DEPARTMENT OF MICROBIOLOGY

UMARU MUSA YAR'ADUA UNIVERSITY, KATSINA

Book Of ABSTRACTS

FOR THE

2nd

Umyu Conference On Microbiology And Related Sciences, 2024

THEME

Advances in Microbiology and related Sciences: Current state and future trends

With Support from

SOCIETY FOR EXPERIMENTAL BIOLOGY

DATE

Tuesday 27th – Thursday 29th February, 2024

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CONFERENCE VENUES/ACCOMMODATION COMMITTEE

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PROGRAMME OF EVENTS

Days/Times	Events
Day 1: Tuesday, 27th February, 2024	
8:00 am – 5:00 pm	Arrival and registration of participants
5:00 pm	Day 1 Closure
Day 2: Wednesday, 28th February, 2024	
9:00 am	Arrival of participants
9:30 am	Arrival of invited guests
9:40 am	Arrival of the Chairman of the Occasion, the Honourable Commissioner of Higher, Vocational and Technical Education, Katsina State, Professor AbdulHamid Ahmed, the Chief Host, Professor Shehu Salihu Muhammad, the Vice Chancellor, Umaru Musa Yar'adua University, Katsina, and Principal Officers of the university
9:45 am	Arrival of the Visitor to the University and Special Guest of Honour, His Excellency, the Executive Governor, Katsina State; and his entourage
9:45-9:50 am	National anthem and national pledge
9:50-9:55 am	Opening prayer
9:55-10:00 am	Introduction of guests
10:00-10:05 am	Declaring the Conference Open by the Chairman of the Occasion, Professor AbdulHamid Ahmed, the Honourable Commissioner of Higher, Vocational and Technical Education
10:05-10:10 am	Welcome Address by the Host and Chairman, Conference Organizing Committee, Dr. Kamaluddeen Kabir, Head, Department of Microbiology
10:10-10:15 am	Remarks by the Chief Host, Professor Shehu Salihu Muhammad, the Vice Chancellor, Umaru Musa Yar'adua University, Katsina
10:15-10:30 am	Departure of guests

10:30-11:00 am	Tea break
11:00 am-12:00 noon	Lead Paper Presentation: Advances in Microbiology and Related Sciences for Sustainable Development: The CRISPR-Cas 9 Revolution by Professor Yusuf Yahaya Deeni (Federal University, Dutse)
12:00 noon-1:30 pm	Technical sessions (including virtual presentations) begins
1:30 pm-2:00 pm	Zuhr prayer and lunch break
2:00-4:30 pm	Technical sessions (including virtual presentations) continue
4:30-5:00 pm	Asr prayer break
5:00 pm	Day 2 Closure
Day 3: Thursday, 29th February, 2024	
9:30-10:00 am	Breakfast
10:00 am -1:00 pm	Resumption of technical sessions
1:00-2:00 pm	Zuhr prayer and lunch break
2:00-3:50 pm	Conclusion of technical sessions
3:50-3:55 pm	Vote of thanks by Dr. Zubairu Umar Darma, Secretary, Conference Organising Committee
3:55-4:00 pm	Closing prayer
4:00-4:30 pm	Asr prayer break
4:30-5:00 pm	Issuance of certificates
5:00pm	Departure of participants

LIST OF ABSTRACTS

2nd UMYU Conf/2024/001

ANTIMICROBIAL ACTIVITY OF *Jatropha curcas* SAP ON SELECTED MICROORGANISMS

Zakari David Adeiza[1,3], Olaitan C.O[1,3], Bello, Kizito Eneye[1], [4], Edegbo Emmanuel[1], Olorunmowaju Abiodun Israel[1,] Shuaib Yusuf Danjuma[2]

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ABSTRACT
Jatropha curcas sap is used for medicinal purposes. It has played a major role in the treatment of various diseases including bacterial and fungal infections. This study evaluated the antimicrobial activity of *Jatropha curcas sap* against selected microorganisms (*Shigella spp, Staphylococcus aureus, Salmonella spp, Candida albicans and Trichophyton spp*) using standard procedures. The qualitative phytochemical screening of the sap reveals the presence of saponins, alkaloids, flavonoids, tannins, carbohydrate, *glycosides* while Steroids was absent. It was observed that the test organisms were more susceptible at high concentration which is 100. The highest zone of inhibition for bacteria was observed on *Staphylococcus aureus* and the lowest zone of inhibition was on Salmonella sp. For fungi the highest zone of inhibition was on *Candida albicans* and the lowest zone of inhibition was on *Trichophyton sp*. There was no zone of inhibition for water which serves as negative control. But there was zone of inhibition for the positive controls; Ciprofloxacin and Ketoconazole. *Jatropha curcas sap* is a potential antimicrobial substance, active against Gram negative and Gram-positive bacteria and some fungi. It is therefore a potential antimicrobial agent.
Keywords: *Jatropha curcas, Shigella spp, Staphylococcus aureus, Salmonella spp, Candida albicans and Trichophyton spp*

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EFFECT OF HYDROETHANOLIC EXTRACT OF *Carica Papaya* SEED ON THE HAEMATOLOGICAL PARAMETERS AND LIPID PROFILE OF MALE WISTAR RATS

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ABSTRACT
In Nigeria today, most rural communities depend on plant-based products for phytochemicals to satisfy medicinal requirements. Plant products are generally considered safe and effective against various human ailments. *Carica papaya* is a fast-growing tree-like herbaceous plant in the family *caricaceae* with four genera. This research aimed to investigate the effect of hydromethanolic extract of *Carica papaya* seed on haematological parameters and lipid profile in Male wistar Rat. Fresh *Carica papaya* seeds were collected locally in Katsina State from fruit sellers. The tree was identified and confirmed by a botanist at Department of Biological Sciences of Al-Qalam University in Katsina.A total of 25 male wistar Rats weighing between 120+2.33 grams were

used. The rats were fasted for 6 hours before the experiment but allowed free water access. The experimental rats were randomized entirely into five groups of five animals each. The phytochemical constituent of the seed was determined quantitatively using UV spectrophotometric method, Hematological parameters were determined using Hematology Analyzer (Medonic CA 620 VET, Stockholm, Sweden), total cholesterol, Low Density Lipoprotein (LDL) cholesterol, High Density Lipoprotein (HDL) cholesterol and triglyceride were determined using the spectrophotometry method (i.e using their respective reagents kits from Randox laboratory limited, U.K.). The results revealed that there is no significant different in the mean concentration of HB, RBC and PVC at ($p<0.05$) after administration of 50mg of CPSE when compared to control. While in group C and D showed significant decrease in the mean concentration of HB, RBC and PCV after administration of 100mg and 200mg of CPSE when compared to control. The Result also shows that there was no significant difference ($p<0.05$) in the levels of TC and TAG at 50mg, 100mg and 200mg/kg body weight of the plant extract when compared to control. Also, no significant difference ($p>0.05$) was observed in the level of HDL at 50mg, 100mg and 200mg/kg body weight of the plant extract when compared to control.

Keyword: *Carica papaya*, seed, hematological parameters, lipid profile and Male Wistar Rat.

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PROXIMATE, VITAMINS, *IN VITRO* ANTIOXIDANT AND FUNCTIONAL ANALYSIS OF SOME POLYHERBAL FORMULATIONS AS POTENTIAL BOTANICAL CANDIDATES FOR PHARMACEUTICAL SCREENING. GINGER, GARLIC AND CLOVE

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ABSTRACT

The drawbacks and side effects of current medications have drawn interest in medicinal plants as possible sources of novel pharmacologically active molecules. This study delves into the medicinal possibilities of three widely utilized herbs: ginger (*Zingiber officinale*), garlic (*Allium sativum*), and clove (*Syzygium aromaticum*). Additionally, the study evaluates the combined formulations of these herbs through proximate analysis, antioxidant activity assessment, functionality tests, and vitamin composition determination. Proximate examination of several formulations revealed differences in the content of moisture, ash, protein, fat, fibre, and carbohydrates. The formulations' general nutritional profile appears to be constant despite variations in formulation, as indicated by statistical analysis that found no significant differences ($P > 0.05$) between them. Analysis of vitamin compositions revealed clear differences between formulations, with varying amounts of Vitamins A, C, and E in each combination. Despite this, the ANOVA analysis revealed no statistically significant variations ($P > 0.05$) in the vitamin makeup among the formulations, suggesting a rather consistent average vitamin content. Although statistical analysis showed no significant differences ($P > 0.05$) in these functional qualities among the formulations, functional analysis showed variations in the formulations' capacity for absorbing glucose, oil, and water. With respect to antioxidant activity, the formulations displayed differing levels of DPPH scavenging activity; GG'C showed the greatest efficacy whereas GG' showed comparatively lesser scavenging capability. Significant variations in antioxidant activity ($P >0.05$) between formulations were verified by statistical analysis. These results call for more research and focused applications in medical settings by pointing to the possibility of using particular combinations of ginger, garlic, and clove to produce intended therapeutic benefits.

Keywords: Ginger, Garlic, Clove, polyherbal formulation, proximate, vitamins

2nd UMYU Conf/2024/004

PROXIMATE, VITAMINS, *IN VITRO* ANTIOXIDANT AND FUNCTIONAL ANALYSIS OF SOME POLYHERBAL FORMULATIONS AS POTENTIAL BOTANICAL CANDIDATES FOR PHARMACEUTICAL SCREENING. TURMERIC, CORIANDER AND MINT LEAVES

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ABSTRACT

Conventional drugs have numerous side effects, toxicity, and microbial resistance, making them unsafe for consumption. Polyherbal formulations are popular due to their potency, low cost, clinical efficacy, safety, and success in chronic conditions. The study aims to evaluate the proximate, vitamin, functional, and antioxidant activity of polyherbal formulations of Turmeric, Coriander, and mint leaves as potential botanical candidates for pharmaceutical screening. Thus, addressing these issues and improve access to drugs for individuals by focusing on polyherbal formulations (PHF) as a potential solution. All analysis conducted were determined according to standard assay guideline. The proximate analysis shows no significant difference among the formulations ($p>0.05$) with TCM showing a nutritional profile shift because of the combination of the herbs than single herbs. In the vitamin composition, Vitamin A displays pattern among the formulations with TC and CM showing higher value than TM and TCM which are in turn better than the single herbs. Vitamin C fluctuates across the formulations, TM displays higher while T shows the lowest. Vitamin E content remains relatively stable among the formulations with a difference from the single herbs. In the functional properties, GAC displays notable variations among the formulations. TCM exhibits the highest GAC at 14.7% indicating its superior ability to absorb glucose. TC, CM, TM and the single herbs shows the comparatively lower GAC value. WAC also varies among the formulations. TCM displays lower WAC compared to TC, TM and CM. The single herbs show the lowest WAC. OAC shows intriguing trends across the formulations. TCM and TC exhibit similar OAC while CM shows a slightly higher OAC and TM displays better than single herbs showing no significant difference ($p>0.05$). In the antioxidant Activity, TCM shows lightly higher scavenging activity in 40, 80 and 120mg/ml concentrations than other formulations. The outcome of this study has led us to conclude that employing safe combinations of these herbal formulations for the production of nutraceuticals is recommended.

Keywords: Turmeric, Coriander and Mint Leaves, polyherbal formulation, proximate, vitamins

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ANTIBIOTIC RESISTANCE PATTERNS OF BETA-LACTAMASE-PRODUCING *Escherichia coli* FROM *Kindirmo* IN NASARAWA TOWN, NASARAWA STATE, NIGERIA

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ABSTRACT
Milk and milk products have been found to be a major vehicle for the transmission of antibiotic-resistant pathogens to man. This study determined the antibiotic resistance patterns of beta-lactamase-producing *Escherichia coli* from *Kindirmo* in Nasarawa town, Nasarawa State, Nigeria. A total of one hundred and sixty-nine samples were collected from April 2023 to August 2023, from the four sampling points selected for this study. The samples were analyzed using standard microbiological procedures. The results showed that, out of the 169 samples examined, 10 were contaminated with *Escherichia coli,* giving a prevalence of 5.92%. The presumptive *Escherichia coli* colonies obtained were identified using conventional biochemical tests. All of the isolates obtained tested positive for beta-lactamase production by iodometric method. The beta-lactamase-producing *E. coli* strains were evaluated for their susceptibility to a panel of 10 antibiotics, using the agar-disc diffusion technique. The *E. coli* strains exhibited complete resistance (100%) to Ampicillin, Septrin, Nalidixin acid, Ceprorex, Streptomycin, and Augmentin. Seventy percent (70%) and 50% of the isolates were susceptible to Tarivid, Reflacine, and Gentamicin respectively. Six (6) antibiotic resistance patterns were recorded among the beta-lactamase-producing *E. coli* strains. The occurrence of beta-lactamase-producing *E. coli* in *Kindirmo* as recorded in this study, suggest that, consumption of the product in the area studied constitute a hazard to consumers. Relevant authorities should impose basic hygiene requirements during production and selling of the product so as to safeguard public health.

Keywords: Antibiotic Resistance, Beta-lactamase, *E. coli*, *Kindirmo,* Nasarawa State, Nigeria

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POTENCY EVALUATION OF SOME DISINFECTANTS AGAINST BACTERIA ISOLATED FROM THE SURFACE OF AUTOMATED TELLER MACHINES

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ABSTRACT
An Automated Teller Machine (ATM) is an electronic unattended banking outlet, which allows customers to complete basic banking transactions without a direct branch interaction or a branch representative or teller. It has been widely used due to its convenience but also serves as a source of bacterial contamination. This work was carried out to isolate the pathogenic bacteria associated with ATMs and to evaluate the potency of the commonly sold disinfectants (Izal, Parazone and Dettol) on these bacterial isolates. Forty (40) Swab samples were collected from four (4) selected

areas and ten (10) different study sites. Standard plate count was employed for the enumeration of bacterial counts and disc diffusion was used for susceptibility test. The result showed that *Staphylococcus aureus* (35%), *Escherichia coli* (27.5%), *Pseudomonas sp*. (17.5%), *Bacillus sp*. (12.5%) and *Clostridium sp*. (7.5%). *Escherichia coli* was the predominant organism found (27.5%) while *Clostridium sp.* was the least (7.5). *Psuedomonas sp.* had the highest susceptibility to Dettol (40±2.20) and least to Parasol (6±0.00). The findings have shown that the potency of the test disinfectants increases with increase in concentrations. It was noted that the ATMs are contaminated with bacteria that are of medical importance and could be easily transferred from one person to another via contact from droplets during coughing, sneezing and touching with previously contaminated hands. It could thus be concluded that the ATMs studied present a very great risk for cross contamination.

Keywords: ATMs, disinfectants, bacteria, *Escherichia coli*, potency

2nd UMYU Conf/2024/007

MISDIAGNOSIS OF ARBOVIRAL INFECTIONS AS MALARIA AMONG FEBRILE PATIENTS ATTENDING VARIOUS HEALTHCARE CENTERS IN KANO STATE: A SYSTEMATIC REVIEW

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ABSTRACT
Arboviral infections are fast becoming a global public health concern as a result of their sporadic spread, affecting large populations and severely among immunocompromised and pregnant women, resulting in complications and sequence. These mosquito-borne infections pose a diagnostic challenge for physicians in different regions of the world, where clinical symptoms of malaria infections are virtually indistinguishable from those initially seen in many Arboviral infections, including Dengue fever, Zika, and Japanese-Encephalitis viral infections. Due to various limitations of the Nigerian public health system, malaria, and co-infections with Arboviral disease are not routinely and accurately assessed. The outbreaks of arboviral infections are either unnoticed or poorly recorded and underreported. A review of previous studies on the most prevalent febrile diseases in Kano State, Nigeria, was conducted by consulting literature from PubMed, NCBI, Research Gate, Africa Journals Online, Google Scholar, and other databases to source studies within this niche in previous years. Most of the publications consulted highlighted the possibilities and cases of malaria co-infection with several Arboviruses. There is good data to support the fact that arboviral infections have often been misdiagnosed as malaria and, in frequent case, resulted in death reported as malaria mortality. Studies and findings on efficiently preventing misdiagnosis have been report and discussed in various clinical trials, as presented in the reviewed articles. The results suggest that misdiagnosis of Arbovirus co-infections as malaria infections, combined with a lack of virus surveillance and underreporting of Arbovirus infections, increase the potential for undetected and uncontrolled spread of important vector-borne arboviruses becoming public health concerns in Nigeria. The effective use of combo kits for Arboviruses and polymerase chain reactions as a serological model in the diagnosis of malaria strongly recommended for completely excluding cases of Arboviral infection during the diagnosis of malaria.

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MICROBIOLOGICAL QUALITY OF FRESH CUT CARROT FOR PREPARATION OF SALAD IN SOME RESTAURANTS WITHIN UMARU MUSA YAR'ADUA UNIVERSITY KATSINA

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ABSTRACT

The consumption of carrot (*Daucus carota*) in salad has become popular, and because of greater understanding of its health benefits, it is more often eaten raw or with minimal processing. Safety of food is still a public health challenge globally. Therefore, microbiological analysis of fresh carrot for preparation of salad is necessary to ensure food safety, mitigate health risk, prevent economic losses and increase consumer's confidence. This study was aimed to determine the microbiological quality of fresh cut carrot for preparation of salad in some restaurants within Umaru Musa Yar'adua University Katsina (UMYUK). A total of fifteen (15) fresh cut carrot samples (three (3) samples each from five different restaurants labelled A-E) were collected and transported immediately to microbiology laboratory UMYUK under aseptic condition to determine the bacterial and fungal load. This was done by serial dilution and pour plate technique. All samples collected had varying level of contamination, restaurant A had the highest bacterial load (3.04×10^3CFU/g), followed by restaurant C (2.57×10^3CFU/g), then restaurant E (2.54×10^3CFU/g), restaurant D (2.49×10^3CFU/g) and the least was restaurant B (2.2×10^3CFU/g). Restaurant C had the highest fungal count (5.5×10^4CFU/g), followed by restaurant A (4.8×10^4CFU/g), then restaurant D (3.7×10^4CFU/g), restaurant D (3.5×10^4CFU/g) and the least was restaurant B (2.9×10^4CFU/g). Isolates were identified using set of biochemical tests. *Escherichia coli*, *Staphylococcus aureus* and *Salmonella* spp. were the predominant bacterial isolates identified in all samples having 31.0%, 27.6% and 24.1% respectively, whereas *B. cereus* and *B. subtilis* were the least bacterial isolates having 6.9% and 10.3%. *Aspergillus flavus, Saccharomyces* and *Mucor* were the predominant fungal isolates identified in all the samples having 37.1%, 25.7% and 17.1% respectively, the least fungi identified were *Aspergillus niger* and *Penicillium* spp. having 8.6% and 11.4%. This research clearly showed that fresh cut carrot for preparation of salad in UMYUK harbored high microbial load majorly *E. coli*, *S. aureus* and *Aspergillus flavus* which could pose a potential hazard to consumers. There is an urgent need for adhering to Good Manufacturing Processes (GMP) in handling of fresh cut carrot for preparation of salad.

Keywords: Carrots, salad, *E. coli*, *Aspergillus* species, restaurant

2nd UMYU Conf/2024/009

ISOLATION, CHARACTERIZATION AND ANTIBIOGRAM OF *Klebsiella pneumoniae* FROM URINE SAMPLES OF PATIENTS ATTENDING AHMADU BELLO UNIVERSITY MEDICAL CENTER, ZARIA, KADUNA STATE

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ABSTRACT
Klebsiella pneumoniae is the second most leading cause of Urinary Tract Infection (UTI) after *E. coli*. The study aimed to determine the prevalence and antibiotic susceptibility of *K. pneumoniae* among patients attending Ahmadu Bello University Medical Center, Zaria. Fifty (50) urine samples were collected from patients and analyzed by culture, microscopy and biochemical tests. A structured questionnaire was administered to the patients to determine socio-demographic and risk factors associated with *K. pneumoniae* infection. From the research conducted, a prevalence of 16% (8 out of 50) was obtained for *Klebsiella pneumoniae*. The prevalence in relation to socio-demographic factors revealed patients within the age group of 26-38 years (23.5%), male (23.8%) and those with tertiary level of education (17.1%) had the highest prevalence. Prevalence in relation to risk factors showed patients without underlying ill-health condition (16.2%) and those not using urinary catheter (16%) had higher prevalence. The most predominant symptom reported by the subjects was frequent urge to urinate (15.6%) followed by painful urination (15.4%). *K. pneumoniae* isolates were susceptible to Ciprofloxacin (87.5%), Gentamicin (75%) but resistant to Chloramphenicol (62.5%). Therefore, Ciprofloxacin and Gentamicin could be used as drug of choice for *K. pneumoniae* infections.

Keywords: Isolation, characterization, antibiogram, *Klebsiella pneumonia*, urine, Zaria

2nd UMYU Conf/2024/010

OCCURRENCE OF E*scherichia coli* IN TAP WATER OBTAINED FROM HOSTELS OF AHMADU BELLO UNIVERSITY, MAIN CAMPUS, SAMARU, ZARIA KADUNA STATE

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ABSTRACT
Water is indispensable to life, however contamination by microorganisms often make it unsafe for consumption. *Escherichia coli* is the most common coliform that is used as an indicator of water quality and faecal contamination. The aim of the study was to investigate the occurrence of *Escherichia coli* in tap water from hostels of ABU main campus Samaru, Zaria. A total of eight (8) samples were collected, two (2) of which were treated and untreated water from ABU Dam and the remaining six (6) were collected from the female hostels. The samples were transported to the Laboratory of the Department of Microbiology for analysis. The physicochemical parameters and microbiological quality of the water samples were determined. The findings of the study showed the physicochemical parameters of the water samples as follows; temperature (24.1-26.4), pH (6.95-7.68) which fall within the WHO range, turbidity (101-112) which was above WHO limits; dissolved oxygen (2.2-3.1) and biological oxygen demand (0.9-1.5) which were lower than the WHO limits. The occurrence rate of 66.7% was obtained for *E. coli* in the water samples. Regular testing of tap water should be conducted in the campus in order to ensure its potability.

Keywords: Occurrence, E*scherichia coli*, tap water, Zaria

2nd UMYU Conf/2024/011

RECENT ADVANCES IN THE DELIVERY, MECHANISM OF ACTION AND ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES

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ABSTRACT
Nanoparticles, particularly silver nanoparticles (AgNPs), have transformed various fields such as microbiology, biotechnology, pharmacy, and medicine due to their unique properties. This study digs into the vast potential of AgNPs in antimicrobial therapy, focusing on recent advancements in their delivery systems, stepwise mechanism of action and antimicrobial activity. Effectively delivering AgNPs to specific sites within the body remains a challenge, prompting innovations in nanotechnology. Nanogels, liposomes, and polymer-based nanoparticles have emerged as promising delivery vehicles, enhancing AgNPs' stability, bioavailability, and controlled release. The antimicrobial activity of AgNPs is entrenched in their distinctive physicochemical properties, including high surface area and reactivity. They disrupt bacterial cell membranes, leading to increased permeability, cell death, and interference with intracellular components. Furthermore, AgNPs inhibit biofilm formation, a common bacterial defense mechanism against antibiotics. Despite their potential, addressing challenges related to cytotoxicity and refining delivery methods remains crucial. This review comprehensively explores the advance method of delivery, mechanisms of action and antibacterial activity of AgNPs, shedding light on their effectiveness against antibiotic-resistant bacteria and the bactericidal/bacteriostatic actions they exhibit.

Keywords: Anti-microbial resistance, delivery, mechanism of action, silver nanoparticles

2nd UMYU Conf/2024/012

HEPATITIS E VIRUS INFECTION AMONG PEOPLE LIVING WITH HIV/AIDS IN KANO STATE, NIGERIA

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ABSTRACT
Hepatitis E is an emerging viral disease-causing acute hepatitis worldwide which may result into a chronic hepatitis especially in immunocompromised individuals. The study determined the prevalence of Hepatitis E Virus (HEV) among people living with Human Immunodeficiency Virus (HIV) infection in Kano State. One hundred and eighty (180) subjects were enrolled for the study and their sera were screened for Hepatitis E Virus Antigen using Enzyme Linked Immunosorbent Assay (ELISA- Wantai Diagnostics, Beijing). Twelve (6.7%) were found to be positive for HEV antigen comprising 7 (58.3%) males and 5 (41.7%) females ($p<0.05$) and was common among subjects aged 35-44 years old (41.7%). Preponderance of HEV antigen was also found among subjects with primary school level of education 5 (41.7%), entrepreneurs 8 (66.7%), those with HIV duration of 3-5 years 8 (66.7%), those on the first line of antiretroviral treatment (ART) 10 (83.3%) or used borehole as a source of water 8 (66.7%). The study provided evidence that HEV is present among people living with HIV in Kano State. There is need to intensify enlightenment campaign among the populace about the disease so as to limit its spread in the community.

Keywords: Hepatitis E virus, HIV/AIDS, Kano

2nd UMYU Conf/2024/013

EXPRESSING THE ISOLATION AND IDENTIFICATION OF MYCOBACTERIUM TUBERCULOSIS COMPLEX (MTBC) WITH TBAGMPT$_{64}$, GENE EXPERT AND MODIFIED LOWENSTEIN-JENSEN MEDIUM

Okoye, L.A, Owuama, C.I and Ewansiha, J U

ABSTRACT

Tuberculosis (TB) is a highly infectious disease potentially fatal for humans and other animals. It infects mainly by aerosol transmission from the respiratory secretion of infected patients to their contacts. To diagnose and treat TB, isolation, identification and confirmation of *Mycobacterium tuberculosis* complex (MTBC) which cause TB are the important steps required. These are made possible by using a chromatogenic technique (TBAGMPT64), GeneXpart technology, a modified Lowenstein-Jensen medium. Five locations from Jalingo Local Government Areas (LGA) were sampled for TB infections. Three hospitals and two Medical Laboratory sites were used. A total of 1320 patients participated. From Federal Medical Center (FMC) Jalingo were 278(21.0%). Taraba State Specialist Hospital (TSH) had 260(19.7%),244(18.5%) from Town Dispensary, 268 (20.3%) patients from Delights Medical Laboratory Service (DMLS) and 270(20.9%), Patients from Mimmlins Laboratory were screened with Ziel-Neelsen (ZN) ZN positive patients were 591(44.4%), ZN negative patients were 729(55.2%),571(43.3%) were TBAgMP64 positive, 18(1.4%) TBAgMPT64 negative, 583(44.2%) were TB detected with GeneXpert. The ZN Positive samples cultured on modified L-J medium grew MTB in 5-8 days. This made the analysis of TB infection with the anti-TB drug sensitivity pattern possible within 14 days where GeneXpart is available it can be used with TBAgMPT64 for faster detection and determination of MTBC. This study will be useful for future researches. The government is encouraged to use the methods applied here in the diagnosis of tuberculosis at all levels.

Keywords: TBAgMPT64, GeneXpart, MTBC Modified L-J, Isolation, identification

2nd UMYU Conf/2024/014

UNLOCKING NATURE'S ARSENAL: THE *in vitro* INHIBITORY POTENTIAL OF *Jatropha tanjorensis* LEAF EXTRACTS AGAINST *Plasmodium falciparum*

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ABSTRACT

The ability of *Plasmodium falciparum* to infect erythrocytes of all ages and escape splenic clearance in the human blood makes it the deadliest and most prevalent malaria parasite worldwide especially in Africa. This study evaluated the *in vitro* anti-plasmodial activity of *Jatropha tanjorensis* leaf extracts against the early and late trophozoite stages of *Plasmodium falciparum* intraerythrocytic cycle. *Ten* (10) malaria positive blood samples were collected the from Ahmadu Bello University Medical Centre, Samaru Main Campus, Zaria, Kaduna State, Nigeria. The samples were confirmed and cultured *in vitro* and the resulting *Plasmodium falciparum* isolates were screened with artemether oil-based injection. The Artemether susceptible *Plasmodium falciparum* isolates with the highest IC_{50} values were selected and synchronized to the early trophozoite stage for the extract susceptibility assay.

The synchronicity was preserved up to the late trophozoite stage for another round of extract susceptibility assay. The *in vitro* culture showed a varying increase in percentage parasitemia of the malaria parasite positive blood samples relative to the initial parasitemia. The susceptibility pattern of the isolates to artemether indicated complete susceptibility with IC_{50} values that ranged from 0.24 µmol/L to 0.77 µmol/L. The anti-plasmodial activity of *J. tanjorensis* leaf extracts against the early and late trophozoite stages of *Plasmodium falciparum* revealed that sequential ethyl acetate extract elicited the highest *in vitro* anti-plasmodial activity with IC_{50} values that ranged from 4.77 µg/ml to 5.83 µg/ml ($p < 0.05$) when compared to the positive control. The isolates recorded reduced susceptibility to artemether lumefantrine but recorded complete susceptibility to quinine as both standard drugs were used as positive controls in the extract susceptibility assay. Although the synchronicity of *Plasmodium falciparum* intraerythrocytic stages in the culture system is easily lost, more studies on the anti-plasmodial activity of *J. tanjorensis* leaf extracts against all the intraerythrocytic stages of *Plasmodium falciparum* should be conducted in order to fully understand the specific target site of anti-plasmodial activity.

Keywords: *Jatropha tanjorensis* leaf extracts, *Invitro* inhibitory potential, *Plasmodium falciparum*.

2nd UMYU Conf/2024/015

Acinetobacter baumannii: A RISING HOSPITAL SUPERBUG

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ABSTRACT
Acinetobacter baumannii is a human pathogen that causes various infections, such as pneumonia, bacteraemia, endocarditis, skin and soft tissue infections, urinary tract infections, and meningitis. It is also a major cause of healthcare-associated infections, both in hospitals and in the community. *A. baumannii* has developed resistance to multiple antibiotics and is considered a serious global public health threat. The aim of this review is to highlight the increasing infections caused by this organism and the challenges in its treatment and prevention. We searched the literature for relevant articles on *A. baumannii* infections, epidemiology, resistance mechanisms, and control measures. We focused on the risk factors for acquiring resistant *A. baumannii* in hospitals, especially in the intensive care unit (ICU), where the organism is endemic. We also discussed the potential strategies to cobat the infection, such as novel vaccines and immunotherapies. We found that *A. baumannii* has a remarkable ability to adapt to harsh environments and to acquire resistance genes rapidly. It is now resistant to most commonly used antibiotics, including carbapenems, which are considered the last resort for treating Gram-negative infections. The World Health Organization has classified carbapenem-resistant *A. baumannii* as a Priority 1 (critical) pathogen that urgently needs new antibiotics. *A. baumannii* is a formidable hospital superbug that poses a serious challenge to infection control and antimicrobial stewardship. The key measures to prevent and contain the spread of this organism include hand hygiene, environmental cleaning, surveillance, and rational use of antibiotics.

Keywords: *Acinetobacter baumannii*, Superbug, Healthcare associated infection, Resistance

2nd UMYU Conf/2024/016

BACTERIOLOGICAL AND MYCOLOGICAL ASSESSMENTS OF SECOND-HAND WEARS PROCURED FROM GIREI AND JIMETA MARKET, ADAMAWA STATE, NIGERIA

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ABSTRACT
Second hand clothes, Okrika or Gwanjo as is commonly called in the study area, are highly patronized by Nigerians. They are purchase and worn without proper consideration of the health implications, there are very little information on the attending health implications thereby subjecting the users to possible infections by pathogenic bacteria and fungi. This study examined the level of microbial contamination of these types of clothes and the relationship between the different categories of the clothes and microbial species contaminants. Second hand clothes which include shirts, trousers, vest, socks, and shoes were bought from three different Markets in Girei, Yola North and Yola South Local Government areas of Adamawa State, Nigeria. Isolation of organisms was carried out using Standard Plate Count Methods. Isolates were identified through morphology and appropriate biochemical methods. Chi square test (*P*-value $\geq$ 0.05 significant) was carried out to analyze some of the data obtained. The most frequently isolated bacteria were *Staphylococcus aureus*. Other bacteria isolated are *Pseudomonas spp,* and *E. coli.* A total of four fungal species were identified by macroscopic and microscopic identification. These are *Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger and Trichophyton rubrum.* Trousers had the highest bacteria count ($109.5x10^2$cfu/ml) while shoes had the highest fungal count ($8.0x10^4$cfu/ml). The data obtained shows there's no significant association between fungi species and the categories of clothes with (*P*-value=0.158) but there is significant association between bacterial species isolated and the categories clothes analyzed (*P*-value=0.02). It has become apparent that these type clothes are potential carriers of pathogens for skin infections and other diseases.

2nd UMYU Conf/2024/017

PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF ANTIBIOTIC RESISTANT *Listeria monocytogenes* ISOLATED FROM DIFFERENT FOOD SAMPLES IN YOLA

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ABSTRACT
Listeria monocytogenes is an opportunistic bacterial pathogen that has been implicated in several lethal illness outbreaks. Future outbreaks may be more complicated to manage because of the surfacing of antibiotic resistance among *L. monocytogenes* strains isolated from food products. The aim of this study was to determine the phenotypic and genotypic antibiotic resistance of *L. monocytogenes* previously isolated from different food samples in Yola. Disc diffusion method was used to determine the phenotypic antibiotic resistance of the

isolates while polymerase chain reaction (PCR) amplification of antibiotic resistance genes was done to determine their genotypic antibiotic resistance. Some of the isolates were multi-drug resistant with high resistance to Beta Lactams and sulfonamides. Percentage resistant to ceftriaxone, ampicillin, augmentin, cefuroxime and sulfamethoxazole/trimethoprim were 100%, 72.7%, 64.0%, 64.0%, and 54.5% respectively and antibiotic resistance genes $bla_{CTX\text{-}M}$, bla_{TEM}, and *sul*1 were detected in all the phenopically resistant isolates. All the phenotypically antibiotic resistant *L. monocytogenes* isolates harbored antibiotic resistant genes and are therefore genotypically resistant to these antibiotics.

2nd UMYU Conf/2024/018

PHYTOCHEMICAL ANALYSIS AND ANTIBACTERIAL ACTIVITY OF AQUEOUS AND ETHANOLIC EXTRACTS OF *BOSWELLIA DALZIELII* ON CLINICAL ISOLATES OF *Escherichia coli* and *Salmonella Spp.*

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ABSTRACT

Boswellia, also known as African or Mali frankincense, is a tree native to West African savannas, notably Mali, Nigeria, and Cameroon. Recognized for its aromatic resin, obtained through traditional tapping, the tree holds medicinal and cultural value. Its resin, long used in traditional medicine, is believed to possess anti-inflammatory properties. Stands out for its ecological significance and cultural importance. In this research the stem bark was harnessed using two different extraction methods (aqueous and ethanolic extraction) for preliminary phytochemical, as well as antibacterial activity. The phytochemical screening of the extracts was carried out using standard methods while the antibacterial activity was carried out using agar well diffusion method. The results for the phytochemical screening showed the presence of most of the phytochemicals tested; including Flavonoids, Saponins and Phenols in both ethanolic and aqueous extract. The results for the antibacterial activity showed varying degrees of antibacterial activity against the bacterial isolates (*E. coli and Salmonella spp).* However, crude ethanolic extract showed a relatively higher zone of inhibition than aqueous extracts. The range of zone of growth inhibition using ethanolic extract (8.00 mm 16.0 mm) was significantly higher than zone of growth inhibition using aqueous extract (6.00 mm 14.0 mm). Minimum inhibitory concentration (MIC) for the ethanolic and aqueous extract against the test organisms was observed as 200mg/ml and 600mg/ml respectively. However, the values of the Minimum bactericidal concentration (MBC) for both extracts against the test organisms remained the same (200mg/ml and 600 mg/ml) respectively. The result of this work gives significant insight as to the adoption of the ethanolic extract of *Boswellia* stem bark as an effective antibacterial agent.

Keywords: Boswellia, ethanolic extract, MBC, MIC, antibacterial agent

2nd UMYU Conf/2024/019

PHYTOCHEMICAL AND ANTIMICROBIAL ACTIVITY OF BITTER KOLA (*Garcinia kola*) EXTRACTS AGAINST SOME PATHOGENS ASSOCIATED WITH HALITOSIS

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ABSTRACT
Halitosis is medically known as the terrible breath and oral odor exhaled from the oral hollow space. This research aimed at the antimicrobial activity of *Garcinia kola* against some pathogens associated with halitosis. *Garcinia kola* was obtained from Antique market Lokoja in a sterile polythene bag and taken to Herbarium at the Department of Biological Sciences, Federal university Lokoja for identification and authentication. Sabaroud Dextrose Agar and Nutrient Agar were the media used, all media were prepared according to manufacturer's instructions and guideline. Agar well diffusion method was employed to determine the antimicrobial activity of *Garcinia kola* at the concentrations of 50 mg/ml, 75 mg/ml and 100 mg/ml against some clinical isolates; *Staphylococcus aureus, E.coli* and *Candida albicans*. The results obtained showed that bitter kola extracts exhibited antimicrobial activity at concentration of 100 mg/ml, with zones of inhibition ranging from 10 to 15mm, the extracts also showed antifungal activity against *C. albicans*. The minimum inhibitory concentration (MIC) showed antimicrobial activity at lowest concentration of 0.005mg/ml and maximum concentration of 5.0mg/ml against *Staphylococcus aureus*. Phytochemical screening showed the presence of the following active compounds namely; flavonoids, tannins, saponins, steroids, cardiac glycosides, and reducing sugars. The results revealed that the aqueous extracts of *Garcinia Kola* seed possess strong antibacterial and antifungal properties when compared with standard antibiotics Amoxicillin; Ciprofloxacin; Tetracycline and Streptomycin used during the investigation. The findings of this study recommend the use of bitter kola to treat halitosis.
Keywords: Halitosis, bitter kola, antimicrobial

2nd UMYU Conf/2024/020

ETHNOBOTANICAL SURVEY AND ANTIBACTERIAL ACTIVITY OF *Ziziphus Mauritiana* (Buck Thorn) LOCALLY USED FOR THE TREATMENT OF FOOD POISONING IN SOKOTO STATE

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ABSTRACT
Foodborne illness is caused by *Escherichia coli* a Gram-negative enteropathogenic bacteria which causes gastroenteritis, and *Staphylococcus aureus* which causes Staphylococcal food poisoning, when outbreaks occurred during large social events, chaotic situations resulted requiring the rapid implementation of medical care for a high number of cases. The preliminary ethnobotanical survey was carried out using questionnaires distributed to respondents in Sokoto state, after the survey, the plant with the highest citation (*Ziziphus mauritiana*, Buck thorn) was selected. Qualitative and Quantitative phytochemical screening was done using standard methods. The antibacterial analysis was conducted using the agar well diffusion method, the MIC and MBC were also determined. The phytochemical analysis revealed the presence of several secondary

metabolites. The aqueous extract of *Ziziphus mauritiana* (Buck thorn) tested against both the ATCC standard strains and clinical isolates of *Escherichia coli* and *Staphylococcus aureus* shows inhibition at all concentrations. The lowest inhibition zone is seen in the clinical isolate of *Staphylococcus aureus* which is 6.80 mm at 100mg/ml and the highest zone of inhibition is shown by both the ATCC standard strains of *Staphylococcus aureus* and *Escherichia coli* having 13.00mm and 14.43mm respectively at 300mg/ml, Streptomycin 21mg was used as positive control. The MIC and MBC of *E. coli* is 9.38 mg/ml and 18.7 mg/ml for both the ATCC standard strain and Clinical isolates respectively. *S. aureus* have 4.69 mg/ml for ATCC standard strain and 9.38 mg/ml for the Clinical isolates. The study proves the plants can be used in the treatment of Gastrointestinal tract infections. More ethnobotanical surveys should be conducted to discover various plants used by locals to treat different ailments.

Keywords: *Food poisoning, Ziziphus mauritiana, Staphylococcus aureus, Escherichia coli*

2nd UMYU Conf/2024/021

BENTHIC MACRO INVERTEBRATES COMPOSITION, DIVERSITY AND DISTRIBUTION OF DABERAM RESERVOIR, KATSINA STATE, NIGERIA

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ABSTRACT
This research has Identify the benthic macro invertebrate's diversity and distribution in Daberam reservoir of Katsina State. The reservoir serves multiple purpose for different individuals ranging from home to some organism, to economic activities such as fishing and irrigation farming around the reservoir. The samples were collected from four (4) different sampling stations (A, B, C and D). Bethic Macro invertebrate collection was conducted around 8:00am monthly for a period of 10 months from each sampling stations using circular framed sieve (250µm mesh size). The samples collected were fixed in the field with 10% formalin and subsequently preserved in 70% ethyl alcohol for further analysis. A standard identification chart (Identification guide to freshwater macro invertebrates) was used to classify the sample into various taxa and species. Abundance and distribution of macro benthic invertebrates were compared using One Way ANOVA) and significant differences between stations was tested using chi-square at 5%. The present study has identified 1492 species of benthic macro invertebrates in Daberam Reservoir of Katsina state. Mullusca (29.63%) is the most dominant group followed by Diptera (22.22%); Coleoptera (14.81%); Oligochaetae (14.81%); Hemiptera (11.11%); Ephemeroptera (3.70%): and Odonata (3.70%) are the least prevalent with only one specie each. *Melanoides tuberculata* was found to have the highest number of occurrences with a total number of 332 individuals across all the sampling sites representing (22.25%). The highest number of benthic macroinvertebrates recorded was in Site D with a cumulative total number of 603 (40.42%) organisms. Site B recorded the least total number of benthic macro invertebrates with cumulative total number of 250 (16.76%) organisms. The low diversity of macro benthic invertebrates in some samples station in the study area was an indication of the presence of high level of pollutants in the water bodies.

Keywords: Abundance, Daberam, Benthic Macro Invertebrates, Diversity, Distribution

2nd UMYU Conf/2024/022

RESPONSE SURFACE METHODOLOGY (RSM) FOR THE OPTIMIZATION OF CAFFEINE-DEGRADING PARAMETERS BY *Bacillus* sp.

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ABSTRACT
Caffeine is an important naturally occurring compound which can be degraded by bacteria. Excessive caffeine consumption is known to have some adverse problems. We isolated a new bacterium from agriculture soil. The bacteria were tested for its ability to utilize caffeine as the sole carbon and nitrogen source. The isolate was Gram-positive and identified as *Bacillus* sp. based on 16S rRNA gene sequencing. Response surface methodology (RSM) was used to optimize the bacterial growth conditions. The parameters were first screened using Plackett-Burman design in order to get the significant parameter for caffeine degradation. The significant parameters were further optimized using central composite design (CCD) and the optimum result was found to be 0.75 g/L caffeine concentration, 1 g/L glucose, 0.4 g/L ammonium sulphate and temperature of 20ºC respectively. RSM predicts a bacterial growth of 0.591. An experiment was then carried out using the optimal parameters identified above to verify the result estimated by CCD. This study demonstrates the possible use of the bacterium with the potential to be used in bioremediating caffeine and wastewater treatments.
Keywords: Caffeine degradation, Central Composite Design (CCD), *Bacillus* sp., Plackett-Burman Design, Response Surface Methodology (RSM)

2nd UMYU Conf/2024/023

CANDIDEMIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC OF MUHAMMAD ABDULLAHI WASE TEACHING HOSPITAL, KANO

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ABSTRACT
As standby opportunistic pathogens, *Candida* species initiate infection from any susceptible part of the body, the common among the disease they causes include oral thrush, oropharyngeal candidiasis and Vulvovaginal candidiasis (especially in pregnancy) from which source the agent disseminates to blood stream causing candidamia. The study aimed to determine the burden of candidamia among pregnant women in the study area. Gram's stain, germ tube test and culture methods were employed to phenotypically identify the different *Candida* species. In the result, a prevalence of 10.4% was recorded and *Candida albicans* was the most isolated specie with 46.43% followed by *C. krusei* 25.0%, *C. glabrata* 21.43%, and *Candida tropicalis* 7.14%. Of the total participants recruited 32.0% were in first trimester, 29.0% were in second trimester while 39.0% were found to be in their third trimester. For the trimester related infection, higher percentage was found in the third trimester with 50.0%, while first and second trimesters had 25% each. On the candidemia result based on age range, those between the age group of 20-29 years had higher number of positive cases 54%.0 while the age bracket less than 20 (<20) years of age had the least 14.0%. It can be concluded therefore that candidamia in pregnancy is a common feature with significant proportion found in the third trimester as observed in the study area.

Keywords: Candidamia, Pregnant women, *Candida* species, Antenal clinic

2nd UMYU Conf/2024/024

CO-EXISTANCE OF MALARIA AND TYPHOID FEVER AMONG FEBRILE PATIENTS ATTENDING KAFIN-MAIYAKI PRIMARY HEALTH CENTRE

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ABSTRACT
Malaria and typhoid fever are two dissimilar but symptomatically similar diseases, because while malaria cases are caused by parasitic agents, the typhoid cases on the other hand are caused by bacterial agents, to be specific, *Plasmodium* species and *Salmonella* species respectively. They both have no gender distinction in terms of their effect but malaria appears to be more serious among children. The study aimed to determine the burden of these two diseases among febrile patients in the study area. In the research procedure, four (4) mL of blood was collected from each participant out of which 2ml were dispensed in to EDTA bottle for use in parasite detection through thin and thick film prepared on glass slide while the other 2mL was dispensed into plain container after which the serum was harvested from it and used for Widal agglutination test, to detect the presence of antibody to *Salmonella* species. Based on the result obtained, malaria and typhoid fever co-existence was found to be 20.9%. The findings with respect to age group revealed age bracket >60 years had higher co-infection rate 75% while the age group 1-12 years had the least infection 10.6%. There was a significant association between the Salmonella co-infection with plasmodium among the age groups (P=0.000019). With respect to gender, females were more prone to be co-infected (53.6%) compared to their male counterpart (46.4%) out of the total positive cases (28) obtained; but there was no statistically significant difference (P=0.157) in the infections among the genders.

Keywords: Malaria, Typhoid fever, Co-infection, febrile subjects

2nd UMYU Conf/2024/025

COMPARATIVE DIAGNOSIS OF URINARY SCHISTOSOMIASIS BY MICROSCOPY AND PCR IN PATIENTS IN SOME SELECTED PRIMARY HEALTHCARE CENTRES IN KEFFI, NORTH CENTRAL NIGERIA

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ABSTRACT
Schistosomiasis is a common Neglected Tropical Disease endemic in many poor rural communities in developing countries, where it is usually not accurately diagnosed due to lack of standard medical laboratory facilities. This study compared the diagnosis of urinary schistosomiasis by microscopy and PCR in patients in some selected primary healthcare centres in Keffi, North-central Nigeria. Urine samples were collected from 200 patients (29 each from Gidan Zakara, Sabon Gida, Jigwada, Angwan Jaba and 28 each from Kowa, Kaibo Mada and Yarkadai PHCs) and information about them was obtained using structured questionnaires. The ova of *S. hematobium* were detected microscopically in the samples using standard sedimentation technique. The DNA of *S. haematobium* was extracted from the samples, amplified and detected by conventional PCR technique using type-specific primers. Data collected were analyzed using

Smith's Statistical Package (version 2.8, California, USA), with a P value of ≤ 0.05 considered statistically significant, and Cohen's Kappa (κ) was used to assess the level of agreement between the two diagnostic methods. Of the 200 patients screened, 6(3.0%) and 15(7.5%) were positive for urinary schistosomiasis by microscopy and PCR respectively indicating fair agreement between the two diagnostic methods (κ=0.3142). There was significant association between gender and urinary schistosomiasis (*P*>0.05), as more males were infected (microscopy:5.8%, PCR:15.1%) than their female counterparts (microscopy:0.9%, PCR:1.8%). Although both age and occupation of patients were not significantly associated with the infection (*P*>0.05), however, higher rate was recorded among pupil/students (microscopy:9.1%, PCR:29.5%) aged ≤14years (microscopy:8.0%, PCR:18.0%). Our results show significant variations between the two diagnostic techniques, with PCR detecting higher rates of urinary schistosomiasis, confirming it to be a more sensitive method for diagnosing the infection. Nevertheless, the choice between these methods should take into account their strengths and limitations, as well as the practical implications for disease prevention and treatment.

Keywords: Schistosomiasis; Microscopy; PCR; Keffi; Nigeria

2nd UMYU Conf/2024/026

ANTIBIOTICS SUSCEPTIBILITY PATTERN OF *Salmonella* SPP FROM STOOL SAMPLE OF PATIENTS ATTENDING GENERAL HOSPITAL, MINNA, NIGERIA

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ABSTRACT
Salmonella species continue to be a major health risk even with the use of antibiotics and the development of more advanced antibacterial drugs. This study aim was to isolate antibiotics susceptibility Pattern of *Salmonella* spp from stool of patients attending General Hospital Minna Niger State. A total of 250 stool samples were collected using sterile container. Isolation of *Salmonella* sp was done by inoculating the samples on *Salmonella Shigella* Agar (SSA) incubate for 24 hours at 37^0C while the isolates were identified using colonial morphology, Gram staining and biochemical tests. From the stool samples collected 27.6% (69/250) *Salmonella* isolates was obtained. Kirby Bauer's method was used for antibiotics susceptibility testing and the results interpreted according to Clinical Laboratory Standard Institute Guidelines (CLSI). The results of antimicrobial susceptibility tests show that Streptomycin and Ofloxacin has the highest susceptibility 49.3% and 44.9% follow by Sparfloxacin 33.3%, Ciprofloxacin 31.9%, Septrim 31.9%, Chloramphenicol 30.4%, Gentamycin 30.4%, Amoxicillin 29.0% while the least susceptibility (high resistant) against Pefloxacin 10.1% and Augmentin 14.5%. The highest resistance was shown to Pefloxacin 62 (89.9%) and the lowest was shown to Ciprofloxacin (27:39.1%). In conclusion *Salmonella* spp showed resistant to Pefloxacin and Augmentin.

Keywords: *Salmonella*, species, Antibiotics, Susceptibility

2nd UMYU Conf/2024/027

THE EFFECT OF TEMPERATURE AND PHOTOPERIOD ON BIOREMEDIATION POTENTIALS OF MONO AND MIXED CULTURES OF CHLOROPHYTE AND CYANOBACTERIA FOR MUNICIPAL WASTEWATER TREATMENT

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ABSTRACT
Investigation on organic xenobiotics bioaccumulation/biodegradation in green algae is of great importance from environmental point of view because widespread distribution of these compounds in agricultural areas has become one of the major problems in aquatic ecosystem. Temperature, light intensity, amount and type of nutrients, amount of CO_2, and pH are the key factors influencing algal growth. Collections of Wastewater Samples were done according to standard method. BG-11 media was prepared for culture of microalgae. Identification and isolation of microalgae was done according to standard method and haemocytometer were used for microalgae cell counting. The results indicated that temperature and photoperiod affect the activities of microalgae; temperature at 25^0C provide with 12:12h light/dark photoperiods show more significant with increases the number of days for both of the species as well as mixed culture, when compared with the treatments at temperature of 10^0C provide with 6/18h light/dark photoperiods. Furthermore, *Chlorogonium sp*. and *Chlorella sorokiniana* showed more response during treatments in increase with the number of weeks when compared with *Microcystis earuginosa* and mixed culture of the species. Therefore, temperature and photoperiod impact potentials of microalgae in the remediation of wastewater effluents.

2nd UMYU Conf/2024/028

ISOLATION AND IDENTIFICATION OF SALMONELLA SPECIES FROM FISH PONDS AND FISH GUTS IN A POULTRY FARM WITHIN KATSINA STATE, NIGERIA.

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ABSTRACT
The contamination of fish with various human pathogens poses a significant threat to human health as it may even lead to an infectious outbreak of the virulent species, including Salmonella. Therefore, there is a need to determine the human pathogens associated with fish ponds and fish (guts) so that appropriate preventive measures can be developed. This study aims to identify the possible Salmonella species associated with fish (in ponds and guts), using bacterial isolation method and biochemical tests. A total of 19 samples were collected (10 fresh fishes, and 9 bottles contained fish pond water). The fish gut and fish pond water were prepared, diluted and plated to obtain bacterial colonies. The appeared growths appeared round, smooth, black-centered colonies, which were subsequently subjected to biochemical characterization after viewing under x10 magnification and evaluated as gram-negative rods. The colony count obtained from fish gut ranged from 1.7×10^{12} to 5.2×10^{12} CFU/mL, and, the colony count obtained from pond water ranged from 2.1×10^{12} to 5.7×10^{12} CFU/mL. The organisms were found to be positive in catalase,

methyl red, and citrate. While negative in oxidase, indole, and urease. The organism produces gas (i.e., H_2S). The antibiotic sensitivity pattern of the organism indicated higher susceptibility to Ciprofloxacin (22 mm), Gentamycin (18 mm), Tarivid (23 mm), and lower susceptibility to Pefloxacin (21mm), Septrin (19 mm), Sparfloxacin (12 mm) and Augmentin (14 mm). The resistivity was only found against Amoxicillin (12 mm), and Streptomycin (8 mm). The study indicated that, the samples collected from the poultry farm in GRA Katsina State contain Salmonella species. Based on these outcomes, fish consumers should always cook fish properly before consumption in order to prevent foodborne diseases. More studies need to be conducted to identify other antibiotics that can be used for the treatment of salmonellosis.

Keywords: Antibiotics, Pathogens, Salmonella, Human, Organisms, Colony, Susceptibility, gram-negative.

2nd UMYU Conf/2024/029

CELLULOLYTIC ACTIVITY OF *Aspergillus Oryzae* AND *Streptomyces Griseus* ISOLATED FROM WASTE DUMP SOIL

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ABSTRACT
The potential of using microorganisms as biological sources of industrially economic enzymes has stimulated interest in the exploitation of extracellular enzymatic activity in several microorganisms. In this research, cellulose utilization by two microorganisms, *Aspergillus oryzae* and *Streptomyces griseus* was studied using cellulose Congo red media. A zone of clearing around the colonies after incubation at 30 ºC for 7days, which confirms the secretion of extracellular cellulase, was used as an indication for cellulose utilization. In the results obtained, *Aspergillus oryzae* showed a zone of clearing of 24.50±0.50 mm while *Streptomyces griseus* showed a wider zone of clearing of 49.00±1.00 mm on the cellulose Congo red agar media. The results indicate that both microorganisms can be dependable producers of the enzyme cellulase, with *Streptomyces griseus* having a higher cellulase-producing ability.

Keywords: Cellulose, Congo red , waste dump, *Aspergillus oryzae*, *Streptomyces griseus*

2nd UMYU Conf/2024/030

THE EPIDEMIOLOGY OF *Bovine fascioliasis:* ASSESSING PREVALENCE AND INVESTIGATING HEMATO-BIOCHEMICAL ALTERATIONS IN KATSINA ABATTOIR NORTH WESTERN NIGERIA

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ABSTRACT
Bovine fascioliasis, caused by liver flukes *Fasciola hepatica* and *Fasciola gigantica*, significantly impacts global cattle health and production. This study aimed to assess the prevalence of bovine fascioliasis and its associated hematobiochemical changes in Katsina central abattoir. A total of

134 cattle faecal samples were examined using the sedimentation technique, revealing a 3.73% infection rate. Notably, females exhibited a higher prevalence (4.55%) compared to males (2.17%), though the difference was not statistically significant (P > 0.05). The age group 2-3 years showed the highest prevalence (25%), while those aged 5 and above had the lowest (1.74%). Among cattle breeds, Wadara had the highest prevalence (20%), while White Fulani exhibited the least (4.93%). Concerning body condition score (BCS), medium-conditioned cattle had the highest prevalence (6.67%), and good-conditioned ones showed the least (1.37%). Hematological analysis of Fasciola-infected cattle revealed significant reductions in packed cell volume (PCV), hemoglobin (Hb), and total erythrocyte count (RBC) (p > 0.05). Additionally, infected cattle demonstrated a significant decrease in white blood cell (WBC) count, mean cellular volume (MCV), and mean cellular hemoglobin concentration (MCHC) compared to uninfected controls. Differential leukocyte counts indicated a notable increase in neutrophils and a decrease in eosinophils, monocytes, and basophils in infected cattle (P > 0.05). Biochemical analysis unveiled significantly elevated levels of alanine transaminase (ALT) and aspartate transaminase (AST), along with increased alkaline phosphatase (ALP) and total bilirubin (TB) in infected cattle. Conversely, albumin (ALB), total protein (TP), and conjugated bilirubin (CB) levels were significantly reduced. Bovine fascioliasis has significant impact on the health and productivity of Cattle. Understanding its prevalence and heamato-biochemical changes is essential for implementing effective control and management strategies.
Keywords: Prevalence, Bovine, Fascioliasis, Haematology, Biochemical parameters.

2nd UMYU Conf/2024/031

ISOLATION AND CHARACTERIZATION OF EXOPOLYSACCHARIDE PRODUCING LACTIC ACID BACTERIA FROM LOCALLY FERMENTED MILK 'NONO'

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ABSTRACT
The aim of this study was to isolate and characterize wild exopolysaccharide (EPS) producing lactic acid bacteria (LAB) strains from locally fermented milk 'nono'. Isolates were characterized based on morphological, physiological, biochemical and molecular characteristics. Eleven EPS producing lactic acid bacteria isolates were characterized to the molecular level. Five (5) of the 11 isolates were identified as *Lactobacillus fermentum,* 2 isolates were identified as *Lactobacillus delbrueickii*, and 1 each as *Lactococcus lactis* and *Lactococcus rafinolactis* respectively. Exopolysaccharide improves the consistency and acceptability of the yoghurt produced from the fermentation of milk.

Keywords: isolation, characterization, exopolysaccharide, LAB, nono.

2nd UMYU Conf/2024/032

COMPARISON OF PHENOTYPIC AND MOLECULAR TEST TO IDENTIFY EXOPOLYSACCHARIDE PRODUCING LACTIC ACID BACTERIA FROM NIGERIAN LOCALLY FERMENTED MILK 'NONO

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ABSTRACT
This study was carried out to compare phenotypic and molecular techniques in the characterization of exopolysaccharide (EPS) producing lactic acid bacteria isolated for locally fermented milk. Eleven EPS producing lactic acid bacteria isolates were subjected to identification using analytical profile index (API) 50CHL test kit (Biomerieux, France) and 16r rRNA sequencing. Results were compared and it was concluded that polyphasic approach is necessary for proper identification of lactic acid bacteria since molecular analysis is most reliable.

Keywords: comparison, phenotype, molecular, identification, LAB

2nd UMYU Conf/2024/033

CLIMATE CHANGE, ENERGY POVERTY AND SUSTAINABLE DEVELOPMENT DILEMMA IN NIGERIA: NECAL 2050 TO THE RESCUE

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ABSTRACT
Climate change has resulted to so many negative impacts in Nigeria especially to the vulnerable population. Nigeria has diverse energy generation potentials, ranging from solar, wind, hydro power, nuclear and bioenergy apart from the abundant fossil fuels including coal, oil and gas. Despite all these, more than half of Nigerians lack affordable and available energy and electricity supply, even the unclean one. Access to the clean and affordable energy is emphasized by the sustainable development goals (SDGs) because without that none of the SDGs will be achieved. Yet, Nigeria at the conference of parties pledged to reduce unconditionally its greenhouse gas emissions by 20% and conditionally by 47% with the international supports by 2030 based on its internationally determined contributions. The biggest question is how will Nigeria fulfill its pledge in the midst of the energy poverty, climate change impacts and the socioeconomic challenges? NECAL 2050 software was developed by the energy commission of Nigeria with the support of UK and the British council. The software models the energy demand, energy supply and greenhouse emissions from now up to 2050. In this work, we present our simulation results as an input to the policy makers on how this issue can be addressed. The results pointed out that Nigeria has to ensure high penetration of renewables, bioenergy, energy efficiency with at least low to medium nuclear intervention.

2nd UMYU Conf/2024/034

ANTIMICROBIAL AND ANTIOXIDANT STUDIES OF SOME LABORATORY PREPARED METAL COMPOUNDS

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ABSTRACT
Manganese, chromium, nickel and copper metal compounds as well as a ligand were prepared and used for this research. They were then characterized and screened for both antioxidant and antimicrobial activities. The antibacterial studies were carried out in vitro using a paper disc diffusion method to determine their activities against *Escherichia coli* (Gram+) and *Staphylococcus aureus* (Gram-). Ciprofloxacin was used as control. Different concentrations (62µg/g to 500µg/g) of all the compounds were used throughout. The result shows that the compounds have well to moderate activity. However, the activity is lower than then that of the standard used. The Manganese and Chromium complexes have the highest values (29mm and 24.5mm) at the concentrations of 250 and 500µg/g against *Escherichia coli* and *Staphylococcus aureus* respectively. All the tested compounds exhibited good to moderate DPPH radicals scavenging activity (42.67 – 62.14%). Ascorbic acid was used as control. The results obtained in both the two studies indicated that the activities are more pronounced when the ligand coordinated to the metal ions.

Keywords: Metal compounds, antimicrobial, antioxidant, *Escherichia coli*, *Staphylococcus aureus*, Ciprofloxacin, DPPH, ligand, ascorbic acid

2nd UMYU Conf/2024/035

PREVALENCE OF FASCIOLIASIS IN CATTLE SLAUGHTERED IN SOKOTO METROPOLITANABATTOIR, SOKOTO, NIGERIA

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ABSTRACT
Fascioliasis, a serious infectious parasitic disease infecting domestic ruminants and humans, tops all the zoonotic helminthes worldwide. A large variety of animals, such as sheep, goats, cattle, buffalo, horses, donkeys, camels and, rabbits, show infection rates that may reach 90% in some areas. The prevalence of fascioliasis in cattle slaughtered in the Sokoto State metropolitan abattoir was investigated which is geographically located at the North Western part of Nigeria. Faeces and bile samples were collected and processed using formal ether concentration technique. Gross lesions from 224 out of 1,313 slaughtered cattle were randomly selected and examined. Out of the 224 cattle examined, 95 (42.41%) were males and 129 (57.59%) were females. Out of 95 male cattle examined, 27 (28.42%) were infected and out of 129 females 35 (27.13%) were infected. Based on breed, infection rates were 31 (31.0%), and 31 (25.2%) for breeds of Sokoto *Gudali* and Red *Bororo* respectively. No infection was recorded in White *Fulani* breed. Lesions

observed were more in males than in females and more in Red *Bororo* than in Sokoto *Gudali*. Overall, prevalence of infection with *Fasciola* was 27.68%. There was no statistically significant association between infection and breed and between infection and sex of the animals sampled ($P > 0.05$). Regular treatment of all animals with an effective flukicide, as well as snail habitat control, tracing source of animals, public enlightenment about the disease, proper abattoir inspection, adequate and clean water supply to animals, and payment of compensation of condemned tissues and organs infested with the parasite by government were suggested. This study would serve to recognize and appreciate the magnitude of problems and losses posed by fascioliasis and also fill the knowledge gaps and update existing information on bovine fascioliasis in Sokoto State and Nigeria at large.

***Keywords**: Abattoir, Cattle, Fascioliasis, Nigeria, Prevalence, Slaughter, Sokoto*

2nd UMYU Conf/2024/036

UNDERSTANDING WATER POLLUTION THROUGH BIOINDICATORS: A REVIEW

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ABSTRACT
Environmental pollution is a severe problem on a global scale that endangers both human health and ecosystems. Comprehending pollution's causes, effects, and patterns is essential to address and mitigate it properly. Bioindicators have emerged as valuable tools in environmental monitoring and assessment, providing insights into the presence and effects of pollutants in various ecosystems. Bioindicators are living things like animals, plants, plankton, and bacteria that are employed to monitor the overall health of an environment. They are employed to evaluate ecosystem, health and biogeographical changes in the background. One organic part of a biological system that gives information about its environment is plankton. It is a crucial biomarker for evaluating water quality and reacts quickly to environmental changes. Knowledge of bioindicators is essential for developing effective strategies to mitigate pollution and protect ecosystems and human health. This paper seeks to provide an in-depth analysis of the application of bioindicators to the study of environmental pollution. It explores the concept of bioindicators, their types, and their applications in environmental contexts, notably water pollution.

Keywords: Bioindicators; Biomonitors; Biomarkers; Pollution

2nd UMYU Conf/2024/037

NUTRITIONAL COMPOSITION AND MINERALS ANALYSIS OF TOMATOES IN SOKOTO, SOKOTO STATE NIGERIA

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ABSTRACT
The work was carried out to determine the proximate and minerals composition of three tomato cultivars namely: DanEka (Cherry), Bahaushe (Beske), and Rom UTC (Pankchin) grown in Sokoto, Sokoto State. The proximate composition of the tomato cultivars was

determined using the Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC, 2000), and the mineral contents were examined using an Atomic Absorption Spectrometre (AAS-3500, thermo Scientific, UK). Proximate analysis revealed that DanEka has the highest moisture contents of (95.2%), Bahaushe with (92.8%) and UTC (90.2%) respectively. Bahaushe and UTC has Ash content of (1.2%) and Daneka of (0.02%). Bahaushe has the highest crude fats of (4%), Daneka (2%) and UTC has the least crude fats of (0.2%). In term of proteins contents UTC has the highest percentage of (1.68%), Bahaushe (0.81%) and DanEka (0.70%). Percentage of Carbohydrate showed that UTC has the highest (91.52%), Bahaushe (90.79%) and DanEka (89.08%). Sodium is found to be higher in UTC (14ppm), Daneka (13 ppm) and Bahaushe (8 ppm). DanEka and Bahaushe has highest concentration of calcium (1.6 ppm) and UTC with (1.5 ppm). UTC has the highest concentration of magnesium and phosphorous of (3.6 ppm) and (0.994 ppm), Bahaushe (3.3ppm) and (0.730ppm), DanEka (2.7 ppm) and (0.795 ppm). The proximate parameters and mineral contents have shown that the cultivars were of high nutritional quality and can be good sources of raw material for industrial use. The lower moisture contents of (Pankchin) UTC could be an indication that it would have longer shelf life thus a good material for storage.

Keywords: DanEka (Cherry), Bahause (Beske), Rom UTC (Pankchin) and Proximate

2nd UMYU Conf/2024/038

HUMAN MYIASIS: ETIOLOGY, PATHOPHYSIOLOGY, CLINICAL MANIFESTATION AND LABORATORY DIAGNOSIS

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ABSTRACT
Human myiasis is a parasitosis found in tropical and Subtropical countries (underdeveloped countries). It usually affects the elderly, unhealthy and mentally disabled individuals. It is caused by dipterous that lay their eggs in necrotic or infected tissues, although areas of the body that are apparently healthy can also be affected. Frequently the fly deposits several eggs on the peripheral parts of scratches and wounds. Myiasis caused by arthropod larvae has been classified in to three types including obligatory myiasis, facultative myiasis and accidental myiasis. Myiasis may be categorized as cutaneous, subcutaneous, or cavitary, according to localization of the embedded larvae. The diagnosis of human myiasis is easily done based solely on clinical grounds, especially in regions where the disease is endemic. Patient history may help identify a possible predisposing factor or travel history. The treatment of myiasis involves mechanical removal of the larvae with hemostatic pincers. Larvae rupture must be avoided. Application of topical ether or similar volatile substance is useful. Preventive approach measures, including basic health care, hygiene, access to primary health service, and safe water and drainage, are fundamental to prevent human myiasis.

Keywords: myiasis, Pathophysiology, Manifestation, Laboratory, cutaneous, diagnosis.

2nd UMYU Conf/2024/039

SERO-PREVALENCE OF TRYPANOSOMIASIS AMONG CATTLES SLAUGHTERED AT KANO ABATTOIR, KANO STATE NORTH WESTERN NIGERIA

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ABSTRACT
African animal trypanosomiasis is a devastating disease of man and animals. Infection by one or more of these trypanosome species results in acute or chronic disease which is characterized by intermittent fever, emaciation, anaemia, loss of appetite, weakness, corneal opacity, occasional diarrhea, parasitemia, coma and death if not treated. The aim of the study was to determine the seroprevalence of trypanosomiasis among cattle slaughtered at Kano Abattoir, Kano state. A total of 91 blood samples were collected from the castle at the point of slaughter. Analysis of animal trypanosomiasis was done using antibody detection test (Bovine Trypanosomes IgG antibody ELISA kit from Melsin Medical Co., Limited, China LOT NUMBER: 20191023) and microhematocrit centrifugation techniques. Out of the 91 samples collected, 13 were positive with trypanosome antibody making the prevalence of 14.3% and 2 motile parasites were detected using microhematocrit technique with 2.2%. The packed cell volume (PCV) of the cattle was measured and the mean±standard deviation of infected and non-infected cattle was found to be 25.69±7.71 and 28.99±7.46 respectively. The association between Trypanosomiasis and anaemia was not statistically significant (p=0.255) because when comparing the infected and non-infected cattle, there is high number of anemic cattle that has no trypanosomiasis infection. Conclusively this finding shows that there is slight rise in seroprevalence of trypanosomiasis when compared to other findings; it is recommended that more epidemiological surveillance should be encouraged in order to prevent the spread of the disease.

Keywords: Seroprevalence, parasitemia, trypanosomiasis, cattle, African, animal

2nd UMYU Conf/2024/40

ANTIBACTERIAL ACTIVITY OF THE ETHANOL AND METHANOL LEAVES EXTRACTS OF *Guiera senegalensis* AGAINST *Staphylococcus aureus* AND *Escherichia coli*

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ABSTRACT
Guiera senegalensis is a versatile tree cultivated in tropical West and North Africa for its medicinal value. Therefore, the qualitative phytochemical composition and in-vitro antibacterial analysis of the Ethanol and methanol extracts of *Guiera senegalensis* leaves were tested scientifically. Phytochemical analysis unveiled the presence of phenols, saponins, steroids, and tannins in both extracts. The result of the in-vitro antibacterial activities of ethanol and methanol extracts at various concentrations (200mg/ml, 150mg/ml, 100mg/ml and 50mg/ml) exhibited significant zones of inhibition (7–10mm) against the tested organisms but the ethanol extract was

highly effective (7mm to 10mm) than methanol (7mm to 8mm). In comparison, the reference antibiotic, Ciprofloxacin, displayed larger zones ranging from (20mm–45mm). The results of the minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) of the plant extracts range between 25–50mg/ml, while the Ciprofloxacin showing no turbidity. These results underscore the substantial bioactive potential of *Guiera senegalensis* extracts, positioning them as promising candidates in herbal medicine for various ailments. The study contributes valuable insights into the medicinal efficacy of Guiera senegalensis, providing a scientific foundation for its application in traditional medicine and emphasizing its potential as a natural antibacterial agent.

Keyword: Antibacterial agent, Herbal medicine, Efficacy and Phytochemical

2nd UMYU Conf/2024/41

ASSESSMENT OF ANTIFUNGAL ACTIVITY OF SODIUM CHLORIDE ON TINEA PEDIS

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ABSTRACT

Tinea pedis, commonly known as athlete's foot, is a fungal infection that affects the skin mostly between the toes. There are several different types of *Tinea pedis*, including Interdigital, hyperkeratotic, vesiculobullous, and ulcerative types. It is one of the most prevalent superficial dermatophyte diseases of the feet. The aim of this study is to assess the antifungal activity of sodium chloride on *Tinea pedis*. Traditionally, sodium chloride, or natural salt, has been suggested to be used as a potential treatment for *Tinea pedis* due to its antifungal properties. Recent research has shown that sodium chloride has a significant inhibitory effect on the growth of various types of fungi, including *Trichophyton ruburum* responsible for causing *Tinea pedis* infection. This study employed an experimental research design to assess the antifungal activity of sodium chloride on Tinea pedis. Purposive sampling method was used during the study and the total number of 10 samples was collected. Agar well diffusion method was adopted as Local antifungal susceptibility testing method, the result shows that sodium chloride is effective in treatment of *T. pedis* with clear zone of inhibitions for each concentration like 9mm, 10mm, 11mm and 14mm. It is recommended that further studies should be conducted on combination of sodium chloride with commercially sold antifungals like ketoconazole Fluconazole, and terbinafine for treatment of *Tinea pedis*.

2nd UMYU Conf/2024/42

ANTIBACTERIAL ACTIVITIES OF AQUEOUS AND ETHANOLIC EXTRACTS OF *Terminalia Catappa* Leaves AGAINST Staphylococcus *Aureus* AND Salmonella *Typhi*.

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ABSTRACT

The leaves of *Terminalia catappa,* the Indian almond, are useful in trado-medicine for the treatment of bacterial infections and other diseases. The study was carried out to determine the antibacterial activities of aqueous and ethanolic leaves extracts of *Terminalia Catappa* on *Staphylococcus aureus* and *Salmonella typhi*. Green leaves of *Terminalia Catappa* were collected, aqueous and ethanolic extracts of leaves were prepared, and both extracts were screened for phytochemical constituent using standard methods. The antibacterial activities of

both extracts were tested on *Staphylococcus aureus* and *Salmonella typhi* using disc-diffusion method at different concentrations. The activities of the extracts were measured by zone of inhibition and compared with a standard antibiotic *Ciprofloxacin*. Results of the phytochemical screening of both aqueous and ethanolic crude extract revealed the presence of saponins, tannins, steroids, phenol, alkaloid and flavonoid. Antibacterial screening with 24hours cultures of clinical isolates of *Salmonella typhi*, and *Staphylococcus aureus* indicated that *S. aureus* was the most sensitive (100ug/ml) while *S. typhi* the least (400ug/ml). Ethanolic extract was relatively more active than aqueous extract. Among the various concentrations (100,200,300, 400 and 500ug/ml), 500 ug/ml was found to be very effective with the highest inhibition in both aqueous and ethanolic extracts on *S. aureus* 27.5mm and 29mm, while on *S. typhi*, 22.5mm. In aqueous and ethanolic extracts, the minimum inhibitory concentration (MIC) was observed on *S.aureus* at 100ug/ml, while in *S. typhi* it was observed at 400ug/ml. The results obtained suggest that *T. catappa* could be effective in the treatment of ailments caused by the test microorganisms.

Keywords: *Terminalia catappa, Extracts, Staphylococcus aureus, Salmonella typhi.*

2nd UMYU Conf/2024/43

FORMULATION OF CULTURE MEDIUM USING GUINEA CORN HUSK AND WHEAT BRAN FOR THE ISOLATION AND IDENTIFICATION OF *Pseudomonas, Salmonella* AND *Staphylococcus Species*

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ABSTRACT
Microorganisms are grown for many purposes. Culture media used in the laboratory for the cultivation of microorganisms supply the nutrients required for their growth and maintenance. The price of commercial media is on the increase; therefore, the aim of this work is to formulate a culture medium for the isolation and identification of *Staphylococcus, Salmonella* and *Pseudomonas species* using Guinea corn husk and Wheat bran (GWA). The Guinea corn husk and Wheat bran were obtained from Muda Lawal market Bauchi and the test organisms (*Salmonella, Staphylococcus,* and *Pseudomonas* species) were obtained from Bayara Hospital Bauchi and was confirmation using serial dilution, cultural, microscopic and biochemical characteristics. Proximate analysis carried out on the substrates using Soxhlet apparatus showed a high carbohydrate content of 65% and 51.10%, and a protein content of 11.20% and 26.0% for Guinea corn husk and Wheat bran respectively. The medium was formulated using 1.5g of each substrate plus 1g of Agar. The test organisms cultured on both the formulated medium (GWA) and the commercial media (Nutrient and Salmonella/Shigella agar), showed that Staphylococcus specie had a significant mean growth of 1.6×104cfu/ml, Salmonella spp1.5×104cfu/ml, and Pseudomonas species 1.8×104cfu/ml on the formulated media, while on the commercial media (SSA AND NA). *Staphylococcus* specie showed significant mean growth of 2.1x104cfu/ml, *Salmonella* specie 1.7x104cfu/ml, and *Pseudomonas* specie 2.2x 104cfu/ml. Thus, the formulated medium from Guinea corn husk and Wheat bran compared favorably with the commercial media and could serve as an alternative for the growth of bacteria.

Keywords: Guinea corn husk, Wheat bran, Culture medium, *Pseudomonas*, *Salmonella*, and *Staphylococcus* species

2nd UMYU Conf/2024/44

ANTAGONISTIC EFFECTS OF *Bacillus* SPECIES AGAINST BACTERIAL MULTI-DRUG RESISTANT (MDR) FOOD-BORNE PATHOGENS AND AFLATOXIGENIC FUNGI

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ABSTRACT

This study was designed to determine the antagonistic pattern of *Bacillus* species against MDR bacterial foodborne pathogens and aflatoxigenic fungi and also to evaluate their technological properties. Production of cell free metabolites, agar well diffusion, optimization of metabolites production and enzymatic assays were carried out using standard techniques while aflatoxin quantification and qualification was done using high performance thin-layer chromatography (HP-TLC). Results revealed that *B. subtilis* OKOI7.12ia had the highest inhibitory activity against *S. enteritidis* ATCC 13875 (27mm) while *B. paralicheniformis* had the least inhibitory activity against *A. niger* (7mm). *B. subtilis* OKOI7.12ia also had the highest metabolites growth rate at 30^{o}C, followed by *B. subtilis* IPOI3.12ia and *B. paralicheniformis* OKAO4.12ia. However, there was no significant difference in the growth rate of *B. subtilis* IPOI3.12ia at 30^{o}C and 40^{o}C ($p < 0.05$). Furthermore, *B. subtilis* OKOI7.12ia and *B. subtilis* IPOI3.12ia had the highest metabolites growth rate at pH 8 while a lower growth rate was observed at pH6 ($p < 0.05$) in all the five *Bacillus* sp. In addition, *B. subtilis* OKOI7.12ia and *B. subtilis* IPOI5.10ia had the highest growth rates using glucose and galactose as carbon source respectively. Growth in nitrogen sources showed that *B. subtilis* OKOI7.12ia had the highest growth rate while *B. subtilis* IPOI5.10ia and *B. subtilis* OGOA10.7ii growths were not significantly different at $p < 0.05$. *B. subtilis* IPOI3.12ia however had the least growth in peptone. In addition, *B. subtilis* OKOI7.12ia also produced the highest amounts of protease, amylase ad lipase enzymes while *B. subtilis* IPOI3.12ia produced the least. Therefore, from the results obtained in this study, *B. subtilis* OKOI7. 12ia proved to be the most suitable *Bacillus* sp. that can be employed as starter culture during fermentation processes for the production of microbiologically safe foods.

Keywords: Enzymes, spectrophotometer, antimicrobial metabolites, agar well diffusion, high performance thin-layer chromatography

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PREVALENCE OF CADMIUM AND LEAD RESIDUES IN PROCESSED (FRIED) MEAT (SUYA) SOLD IN KADUNA METROPOLIS, KADUNA STATE, NIGERIA

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ABSTRACT
Heavy metals are of public health concern worldwide due to their damaging effects on human and animal health. The study aims to analyze the presence of Cadmium (Cd) and Lead (Pb) residues in suya meats; cattle meat (beef), sheep meat (mutton), goat meat (caprine), fowl meat (chicken) and dog meat sold in the Kaduna metropolis, Kaduna State. A descriptive-quantitative research design was used, with fifty samples collected from four Local Government Areas (Chikun, Igabi, Kaduna North and Kaduna South). Atomic Absorption Spectrophotometer was used to analyze and quantify the presence of these heavy metals through absorption of optical radiation by free atoms in the gaseous state. Cd and Pb were found to be present in all the suya samples analyzed and Microsoft Excel and ANOVA are the statistical tools used for result analysis. The results showed statistical significance (p<0.05) between the overall mean concentration of Cd (0.0496mg/kg) and Pb (0.4380mg/kg) in the samples. The mean concentration of Cd in suya samples of cattle (0.0333mg/kg), sheep (0.0575mg/kg), goat (0.0480mg/kg), dog (0.0400mg/kg) and chicken (0.0775mg/kg), while that of Pb in cattle (0.4675mg/kg), sheep (0.4050mg/kg), goat (0.4100mg/kg), dog (0.3950mg/kg) and chicken (0.5050mg/kg) and between animal species there was no significance statistically (p>0.05). The mean concentration of Cd and Pb obtained within the study areas were Chikun (0.0462mg/kg) and (0.4292), Igabi (0.0438mg/kg) and (0.4250), Kaduna North (0.0536mg/kg) and (0.4900mg/kg), Kaduna South (0.0529mg/kg) and (0.4129mg/kg) respectively. The mean concentration of cadmium and lead in the suya samples was above the permissible limits set by WHO and EC, indicating the general contamination of suya meats by heavy metals. The study recommends public measures to minimize environmental pollution and food-chain transfer of Cd and Pb to prevent related ailments and mortality by enforcing regulations governing industrial activities and waste disposal to protect the public from the harmful effects.

***Keywords**:* Cadmium (Cd), Lead (Pb), Residues, Processed meat (Suya), Kaduna Metropolis, Nigeria

2nd UMYU Conf/2024/46

ENVIRONMENTAL EFFECT OF URBAN GREEN SPACE CONVERSION IN KANO METROPOLIS, KANO STATE, NIGERIA

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ABSTRACT
The creation of green space in urban areas can have a significant impact on maintaining environmental equilibrium and reducing air pollution. One of the uses of urban space is urban green space because of the significance of its distribution inside cities. The study aims to investigate the environmental effects of urban green space conversion and was carried out in three (3) Kano Town wall plantations, Kundila Dogon Rimi, Kundila Gindin Gawo, Kureken Sani community forestry area, Unguwa Uku Shargalle, Maikalwa garden, and approximately

twenty-two (2) designated parks and gardens in Kano metropolis. Field observation and questionnaire surveys were used in the study. The findings also showed that 56.0% of respondents believed that conversions of urban green space had a major negative impact on the environment. The results also showed that 36% of respondents thought that the conversion of urban green space caused ongoing seasonal flooding, while 27% noted soil erosion and the loss of urban area. Additionally, 18% of respondents said that the conversion of urban green space caused a reduction in water quality. Only a small percentage of respondents—7% and 11%, respectively—reaffirmed that the conversion of urban areas into green spaces results in the loss of urban scenic attractiveness and constant urban heat exposure. The study suggests that more investigation be done into how urban green conversion affects land usage, noise pollution, and air quality. The government must also refrain from altering the current urban green areas while incorporating the ambition for their development in Kano metropolis into its master plan.

Keywords: Environmental effect, urban green conversion, Kano metropolis

2nd UMYU Conf/2024/47

ANTIMICROBIAL ACTIVITY OF *Chlorophytum laxum* CRUDE EXTRACT AGAINST *Tinea Capitis* ISOLATED FROM PRIMARY SCHOOL PUPILS IN ZARIA, KADUNA STATE

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ABSTRACT
Resistance to potent antibiotics used in hospitals and clinics by disease-causing organisms is currently among the major public health concerns, whereby disease-causing organisms such as bacteria and fungi are continuously becoming resistant to antibiotics used in hospitals. However, these necessitate the search for alternative antimicrobial agents. Therefore, this study was conducted to determine the antifungal activity of *Chlorophytum laxum* crude extract against *Tinea capitis* Isolated from Primary School Pupils in Zaria, Kaduna State Nigeria. The antifungal activity of extract fraction was evaluated using the poisoned-food technique and the effect of different concentrations of crude methanolic extracts of *Chlorophytum laxum* (2.5, 5, 10, 15, and 20%) on the Growth of Fungi species were determined. the actual chemical compounds in the active fractions of the extracts, the fraction was further analyzed by GC/MS machine. That crude methanolic extract showed a toxic effect on the test organism, thus the highest inhibitory effect was observed in 20% concentration of the extract against the test organisms (30.00 ± 6.11 for *Microsporum ferrugineum*, 37.33 ± 1.20 for *Trichophyton soudanense* and 60.33 ± 0.88 for *Trichophyton tonsurans* respectively. The Highest antifungal activities in *Microsporum ferrugineum, Trichophyton soudanense,* and *Trichophyton tonsurans* were observed in 20% concentration regardless of the fraction method. The highest mean values of 78.00 ±5 .51, 80.00 ± 3.3.51 and 85.00 ± 2.65 were observed at 20% concentration of aqueous fractions. The outcome of this study showed that the *Chlorophytum laxum* could be a good candidate for use in the management of infection caused by *Tinea capitis*, although further evaluation needs to be carried out in other to fully validate it traditional usage.

Keywords: Antimicrobial; *Chlorophytum laxum*; Fraction; Pupils, *Tinea capitis;* Zaria

2nd UMYU Conf/2024/48

SEROPREVALENCE OF *Toxoplasmosis* AMONG OUTPATIENTS WITH PSYCHIATRIC ILLNESS ATTENDING DAWANAU PSYCHIATRIC HOSPITAL, KANO, NIGERIA

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ABSTRACT

Toxoplasmosis is caused by an obligatory intracellular coccidian protozoan organism, *Toxoplasma gondii*. It has a worldwide distribution, affecting one-third of the word population. Psychiatric patients have a higher risk of exposure to *Toxoplasma gondii* infection due to lack of good personal hygiene. The burden of toxoplasmosis among psychiatric patients in Kano, Nigeria has not been studied extensively. This study aimed to determine the seroprevalence of *Toxoplasma gondii* among psychiatric outpatients at Dawanau psychiatric hospital, Kano. This is a cross-sectional study in which blood sample was collected from 90 psychiatric outpatients. Anti-toxoplasma antibodies were determined using Enzyme Linked Immunosorbent Assay (ELISA). Schizophrenia patients had highest seroprevalence of both IgG and IgM of 23.3% and 23.3% respectively when compared with other type of the psychiatric illnesses. The seroprevalence rate of anti-*Toxoplasma gondii* IgG and IgM antibodies was 33.3% and 46.7% respectively. Gender, occupation, residence, age and ethnicity had not shown statistically significant association with *T. gondii* infection. Cleaning of cats' excreta was found to be significantly associated with the seroprevalence of *T. gondii* IgM (P-value = 0.003). Results suggest that awareness gaps need to be addressed for prevention and management of toxoplasmosis, knowing transmission routes and that the parasites can affect several organs causing behavioral changes is relevant.

2nd UMYU Conf/2024/49

PHENOTYPIC CHARACTERIZATION OF METHICILLIN RESISTANT *Staphylococci* ISOLATED FROM WOUNDS AND NASAL SWABS IN SOME NORTHWESTERN STATES, NIGERIA

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ABSTRACT

Methicillin resistant *Staphylococci* (MRS) remains important opportunistic pathogens and most frequently identified worldwide. The study was carried out to determine the phenotypic characteristics of Methicillin resistant *Staphylococci*, its antibiotic susceptibility pattern and socio-demographic characteristics of the isolates from wounds and nasal swabs in selected Hospitals across some states of Northwestern Nigeria. A total of eight hundred and six wounds and nasal swabs were collected from patients admitted at nine facilities in 4 states of northwestern Nigeria. All samples were analyzed using standard bacteriological techniques. Antibiotic susceptibility testing (AST) using Kirby –Bauer technique was performed. Out of 806 samples, 652 (80.3%) were Culture positive while 154(19.1%) were culture negative. A total of 704 (87.3%) isolates were realized out of which 418 (59.4%) were identified as

Staphylococci isolates, identified as 144(17.7%) Methicillin resistant *Staphylococcus aureus* (MRSA), 124 (15.4%) Methicillin susceptible *Staphylococcus aureus* (MSSA), 89 (11%) Methicillin resistant coagulase negative *Staphylococci* (MRCoNS) and 61 (7.6%) Methicillin susceptible Coagulase negative *Staphylococci* (MSCoNS). The highest sensitivity of *Staphylococci* isolates was found in Vancomycin 408 (97.6%) while the lowest was penicillin 24 (5.7%). The isolation rate of MRS was highest among patients belonging to age group 11-30 years old while 71-90 years age group has the lowest. It was higher (37%) in Male patients than female patients (18.6%). There was no statistically significant association between the distribution of MRS among the different age group, gender, occupational affiliations, educational and economic statuses of research participants. Occurrence of MRS was however, lower among patients with high level of formal education but higher among those without and with low level of education. The findings herewith will assist healthcare workers to institute policy for antibiotic usage, surveillance and infection prevention and control measures.

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COMBINE EFFECT OF SELENIUM AND CADMIUM ON *Citrobacter freundii's* Antioxidant Enzymes Activity

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ABSTRACT
In this study, *Citrobacter freundii* (NRRL B-2643) bacteria were cultured in an LB medium with different cadmium (Cd) concentrations. To mitigate the deleterious impact of Cd, varying quantities of selenium, renowned for its antioxidative power, were added in the cadmium-containing growth medium. Bacterial concentration, soluble protein and activities of antioxidant enzymes (Glutathione peroxidase (GSH-Px), Glutathione reductase (GSH-Rd), Superoxide dismutase (SOD) and Catalase (CAT) were determined by spectrophotometer. No significant microorganism growth was observed at 150 ppm and higher Cd concentrations. However, the bacterial growth was not affected up to 40 ppm Cd concentration. Bacteria were grown in media containing 0, 75, 100 and 125 ppm Cd where the 0-ppm cadmium group served as control. The protein content of the microorganism grown in the medium containing 75, 100 and 125 ppm Cd decreased about 21, 40 and 62 percent, respectively, when compared to the control. When 3.0 ppm selenium was added to the same growth medium, the percentage decrease in protein amount compared to the control was found to be 12, 25 and 50, respectively. An increase in the antioxidant enzymes activities in bacteria grown in cadmium- containing media compared to the control was observed ($p<0.05$). With the addition of 1.0 and 3.0 ppm selenium to cadmium-containing media, a decrease was observed in the activities of antioxidant enzymes.

Keywords: *Citrobacter freundii*, selenium, cadmium, antioxidant enzymes

2nd UMYU Conf/2024/51

PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL POTENTIAL OF *Eucalyptus Globulus* LEAF EXTRACTS

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ABSTRACT
The study was conducted to assess the phytochemical components and antibacterial efficacy of the aqueous and ethanolic leaf extracts of *Eucalyptus globulus.* The antibacterial potential was tested via disc diffusion and agar well diffusion methods. The phytochemical screening revealed the presence of alkaloid, tannin, saponin, glycoside, flavonoid, terpenoid, and phenols. For the ethanolic leaf extract via disc diffusion method, the highest zones of inhibition in all the tested organisms were all recorded at the concentration of 250mg/ml of the extract. The zones of inhibition at these concentrations were 13mm, 10mm, and 10mm and 7mm for *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively whereas lowest zones of inhibition were observed in the aqueous leaf extract at the highest concentration of 250mg/l of the extract via similar method. Similarly, results were obtained via Agar well diffusion method, where the ethanolic extract showed zones of inhibition of 12mm, 14mm, 15mm and 13mm, higher than aqueous extract which recorded zones of inhibition at similar concentration as 9mm, 6mm, 8mm and 7mm for *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively. The minimum inhibitory concentrations (MIC) of the ethanolic extract were 31.5mg/ml, 62.55mg/ml, 31.55mg/ml and 31.55mg/ml *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively and that of the aqueous extract were 62.5mg/ml, 62.5mg/ml, 125mg/ml and 31.5mg/ml for *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively. The Minimum bactericidal concentrations of the ethanolic extract were 125mg/ml, 62.5mg/ml, 31.5mg/ml and 31.5mg/ml for *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively, and that of the aqueous extract were 62.5mg/ml, 62.5mg/ml, 125mg/ml, and 62.5mg/ml for *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively. The present study shows the potential of the *Eucalyptus globulus* plant materials as a possible therapeutic agent against diseases caused by *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively

Keywords: Phytochemicals, Antibacterial activity, *Eucalyptus globulus*, *Bacillus megaterium.*

2nd UMYU Conf/2024/52

OPTIMIZATION OF FERMENTATION CONDITIONS OF CELLULASE FROM *Trichoderma harzianum* PK5 OBTAINED FROM DECAYING PALM KERNEL CAKE

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ABSTRACT
Cellulases are considered to be among the most important enzymes in the commercial market and some industries. Their applications are widely spread thus leading to increased demand and associated high cost. These necessitates the quest for cheaper cellulases from microorganisms, therefore, this study aimed at optimizing cellulase production by *Trichoderma harzianum* PK5 using the One Factor at a Time (OFAT) approach. Effect of carbon, nitrogen and various environmental factors were

studied in submerged and solid-state fermentation set-ups by varying the next factor using the optimal condition established with the previous condition. Copra meal and KNO_3 were the best complex carbon and nitrogen sources respectively, for cellulase production using *Trichoderma harzianum* PK5. The optimum pH of 4.0, moisture concentration (125% v/w), inoculum size (8%), temperature (30°C), incubation time of 7days were determined to be the optimal conditions for cellulase production by this isolate with enzyme titre of 252.54±7.73 U/gds in solid state fermentation. Cellulase enzyme production by the isolate was constitutive. Conclusively, cellulase production by *T harzianum* PK5 was tremendously optimized using the OFAT approach.

Keywords*: Trichoderma harzianum;* Optimization; Solid State Fermentation; Cellulase

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BIOPROSPECTING FOR EXOPOLYSACCHARIDES (EPS) PRODUCERS USING XYLOSE AS THE MAJOR CARBON SOURCE

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ABSTRACT

Many microorganisms are capable of producing Exopolysaccharides (EPS) while utilizing simple sugars and hexoses. Minimal attention has been paid to those capable of utilizing pentoses such as xylose. The use of alternative carbon sources for EPS production has gained significant attention in recent years. This study was designed to bioprospect for xylose utilizing bacteria for EPS production. Various samples were obtained from different sources and they were serially diluted and cultured in a salt-based medium with xylose as the main carbon source. Slimy and mucoid colonies were selected as EPS producing isolates. They were identified morphologically and biochemically using VITEX 2 identification system. Production of EPS by these isolates was carried out in submerged fermentation with xylose as the sole carbon source. The mean heterotrophic bacterial count of xylose utilizing bacteria ranged from $2.1x10^6$ CFU to $3.5x10^8$ CFU per gram or milliliter of samples analysed. Slimy and mucoid colonies were identified to be members of the genuses *Staphylococcus*, *Enterobacter*, *Kocuria*, *Klebsiella*, *Enterococcus*, *Serratia* and *Burkholderia.* The quantities of EPS produced by the isolates ranged from 0.04 g/L to 2.0 g/L with *E. cloacae* D1, *E. cloacae* D2, *K. oxytoca* D2 and *K oxytoca* G1 being better producers. Bacterial isolates capable of utilizing xylose for EPS production were obtained from various sources with potential for possible optimization.

Keywords: Exopolysaccharides, xylose utilization, Lignocellulosic biomass, Microbial polymer

2nd UMYU Conf/2024/54

ANTIBACTERIAL ACTIVITY OF METHANOL EXTRACT OF *Salvadora Persica* (Linn) STEM AGAINST GRAM POSITIVE BACTERIA ISOLATED FROM ORAL INFECTIONS

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ABSTRACT

Salvadora persica L. also known as Miswak is a commonly use oral hygiene tool popularly referred to as chewing stick. The aim was to determine the antibacterial activity of *S. persic*a methanol crude extract against gram positive bacteria isolated from orally infected patients attending the University Health clinic of Ahmadu Bello University. Twenty (20) samples were collected from patients with oral infection. These were analyzed using standard microbiological and biochemical procedures. Antibiotic susceptibility test was performed using Kirby–Bauer disc diffusion method and results were interpreted using CLSI guidelines. *Salvadora persica* L was extracted using cold maceration with methanol. The crude extract was tested using agar well diffusion and Broth dilution methods. Phytochemical screenings were carried out using standard methods. From the results, *Staphylococcus aureus* was found to be the most prevalent with 60%, then *Streptococcus sp*. 10%. High resistance was observed against amoxicillin (100%), *chloramphenicol (85%), ciprofloxacin (60%), ceftriaxone (50%), gentamycin (47.5%).* Cold maceration extraction revealed 11.59% yield of crude extract. The phytochemical constituents were identified as saponin, tannin, alkaloid, flavonoid, phenol, cardiac glycoside, carbohydrate, steroid and terpenoid. A significant activity was observed with 18-22mm Zone of inhibition and 25mg/ml MIC. The methanolic extract of *Salvadora persica* L. had significant activity against gram-positive bacteria isolated from orally infected patients with 18-22mm Zone of inhibition and 25mg/ml MIC.

Keywords; Gram-Positive Bacteria, orally infection, Antibacterial

2nd UMYU Conf/2024/55

GREEN SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL POTENTIAL OF COPPER OXIDE NANOPARTICLES USING AQUEOUS LEAF EXTRACT OF *Eucalyptus Globulus*

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ABSTRACT

Bacterial infections have emerged as a pervasive challenge with far-reaching implications across various sectors, from agriculture to healthcare, and also wastewaters generated from daily human activities often contains various pathogenic microorganisms. These compromise public health and increase the growth and spread of bacterial pathogens. In this study, a green synthesis approach was utilized for the fabrication of copper oxide nanoparticles (CuONPs) using the aqueous leaf extract of *Eucalyptus Globulus* obtained from Iyatawa, Northwestern Nigeria. Scanning Electron Microscopy was used to characterize the synthesized CuONPs. The scanning electron

micrographic examinations of the synthesized copper nanoparticles showed a highly porous morphology of the synthesized CuONPs with pores. Before the bacterial activity, the SEM image revealed that the external surface was full of cavities characterized by irregular heterogeneous surfaces which suggested that the synthesized CuONPs exhibits a high surface area and irregular in shape. The seemingly rough surface of the synthesized CuONPs was an indication of high surface area. The synthesized CuONPs showed antimicrobial activity against Gram-negative bacteria (*Salmonella typhimurium, Escherichia coli* and *Bacillus megaterium*) and Gram-positive bacteria (*Staphylococcus aureus).* The green synthesized copper nanoparticles exerted high antimicrobial activity against *Salmonella typhi* (inhibition zone diameter of 16mm) followed by *Bacillus megaterium (*inhibition zone diameter of 14mm) while the same concentration of the CuO nanoparticles proved the least antibacterial activity against *Staphylococcus aureus* and *E. coli* with each showing inhibition zone diameters 10mm. The minimum inhibitory concentrations of the synthesized copper nanoparticles against *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* were 125, 250, 62.5 and 125mg/ml respectively. The minimum bactericidal concentrations of the green copper nanoparticles against *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* were 125, 250, 250 and 62.5mg/ml respectively. The results indicate the antibacterial efficacy of the green synthesized copper nanoparticles and thus can be used as a possible and potential therapeutic agent against diseases caused by *Staphylococcus aureus, Bacillus megaterium, Salmonella typhi* and *E. coli* respectively

Keywords: Nanoparticles, *Escherichia Coli,* Fabrication, Surface Area, Inhibition, Green Synthesis

2nd UMYU Conf/2024/56

HEPATITIS B VIRUS PREVALENCE AND IMMUNOLOGICAL RESPONSE AMONG STUDENTS OF USMANU DANFODIYO UNIVERSITY SOKOTO, NIGERIA

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ABSTRACT
Hepatitis B Virus Infection is one of the major global public health problems which are silent killer in the world. The study aimed to determine the seroprevalence of HBV infection, study the immunological response, and determine the possible potential risk factors among university students in Nigeria. The study was conducted between December 2022 and April 2023. Structured questionnaires were administered to obtain socio-demographic Data and the potential risk factors that might be associated with the infection. A total number of 139 students consisting of 10 females and 129 males were screened randomly for HBsAg using a rapid HBsAg test kit. Of the 139 participants screened, 17(12.2%) were seropositive and 122(87.8%) were seronegative. The sera of the positive participants were further screened for HBeAg, anti- (HBs, HBe, and HBc) using one-step cassette-style diagnostic kits. Of the 17 samples screened none was reactive for anti-HBs antibodies and HBeAg. Fifteen (15) of the samples were positive for anti-HBe and anti-HBc which indicate response to natural infection. The significant association ($P<0.05$) between Sexual Activity, Unprotected sexual Practices, use of already used sharp objects, and awareness of HBV infection with the viral infection statistically confirmed these factors as the risk factors. The study indicates high endemicity.

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AMYLASE PRODUCING POTENTIALS OF *Aspergillus Spp* SOURCED FROM SPOILED FRUITS USING AGRO-INDUSTRIAL WASTE SUBSTRATE

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ABSTRACT
Amylases are group of hydrolyses enzymes use by industries using starch raw materials, they are safe and stable produced by microorganisms that meet industrial demands. As such, this study aimed to ascertain the ability of *Aspergillus* spp sourced from spoiled fruits to produce amylase enzyme using agro-industrial waste as substrate. Starch medium was used to confirm amylolytic activity of the isolates. Submerged fermentation technique was employed for amylase production using basal medium and agro-industrial waste (sugar cane bagasse, wheat bran and groundnut shell) as substrate. Parameters of incubation period (72 to 168hrs), Concentration of substrates (2 and 3%/100mL), inoculum Concentration (2 and 3%/100mL) pH (2-10) and temperature (20-60 ^{o}C). Dinitrosalicylic acid reagent (DNS) method was used to assay the activity of the amylase produced. Results revealed that *Aspergillus flavus* (62.50±0.02 mm) and *Aspergillus niger* (69.00±0.07 mm) have amylolytic activity and are considered for the study. Production of amylase using sugar cane bagasse, wheat bran and groundnut shell substrates revealed that *Aspergillus niger* (5.45 ±0.07 U/mL/min) utilizes groundnut shell best with an optimum incubation period of 5 days, inoculum concentration of 2%, substrate concentration of 3%, temperature of 40°C and pH of 6.0 while *Aspergillus flavus (*7.00±0.24 U/mL/min*)* was found to utilize wheat bran best with optimum fermentation condition of 5 days, 2% inoculum, 3% substrate, 30°C and a pH of 6.0. In conclusion Fruits were found to be good source of *Aspergillus* spp with amylase production potentials. The use of cheap and readily available agro-industrial waste can serve as a better substitute to costly synthetic starch substrate use in amylase production. The research suggests more in-depth research as it is limited to preliminary identification of the isolates only.

Keywords: Agro-industrial, amylase, starch, substrate, synthetic.

2nd UMYU Conf/2024/58

AFLATOXIN ASSOCIATED WITH STORED GRAINS IN SOKOTO

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ABSTRACT
Grains (Corn, millet and guinea corn) for this study were purchased randomly from selected wholesale markets (grain markets) within Sokoto State, Nigeria. They were analyzed for total aflatoxin and fungal contamination using Enzyme Linked Immunosorbent Assay (ELISA) and mycological procedures. Six fungal species namely *Aspergillus niger, Penicillium, Aspergillus flavus, Fusarium species, Candida species* and *Rhizopus species* were isolated. Aspergillus flavus (30%) had the highest percentage frequency of occurrence while *Aspergillus niger* and *Penicillium* (20%) had the same percentage frequency of occurrence, and Fusarium species, Candida species and Rhizopus (10%) had the lowest percentage frequency of occurrence. The mean aflatoxin concentration of the corn, millet and guinea corn obtained from this study revealed that sample A (Guinea corn) has a mean aflatoxin concentration of 1.485ug/kg while

sample B (Corn) has a mean Aflatoxin concentration of 17.77ug /kg and sample C (Millet) has a mean aflatoxin concentration of 2.215ug/kg. The high level of aflatoxin in grain (corn) highlights the health problem associated with the consumption of these grains with the toxin that could lead to adverse health effects such as liver, cervical, breast or esophageal cancer. It is important to sensitize the populace on the danger of aflatoxin in Grains.

Keyword: Grains, Aflatoxin and Fungal species.

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YOGHURT PRODUCTION FROM SOYABEANS USING COW MILK (NONO) AS STARTER CULTURE

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ABSTRACT
The production of soy-yoghurt by fermentation of soyabeans with Nono (a Nigerian indigenous fermented cow-milk) was studied. Soyabeans was extracted from whole and dehulled, the seeds were pasteurized. The fermentation was carried out with both the nono and soy-milk, (the nono was analyzed and confirmed the presence *Streptococcus thermophilus, Lactobacillus bulgaricus* and other lactic acid bacteria, as control or Starter Culture). Soy-yoghurt samples produced were subsequently subjected to biochemical and microbiological assays. All the Lactobacilli (LAB) isolated from Nono were gram positive, catalase negative, indole negative, oxidase negative, spore straining negative and produced acid from glucose and lactose. The results demonstrated that addition of nono to soymilk significantly improved the sensory attributes of soy-yoghurt produced from soymilk. The use of isolate from nono has the added advantage of reducing the cost of yoghurt starter culture, thereby making soy-yoghurt, a good source of much desired good quality protein cheaper in Nigeria.

Keywords- Soybean, Soy-yoghurt, Fermentation, Starter Culture and Nono.

2nd UMYU Conf/2024/60

PREVALENCE OF *Schistosoma haematobium* AMONG CHILDREN ATTENDING FEDERAL POLYTECHNIC BAUCHI STAFF PRIMARY AND SECONDARY SCHOOL

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ABSTRACT
Schistosomiasis remains a public health burden in Nigeria, particularly in Bauchi. This study aims at detecting schistosomiasis and its Physiological indices among children of school age attending Federal polytechnic staff primary and secondary school. Some Physiological indices which included ketones, proteinuria and bilirubin were tested for in the urine samples of the studied children. Socio-demographic and risk factors associated with the disease and their association with schistosomiasis in the study area were also considered. A cross sectional study involving fifty (50) school age (7-14 years). Questionnaire was administered to determine their socio-demographic and risk factors. A total of 50 urine samples were collected. Samples were investigated using Microscopy and Urinalysis test strip following regulated guidelines. Out of the 50 children screened Microscopy showed 11(22.0%) positive for S. haematobium. Children of age group (13-14 years) were more infected and males had higher prevalence of 25.0% than females 16.7%. Comparatively, highest prevalence of 24.1% schistosomiasis was observed among secondary school children.

2nd UMYU Conf/2024/61

STUDIES ON ANTIBIOTIC RESISTANCE PROFILES EXHIBITED BY VIBRIO SPECIES ISOLATED FROM LANDFILL SOILS IN ZARIA METROPOLIS, NORTHERN NIGERIA

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ABSTRACT
Antibiotic resistance among bacteria poses a significant threat to public health and the environment. *Vibrio species* infections remain a serious threat to public health and waste management has emerged as one of the greatest challenges facing environmental protection agencies in Nigeria. This study investigated the antibiotic resistance profiles of *Vibrio species* obtained from landfill soils in Zaria Metropolis. A total of one hundred and twenty (120) soil samples were collected from designated landfills of four locations in Sabon-Gari, Samaru, Tudun-Wada and Zaria City. *Vibrio species* were isolated using Thiosulphate citrate bile salt sucrose (TCBS) agar and identified using standard microbiological techniques. The isolates were tested for susceptibility against ten commonly used antibiotic belonging to three different groups, namely: Inhibitors of cell wall synthesis, Inhibitor of protein synthesis and Inhibitor of nucleic acid synthesis using the Kirby-Bauer method. Results revealed higher incidence of *Vibrio species* in samples taking from Tundun-Wada 4(13.3%) as compared to 2 (6.7%), 2 (6.7%) and 1(3.3%) in Samaru, Zaria city and Sabon-Gari sample locations respectively. Highest 55.6% resistance among total *Vibrio* isolates was observed to Beta-Lactams, Fluoroquinolones, and Tetracyclines. The isolates were Multiple Antibiotic Resistance (MAR) to 4-6 antibiotics and four different phenotypic resistance profiles were observed among them. The origin and varying levels of resistance to multiple antibiotics indicated could be trace to the faecal constituent of the waste in landfill produced by people or animals that have been treated indiscriminately with various antibiotics or items containing residual antimicrobial agents disposed of in dumps highlighting the potential environmental reservoirs of antibiotic resistance and call for further research to understand the implications for public health and environmental management.

Keywords: *Vibrio species*, Antimicrobial Resistance, Multidrug Resistance, Public Health and Environmental Management, Zaria Metropolis

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COMPARING THE RELATIVE EFFICACY OF SELECTED STREET-HAWKED AND CHEMIST-SOLD ANTIBIOTICS AGAINST *E. Coli* AND *S. aureus* IN DUTSE, JIGAWA STATE

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ABSTRACT
Antibiotics have been used for the treatment and prevention of bacterial infections. The effectiveness of antibiotics can be affected by temperature, light, moisture, and storage conditions**.** A study was conducted to compare the relative efficacy of hawked antibiotics and antibiotics stored under optimal conditions (pharmacy). To ascertain the efficacy of the antibiotics against clinical isolates of *E. coli* and *S. aureus*, the isolates were confirmed using biochemical tests and gram staining, antibiotic susceptibility test was performed by disc diffusion method as described by the Clinical Laboratory Standard Institute (CLSI) guideline. Among the hawked antibiotics tested, amoxicillin showed the highest efficacy with the mean zone of

inhibition of 16 ± 1.2mm and tetracycline had the least efficacy with the mean zone of inhibition of 11 ± 0.9mm. While among the antibiotics stored under optimal conditions amoxicillin had the highest potency with the mean zone of inhibition of 16.5 ± 1.1mm and ciprofloxacin had the least efficacy with the mean zone of inhibition of 12 ± 0.9mm. Only 40% of the hawked antibiotics tested were found to retain efficacy and about 60% have lost some efficacy. The storage conditions of these antibiotics, especially the temperature may have been responsible for the loss of their effectiveness. As such, it is recommended that the use of hawked antibiotics should be avoided.

Keywords: Antibiotics, Efficacy, *E. coli*, *S. aureus*, Hawked, Storage, Temperature

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PHYTOCHEMICAL CONSTITUENTS AND ANTIBACTERIAL EFFICACY OF *Senna siamea* LEAVE EXTRACTS ON *Staphylococcus aureus*

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ABSTRACT
Staphylococcus aureus has become a major human pathogen and notorious for its ability to resist antimicrobial drugs. *Senna siamea*, or *Thai Cassia*, is an indigenous plant in Southeast Asia that has a prominent place in the traditional medicine within the region. The aim of the study was to investigate the phytochemical constituents and antibacterial activity of *Senna siamea* leaf extracts against Staphylococcus aureus. Phytochemical screening revealed the presence of alkaloid, tannin, saponin, glycoside, flavonoid, terpenoid and phenols. Disc diffusion and agar well diffusion methods were used for antibacterial analysis and a significant difference. Disc diffusion and agar well diffusion methods were employed for the antibacterial analysis and the significant difference was observed between the aqueous and ethanolic extract with the ethanolic extract indicating higher zones of inhibition in disc diffusion method, having 6 mm, 8 mm, 9 mm and 11mm at varying concentrations of 25%, 50%, 75% and 100% respectively. The aqueous shows no inhibition at 25% and 50%, with 4 mm and 7 mm zones at 75% and 100% respectively. Similar result was obtained via Agar well diffusion method, while ethanolic extract indicated zones of inhibition of 12 mm, 13 mm, 15 mm and 17 mm, higher than 6 mm, 8 mm, 11 mm and 12 mm observed from the aqueous extract. The minimum inhibitory concentrations (MIC) of the ethanolic and aqueous extracts were 6.5mg/ml and 12.5mg/ml respectively. The Minimum bactericidal concentration of the extracts was 50 mg/ml. The present study indicated the potential of the *Senna siamea* plant materials as a possible therapeutic agent against Staphylococcal infection.

Keywords: Phytochemicals, Antibacterial, *Senna siamea*, Constituents, Staphylococcus aureus, Infection, and Pathogen.

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BACTERIOLOGICAL QUALITY OF BOREHOLE WATER IN GUSAU METROPOLIS

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ABSTRACT
Microbes are ubiquitous and are known to contaminate materials including food and water. The bacteriological quality of borehole water in Gusau metropolis were examined to determine their potability. A total of fifteen borehole samples were analyzed. The total bacterial load, total coliform, faecal coliform and salmonella-shigella count were determined using membrane filtration technique. The total bacteria count ranged from 6×10^1 cfu/ml to 39×10^1cfu/ml, total coliform count, 3×10^1 cfu/ml to 65×10^1 cfu/ml; faecal coliform count, 1×10^0cfu/ml to 4×10^0cfu/ml and salmonella-shigella count, 0 cfu/ml to 4×10^0cfu/ml. The organisms isolated were *Escherichia coli, Salmonella typhi* and *Shigella* spp. Percentage occurrence of the bacterial isolates showed that *Escherichia coli* was predominant in comparison to *Salmonella typhi* and *Shigella* spp. The study revealed that the bacteriological quality exceeded World Health Organization (WHO) allowable limits of 0cfu/100ml for total bacterial load, total coliform count, faecal coliform count and *Salmonella-shigella* count. The present study indicates that water testing would ensure identification of bacteria and contaminates present in the water which are detrimental to human health. Educate people on the importance of clean and safe water which is essential for good health. This study suggests that borehole water sources should be properly treated prior to consumption, so as to reduce the occurrence of water borne diseases.
Keywords: Bacteriological, Quality, Borehole, Water and Coliform.

2nd UMYU Conf/2024/65

DEVELOPMENT OF MYCOLOGICAL MEDIA UTILIZING TOMATO JUICE EXTRACT AS THE PRINCIPAL BASE

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ABSTRACT
This study focused on the development of mycological media using Tomato Juice Extract (TJA) as the primary base. Various concentrations of Tomato Juice Agar (TJA) and Potato Dextrose Agar (PDA) were prepared (200ml, 300ml, and 400ml). TJA was created by combining tomato filtrate with different sugar concentrations (10g, 15g, 20g), keeping Agar Agar powder constant at 20g. Samples from refuse dumpsite soil and spoiled bread were inoculated into TJA and PDA. The total fungal counts, isolation, and identification were determined using PDA and TJA. TJA exhibited total fungal counts of 2-3 cfu/ml for refuse dumpsite soil and 3-4 cfu/ml for spoiled bread. PDA yielded counts of 3-6 cfu/ml for refuse dumpsite soil and 3-5 cfu/ml for spoiled bread. Various fungi, including *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus niger*, *Rhizopus stolonifer*, *Penicillium. digitanum*, and

Fusarium oxyporum were identified. TJA showed selective preferences for *Aspergillus niger* and *Rhizopus stolonifer*. This study successfully developed mycological media with tomato juice extract, yielding promising fungal cultivation results. Different TJA concentrations influenced fungal growth, this emphasized medium selection importance. The absence of certain fungi in TJA and exclusive *Fusarium oxysporum* isolation in PDA shows medium-specific preferences. Tomato juice extract aligns with sustainability and cost-effectiveness, offering an alternative to traditional components. Valuable insights into concentration-dependent fungal growth guide future experimentation and optimization. Tomato juice extract as a mycological media base introduces a sustainable alternative with unique nutritional profiles. Concentration-dependent fungal preferences highlight medium optimization significance. These findings encourage exploring natural sources for sustainable microbiological practices. While laying innovative mycological media groundwork, further research is needed to optimize tomato juice agar fully. Mycological media development with tomato juice extract offers practical benefits in cost-effectiveness and sustainability.

Keywords: Tomatoes, Juice extract, Medium and Mycology

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MULTI-DRUG RESISTANT BACTERIA IN MEAT RETAILERS' ENVIRONMENT: A PUBLIC HEALTH CONCERN IN DUTSIN-MA, KATSINA STATE, NIGERIA

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ABSTRACT

Antibiotic-resistant bacteria (ARB) in food and food-retailing environments is a growing public health concern worldwide. ARB poses a significant risk of contaminating food products in the supply chain. Therefore, this study aimed to evaluate antibiotic-resistance profiles of bacteria recovered from meat retailers' environments in Dutsin-Ma, Katsina State, Nigeria. Forty-five swab samples were collected aseptically from meat retailers' table surfaces, palms, and knives in retail outlets that include the Wednesdays' Market, Hayin Gada, Abuja Road, Federal University Dutsin-Ma (FUDMA) take-off sites' Market, and Darawa. *Escherichia coli* and *Staphylococcus aureus* were recovered using standard microbiological techniques, and the total bacterial counts were determined on nutrient agar. Isolates were characterized using conventional biochemical tests, and antibiotics susceptibility testing was performed using disk diffusion method. Isolates resistant to ≥ 3 classes of antibiotics were selected as multidrug-resistant (MDR) bacteria. Seventy-seven bacterial isolates were recovered from the forty-five samples collected, *Escherichia coli* (34/77; 44.2%) and *Staphylococcus aureus* (43/77; 55.8 %). Mean bacterial counts found on Wednesday's market tables, Darawa retailers' palms, and knives used in the FUDMA take-off sites' Market were 11.38×10^4 cfu/mL, 1.33×10^4 cfu/mL, and 1.38×10^4 cfu/mL, respectively. *E. coli* exhibited the highest (100%) resistance to amoxicillin and septrin and the lowest (11.80 %) resistance to ciprofloxacin, while, *S. aureus* showed the highest (100%) and lowest (51.2%) resistance to zinnacef and ciprofloxacin, respectively. Overall, 59.80% of MDR strains of *Escherichia coli* (21/77; 27.30%) and *Staphylococcus aureus* (25/77; 32.50%) were identified. This study found pathogenic MDR bacteria resistant to commonly used antibiotics in clinical practice. This portends a public health threat and underscores the need for ARB surveillance in the local food supply chain.

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COMPARISON OF MALARIA DIAGNOSIS THROUGH MICROSCOPY, RDT AND ELISA-BASED DETECTION OF *PF*HRP-2 FROM SYMPTOMATIC PATIENTS WITHIN KATSINA METROPOLIS

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ABSTRACT
Malaria killed about 619,000 people globally in 2022 (31% of these from Nigeria). A research gap exists concerning comparison of the detection accuracy of the numerous malaria-detection techniques available, as continuous prevalence surveys in malaria-endemic areas are critical to improving diagnostic accuracy, enhancing public health efforts and reducing disease burden. This study detected the prevalence of malaria from symptomatic patients attending some selected hospitals in Katsina and compared the efficacy of the detection using microscopy, RDT and the ELISA-based detection of *Pf*HRP-2. The seventy-three (73) blood samples collected were tested for malaria using RDT kit, microscopy (using Giemsa staining), and detection of *Pf*HRP using ELISA. RDT results showed that all the samples (100%) were positive for malaria; however, microscopy confirmed 96% positive. Finally, ELISA confirmed all the microscopy-positive samples as positive for *Pf*HRP-2 (100%), at 450nm absorbance. The research confirmed the accuracy of microscopy and ELISA as the gold standard for malaria diagnosis compared to RDT. Further studies to compare the performance of these methods vis-à-vis molecular tests are recommended towards enhanced malaria diagnosis.

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SAFETY ASSESSMENT OF THE HYDROETHANOLIC EXTRACT OF *Citrullus lanatus* SEEDS IN FEMALE WISTAR RATS

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ABSTRACT
The recognition of herbal medicines for treating various illnesses stems from their effectiveness, affordability, accessibility, alignment with patients' beliefs, perceived low toxicity, minimal side effects, and fulfillment of the desire for personalized healthcare. This study aimed to assess the safety of hydroethanolic extract of *Citrullus lanatus* seeds in female Wistar rats. Twenty Wistar rats were completely randomized into four groups (I, II, III and IV) of five animals each such that the animals in group I (Control) received 1.0 mL of distilled water orally while those in groups II, III and DIV received equal volume (1.0 mL) of the hydroethanolic extract of *C. lanatus* seed corresponding to 50, 100 and 200 mg/kg body weight respectively for 7 days. Weight changes were monitored, and on the eighth day, biochemical analyses were conducted on serum and tissues. Phytochemical screening revealed the presence of several compounds, with notable

minerals including iron, potassium, and magnesium. Heavy metals analysis reveals the presence of cadmium, chromium, lead, and cobalt in trace amount. Lipid profile analysis showed a significant decrease ($p<0.05$) in total cholesterol (TC) and triglycerides (TAG) at higher doses, accompanied by an increase in high-density lipoprotein (HDL) and a decrease in low-density lipoprotein (LDL). Hematological parameters showed no significant changes except for lymphocytes, mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV), and red blood cell count (RBC), which increased dose-dependently, while neutrophils decreased. Liver parameters indicated increased levels of protein, bilirubin, and albumin, with decreased ALT, AST, and LDH activities. Urea, calcium, chloride, and sodium ion activities increased significantly, while potassium, bicarbonate, uric acid, and creatinine activities showed no significant differences. Overall, the study suggests that the hydroethanolic extract of *Citrullus lanatus* seeds is safe and exhibits hepatoprotective, antihyperlipidemic, and hematological effects.

Keywords: Toxicity, *Citrulus lanatus*, leaves extract, hydroethanolic.

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PHENOTYPIC CHARACTERIZATION AND ANTIBACTERIAL SUSCEPTIBILITY OF PATHOGENIC BACTERIA ISOLATED FROM CHILDREN WITH ACUTE OTITIS MEDIA IN WUDIL GENERAL HOSPITAL

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ABSTRACT

Otitis media was characterized by an inflammation of the ear in children as a result of infections particular caused by bacterial pathogens consequence a high antibacterial administration routine to antibacterial resistance. This study aimed at evaluating the phenotypic characterization and antibacterial susceptibility of pathogenic bacteria isolated from children with acute otitis media. A total of 89 ear swab samples were bacteriologically examined following standard microbiological techniques for culture, microscopy and biochemical reactions. Sensitivity of the isolates to commonly used antibacterial agent was determined using Kirby Bauer disc diffusion method. All the 89 ear swab samples reveal the presence of at least one bacterial species following cultural characterization. Five predominant bacterial species recovered were *Staphylococcus aureus* 26(29.21%), *Pseudomonas aeruginosa* 17(19.10%), *Streptococcus pneumonia* 13(14.61%), *Staphylococcus epidermidis* 9(10.11%), *Klebsiella pneumonia* 8(8.98%), and mixed infection 16(17.98%). The highest susceptibility was recorded in Perfloxacin, Ciprofloxacin, Sparfloxacin antibiotics with highest activity to *Staphylococcus aureus*, and *Staphylococcus hycus* while highest resistance was in Ampicillin and Septrin with about 64% resistance. Susceptibility test of the isolates shows that 85% of the *Escherichia coli* and *Streptococcus pneumonia* isolates are more sensitive to Perfloxacin whereas 70% of the *Pseudomonas aeruginosa* are resistant to the tested antibacterial agents.

Keywords; Antibacterial, Acute Otitis media, Phenotypic, Wudil

2nd UMYU Conf/2024/70

BACTERIOLOGICAL, PHYSICOCHEMICAL AND HEAVY METAL ASSESSMENT OF BOREHOLE WATER SAMPLE FROM KOFAR RUWA QUARTERS, DALA LOCAL GOVERNMENT AREA KANO STATE, NIGERIA

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ABSTRACT
Despite the general safety of underground water, if a borehole facility is not properly managed, contamination may occur in the process through the buildup of chemical, physical, and biological agents in the pipelines and storage tanks of a distribution system. This study was aimed at assessing the quality of borehole water used in Kofar ruwa quarters, Dala local government area, Kano – Nigeria. A total of 27 borehole water were samples and subjected to bacteriological, physiochemical and heavy metal analysis. The results obtained were compared with the maximum level of the World Health Organization (WHO). Result of the bacteriological analysis revealed the viable count in the range of $1.0x10^2$ to $7.5x10^2$ CFU/ml and a total coliform count of 2.0 to 8.2 MPN/100ml of borehole water. Identified bacterial isolates were; *Staphylococcus aureus, Enterobacter aerogenes* and *Escherichia coli.* The pH and conductivity of the samples water were within the range of 7.2 to 7.9 and 300 – 392µScm^{-1} respectively. That of dissolved oxygen and alkalinity were 3.60 to 4.5 mgL^{-1} and 30.25 to 31.93mgL^{-1} respectively while that of the total hardness was 134.6 to 237.9 mgL^{-1}. The heavy metal analysis discovered a Cadmium concentration (0.01 to 0.04 mgL^{-1}), Iron (0.08 to 0.15 mg L^{-1}), Manganese (0.10 to 0.12 mgL^{-1}), and that of Lead content (0.16 to 0.18 mgL^{-1}). The finding of this study shows that majority of the borehole water in the study area did not meet the standard limit set by the WHO for drinking water.

Keywords: Bacteriological, Borehole water, Physicochemical, Heavy metal, Kofar ruwa

2nd UMYU Conf/2024/71

MICROBIAL EVALUATION OF MAIZE FLOUR SOLD IN MINNA TOWNSHIP

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ABSTRACT
The study was conducted to evaluate the microbial quality of maize flour sold in Minna. A total of four samples of maize flour from four markets in Minna such as Chanchaga, Bosso, Dutsen kura gwari and Kure market was analyzed to determine the bacteria count, fungi count, bacteria and fungi identification to the species level. The total fungal count ranged from 1.0×10^4 to 2.48×10^6 CFU/g. While the total bacteria count ranged from 7.0×10^4 to 2.4×10^5CFU/g. The isolated bacteria were: *Staphylococcus aureus, Escherichia coli, Bacillus subtilis, Psuedomonas aeruginosa, Staphylococcus aureus and Klebsiella sp* while the isolated fungi were: *Saccharomyces cerevisiea, Aspergillus niger, Fusarium sp, Saccharomyces cerevisea, Penicillum*

sp, Candida maltosa and *Kluyveromyces marxianus. Bacillus subtilis* and *Staphylococcus aureus, Aspergillus niger, Penicillum sp* and *Saccharomyces cerevisea* had the highest occurrence for both bacteria and fungi respectively. The results show that the rate of bacteria and fungi contamination of the maize flour is far above the safe level that ranged from 1.8 x 10^3 to 2.3 x 10^4 which is the acceptable or safe level and this is potentially hazardous to human health. This contamination could be due to the unhygienic method of processing the flour as a result of the direct contact with both the maize grain and flour, gross contamination of the product during processing, unhygienic method of production, lack of portal water for washing the maize, unhygienic production environment, exposure to open air, contamination during post-harvest and storage of the maize. Therefore, severe regulatory actions on the microbiological quality control of maize flour, use of portal water for washing maize before milling into flour together with the training of production process and sales personnel on food contamination and spoilage is necessary for the better management of public health condition.

Keywords: Maize flour, Bacteria count, Fungi count and Microbial quality

2nd UMYU Conf/2024/72

A REVIEW ON MICROBIAL DEGRADATION AND BIOREMEDIATION OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

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ABSTRACT
Polycyclic Aromatic Hydrocarbons PAHs are a group of ubiquitous priority pollutants that cause great damage to the environment and public health. Increased concerns relating to PAHs and their adverse effects on the environment and human health has resulted to various approaches aimed at removing PAHs from the environment. Various physical and chemical methods are currently being employed to remediate PAHs contaminated sites. However, these technologies are either too expensive or have other short comings. Therefore, the application of a biological treatment method that is more efficient and eco-friendlier is preferred. In this review, the ability of microorganisms like bacteria, fungi and algae species to degrade and transform PAHs into less harmful substances through enzymatic processes are presented under various environmental conditions like temperature, oxygen, nutrient availability and pH among others. The ability of these organisms to act in co-metabolism as co-cultures for a more efficient remediation as well as their mechanisms of action is also examined

Keywords: Polycyclic aromatic hydrocarbons (PAHs), degradation, bioremediation, bacteria, fungi, algae

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USE OF DIFFERENT SUBSTRATES IN BIOGAS OPTIMIZATION PROCESS AND THEIR COMPARATIVE EFFECT

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ABSTRACT
In biogas production, optimization has become so much important. Optimization of biogas production has to do with the adjustment of production and process parameters so as to increase biogas production both in quality and quantity. The aim and objective of this research was to use

different domestically sourced substrates in biogas optimization process. and also, to compare the quantity of gas produced so as to be able to suggest which domestic substrate should be used. The samples used in this research/investigation include cow dungs, poultry dungs, human faeces and from piggery. Comparative analysis of the volume of gas produced after 15 days was done at interval. Four bio digesters were fabricated and a batch culture fermentation process was adopted. Their comparative effect done to ascertain the volume of biogas produced using different organic biomass. For containers 1, 2, 3 and 4; there are reasonable amount of gas production for container 4 which is for poultry dungs. The ratio of the 4 containers at day 15 shows 0.10: 0.11: 0.12: 0.16: and 0.20. This shows that containers which represent cow dungs, poultry dungs and sewage for day 3, 6, 9, 12 and 15 are in the percentage of 14.49%, 15.94%, 17.39%, 23.19% and 28.99%. The 28.99% recommends that poultry dungs should be used most in biogas production process.

Keywords: Substrate, Co-Digestion, Anaerobic, Biogas, Methanogen, Fermentation

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THE ROLE OF MOLECULAR ASSESSMENT IN MANAGING BACTERIAL INFECTIONS IN HIV PATIENTS: A SCOPING REVIEW

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ABSTRACT

The co-infection of HIV with pathogenic bacteria presents a significant clinical challenge, leading to increased morbidity and mortality in affected individuals. This review provides an overview of the molecular assessment techniques used to identify and characterize pathogenic bacteria in HIV patients. Molecular methods such as polymerase chain reaction (PCR), next-generation sequencing (NGS), and metagenomic analysis have revolutionized the detection and profiling of bacterial pathogens, enabling rapid and accurate diagnosis. The review discusses the mechanisms underlying the increased susceptibility of HIV patients to bacterial infections, including immune dysfunction, microbial translocation, and dysbiosis of the microbiota. The interactions between HIV and bacterial pathogens at the molecular level are explored, shedding light on the complex interplay between host immune responses and bacterial virulence factors. In addition to diagnostics, the review examines therapeutic interventions targeting pathogenic bacteria in HIV patients. Antibiotic therapy remains the cornerstone of treatment, but the emergence of drug-resistant strains poses a growing concern. Novel therapeutic strategies, such as phage therapy, immunomodulation, and microbiota-based interventions, are discussed in the context of their potential to improve clinical outcomes in co-infected individuals. This review highlights the importance of molecular assessment in the management of bacterial infections in HIV patients, emphasizing the need for integrated approaches that consider both the host and microbial factors driving disease progression. Future research directions aimed at enhancing our understanding of host-pathogen interactions and developing targeted therapies are also discussed.

Keywords: pathogenic bacteria, co infection, molecular diagnostic techniques and antibiotics therapy

2nd UMYU Conf/2024/75

ASSESSMENT OF ANTIOXIDANT VITAMIN LEVELS IN INDIVIDUALS ENVIRONMENTALLY EXPOSED TO LEAD IN ZAMFARA STATE

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ABSTRACT
Lead is a pervasive environmental and industrial toxic metal known to cause multi-organ toxicity through oxidative stress. Understanding the impact of lead exposure on antioxidant vitamins (A, C and E) levels is crucial for mitigating its harmful effects. Blood samples were collected from 90 individuals in lead-exposed Bagega and Kawaye Villages, Zamfara State. Sixty participants with elevated blood lead levels (>10µg/dl) due to gold ore mining were compared to 30 age- and sex-matched controls with no history of lead exposure. Blood lead levels were assessed using Atomic Absorption Spectrophotometry (AAS), while antioxidant vitamin levels were measured using a UV-Visible spectrophotometer. Participants were categorized into low (58.06 ± 4.19 µg/dL), medium (143.61 ± 4.08 µg/dL), and high (595.78 ± 7.19 µg/dL) blood lead level groups for analysis. Lead-exposed individuals exhibited significantly lower levels of antioxidant vitamins compared to the control group ($p < 0.05$). Vitamin C levels were 72.32±6.2 µg/dL, 49.13±4.1 µg/dL, 33.89±4.7 µg/dL and 93.46±5.8 µg/dL. Vitamin E levels were 393.03±11.62 µg/dL, 243.95±9.78 µg/dL, 156.59±7.91 µg/dL, 671.74±21.23 µg/dL and Vitamin A had 4.67±0.62 µg/dL, 3.21±0.77 µg/dL, 1.92±0.04 µg/dL, 8.75±1.32 µg/dL in Low, medium, high blood lead levels and control groups respectively. These findings suggest that lead exposure negatively impacts antioxidant vitamin levels, likely through disrupting the cellular antioxidant balance. Supplementation with these vitamins may offer a potential strategy for reducing blood lead levels. Further research is needed to explore the therapeutic potential of antioxidant vitamin supplementation in lead-exposed populations.

Keywords: Lead toxicity, Antioxidant vitamins, multi-organ toxicity

2nd UMYU Conf/2024/76

HEAVY METALS AND ANTIBIOTICS RESISTANCE OF BACTERIA ISOLATED FROM DUMP SITE SOIL

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ABSTRACT
Dump sites are significant sources of environmental contaminants, housing diverse bacterial populations subjected to multiple stressors, including heavy metals and antibiotics. This study investigated the resistance of bacteria isolated from dump site soil to various heavy metals and antibiotics. Soil sample was collected from a prominent dump site of Ulul Albab secondary school. Heavy metals concentrations of the soil sample were analyzed using atomic absorption spectroscopy. Bacteria were isolated and characterized, and heavy metals resistance of the isolates was assessed in nutrient medium supplemented with different concentrations (50, 100, 150, 200mg) of copper, cobalt, lead and nickel. Antibiotics

susceptibility testing was performed using Kirby-Bauer disc diffusion method. Gram positive and negative isolates that showed resistance to the tested heavy metals and antibiotics were identified using Gram's reaction, cell morphology and biochemical characteristics. At the lowest concentration (50mg), all the isolates resist the tested heavy metals with exception of copper, but fewer isolates (DSS_3 and DSS_8) resisted the higher concentration of 200mg. Out of the Ten (10) isolates subjected to antibiotics sensitivity, five (5) isolates (DSS3, DSS4, DSS7, DSS8, and DSS9) showed multiple drug resistance. Isolates resistant to both heavy metals and antibiotics were identified as *Bacillus subtilis* and *Escherichia coli*. This study concludes that there is a concerning correlation between the presence of heavy metals and the development of antibiotic resistance in soil bacteria. This suggests a potential co-selection mechanism whereby exposure to heavy metals may contribute to the proliferation of antibiotic resistant bacteria in the dump site. Further studies are needed to elucidate the underlying mechanisms and assess the implications for public health and environmental management strategies.

Keywords: Heavy metals, antibiotics, resistance, dump site soil

2nd UMYU Conf/2024/77

PREVALENCE OF ENTERIC BACTERIA AND ANTIBIOTIC SUSCEPTIBILITY OF *Escherichia coli* FROM URINE OF PREGNANT WOMEN ATTENDING ANTENATAL AT AHMADU BELLO UNIVERSITY MEDICAL CENTRE SAMARU, ZARIA, NIGERIA

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ABSTRACT
Urinary tract infection (UTI) is a common infection diagnosed among pregnant women. A total of 100 urine samples were collected from pregnant women attending Ahmadu Bello University Medical Centre, Zaria, Nigeria and were screened for the presence of *Escherichia coli*. *Escherichia coli* was isolated using Eosin methylene blue agar. The isolates were identified based on morphology, microscopic characteristics and biochemical tests. Antibiotic susceptibility pattern of the isolates was determined using the disc diffusion method. Out of the 100 samples collected, 5 (5%) were positive for *Escherichia coli*, 3(3%) were positive for *Klebsiella* species, 1(1%) was positive for *Yersinia* and *Enterobacter* species respectively. In relation to the age group, pregnant women within the age group of 21-25 years had the highest prevalence of the infection, 3 (3%) followed by 26-30years and 31-35years having 1 (1%) respectively. *Escherichia coli* showed susceptibility to Gentamicin, Amoxicillin, Ciprofloxacin, Tarivid, Pefloxacin, Sparfloxacin and Streptomycin. However, it was resistant to Cotrimoxazole and Augmentin.

Keywords: Urinary tract infection, *Escherichia coli*, antibiotics, pregnancy, enteric bacteria, Zaria

2nd UMYU Conf/2024/78

ANTIFUNGAL ACTIVITY OF *Senna alata* ON FUNGI ISOLATED FROM SALON EQUIPMENT IN RIVERS STATE, NIGERIA.

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ABSTRACT
Most barbing equipment are contaminated by fungi due to unproven methods of cleaning and sterilization. This research was carried out to investigate the antifungal potential of *Senna alata* on fungi isolated from salon equipment in Rivers State, Nigeria. A total of one hundred and

eighty (180) swab samples from clipper, brush and combs were subjected to standard mycological procedures such as culturing using dermatophyte test medium and sabouraud dextrose agar and identified using macroscopic and microscopic method. Total number of identified fungal isolates (44), belonging to six genera from the study locations were, *Aspergillus* flavus, *Aspergillus terrus*, *Fusarium solani*, *Mucor indicus*, *Rhizopus nigricans*, *Trichophyton rubrum* and *Penicillium italicum* and subjected to ethanol, methanol and crude extract of *S. alata*. Results showed that ethanol and methanol extracts of *S. alata* completely inhibited the growth of *Trichophyton rubrum* (100%), *Aspergillus terrus* (100%), *Fusarium solani* (100%), *Mucor indicus* (100%), *Rhizopus nigricans* (100%), *Penicillium italicum* (100%), *Aspergillus flavus* (100%) while the results of the crude extract of ***S. alata*** showed that the fungal isolates were not inhibited. The activities of the extract on the fungal isolates were concentration dependent especially as high concentrations of the extracts proved more potent than those with low concentrations. The extracts hold a potential in treating diseases that might arise as a result of using barbing equipment contaminated with pathogenic fungi.

2nd UMYU Conf/2024/79

ANTIVIRAL ACTIVITIES OF *Allium Cepa* (ONION) PEEL EXTRACT AGAINST INFLUENZA VIRUS

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ABSTRACT

Influenza viral infection is a contagious airborne disease characterized by acute respiratory illness in all ages and patients with chronic illness and pregnant women. The aim of the study was to determine the antiviral activities of chloroform extract of *Allium cepa* peel (onion) on influenza virus using embryonated eggs. The pulverized onion peel was extracted successively in other of increasing polarity (n-hexane, chloroform). Qualitative and quantitative phytoconstituents of the chloroform extract was determined using the method described by the Association of Analytical Chemists (AOAC). The chloroform extract was found to contain alkaloids (7.22mg/g), terpenoids (2.89mg/g) phenols (2.83mg/g) tannins (2.61mg/g), saponins (2.61mg/g), steroids (2.54mg/g), glycosides (2.42mg/g), and flavonoids (2.70mg/g). There was significant inhibition of adverse structural changes in embryonated eggs and absence of clumping of red blood cells at 250mg/ml. Therefore, chloroform extract of *Allium cepa* may be useful in treatment of influenza viral infection.

Keywords: Influenza virus, *Allium cepa*, Antiviral, Phytochemical.

2nd UMYU Conf/2024/80

ASSESSMENT OF SENSITIVITY PATTERN OF THREE MULTIDRUG RESISTANT BACTERIAL ISOLATES TO SOME ANTIBIOTICS AMONG PATIENTS ATTENDING MURTALA MUHAMMAD HOSPITAL KANO STATE, NIGERIA

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ABSTRACT
Multidrug resistant (MDR) bacteria are commonly associated with nosocomial infections. However, their emergence at the community level has increased, making the infections treatment more difficult, namely the most common ones, such as the urinary tract infection (UTI) are one of the most common pathological condition both community and hospital settings. The aim of this research work is to investigate the current antibiotics resistance through susceptibility test among the targeted multidrug resistant isolates to three antibiotics chosen which was conducted at Murtala Muhammad Specialist Hospital Kano State. A total number of 30 isolates were collected confirmed (identified) and screen for susceptibility. The isolates were identified to be *Proteus mirabilis* 10 (33.3%), *Klebsiella pneumoniae* 12 (40%) and *Pseudomonas aeruginosa* 8 (26.6%). All the isolates were tested for antibiotic sensitivity pattern on three antibiotics Fasfomycin, Tarivid, and Eryvacycline. The isolated *Proteus mirabilis* was resistant to fosfomycin (33.3%), eryvacycline (33.3%), and Tarivid (33.3%). Klebsiella pneumonia was sensitive to fosfomycin (33.3%), tarivid (27.7%), and eryvacycline (16.6%) while *Pseudomonas aeroginosa* was also sensitive to fosfomycin (20.8%), tarivid (33.3%) and eryvacycline (25%). Based on this study the bacterial sensitivity profile reveals that fosfomycin, tarivid and eyrvacycline were highly effective aginst *Klebsiella pneumoniae* and Pseudomonas aeruginosa while on Proteus mirabilis fosfomycin, tarivid, and eryvacycline were resistant. Statistical analysis showed that there were significant effects of the three antibiotics on the isolates tested (**P.value 0.0014)**. It is recommended that for appropriate treatment and prevention of bacterial resistant, the pysicians should prescribe antibiotics depending on antibacterial susceptibility results.

2nd UMYU Conf/2024/081

CRISIS AT THE CROSS ROADS: DETERMINATION OF HEAVY METALS IN SOME SELECTED HERBAL MEDICINAL PREPARATIONS MARKETED IN KANO STATE, NIGERIA.

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ABSTRACT
Herbs are extensively consumed in Nigeria, for their medicinal properties and availability. This study aimed at determining the concentration of heavy metals residues in some selected traditional medicinal herbs consumed in Kano State, Nigeria. This is to assess their relative safety

and potential health risks to local inhabitants based on the world health organization standard limit.

A total of ten (10) powdered samples of medicinal preparations labeled A to J were purchased from the local markets in Kano metropolis and were analyzed for the presence of lead, chromium, cadmium and mercury contents. Plant samples were digested according to the method described by Street *et al.,* 2008, and heavy metal concentration was determined using Atomic Absorption Spectrometry (AAS). Metals found to be present varied in different concentrations in the herbal samples. The presence of heavy metal ranges as follows: 0.6-6.5mg/kg for chromium, 3.10-22.10mg/kg for lead, 0.08-0.60mg/kg for cadmium and 0.09-0.30mg/kg for mercury. However, the content of mercury was not detected in some samples. The findings of the study suggest that most of these samples were contaminated with high amount of lead chromium and cadmium, thus these herbs contain unsafe levels of heavy metals that exceeded the World Health Organization (WHO) permissible limits, in some of the samples the levels of Mercury found present did not exceed the permissible limit by World Health Organization.

Keywords; Traditional medicine, heavy metals, permissible limits and contamination.

2nd UMYU Conf/2024/082

DETERMINATION OF MICROBIAL CONTAMINATION IN SOME SELECTED HERBAL MEDICINAL PREPARATIONS MARKETED IN KANO STATE, NIGERIA

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ABSTRACT

The use of medicinal plants is continually expanding worldwide, according to a World Health Organization (WHO) report, around 80% of the world population relies on traditional medicines, largely based on plants. About ten samples of powdered and liquid traditional medicinal plants were purchased from local vendors across the five markets in Kano State. A spread plate technique was involved to test the analyzed samples for the presence of bacterial contamination using nutrient agar as selected media. The bacterial load was quantified in terms of colony-forming units per gram (CFU/g) for powdered samples and colony-forming units per milliliter (CFU/ml) for liquid samples. The result revealed substantial variations in bacterial counts, the least contamination was observed in powdered sample C 1.70×10^{7} CFU/g, while the highest contamination recorded 4.14×10^{15} CFU/ml for liquid sample D which is consumed by inhabitants of Kano State. No contamination was seen in liquid sample E. We identified a total of six bacterial isolates using cultural and morphological methods. Remarkably, the CFU/g and CFU/ml counts for nine of the samples exceeded the maximum permissible contamination levels for finished herbal medicine samples established by the World Health Organization (WHO) ($\leq 10^{5}$ CFU/g, /ml), except for only one liquid sample E recording about 1.00×10^{4} which was found to be less than the acceptable limit set by W.H.O, thus free of bacterial contamination. The study revealed that the bacterial counts in most of the samples exceeded the World Health Organization's permissible limits for medicinal plants, the samples were contaminated with *Escherichia coli*s *Staphylococus aureus, Enterobacter eurogenes, Klebsiella pneumonia, streptococcus faecalis and Salmonella typhi*.

Keywords: Ethno-medicinal plants, microbial contamination, microorganism

2nd UMYU Conf/2024/083

ISOLATION AND IDENTIFICATION OF COLIFORMS FROM WELL WATER IN SABON GIDA AREA GUSAU, ZAMFARA STATE, NIGERIA

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ABSTRACT
Majority of the population in Sabon Gida village depend on wells as their source of water supply. The aim of this study was to examine the microbial quality of well water in Sabon Gida, Zamfara State Nigeria as a way of safeguarding public health against water borne diseases. Nine Water samples from a total of three wells were assessed for their bacteriological quality using serial dilution to obtain total bacteria count. The total viable bacterial count ranged from 4.6×10^5 to 13.5×10^5 CFU/ml which was high and exceeded the recommended limit of 0 CFU/ml. These values are high and exceeded the standard limit of 0 coliforms per 1 ml set for untreated drinking water. The organisms isolated were further characterized using standard procedures. From the water samples collected and analyzed, *Escherichia coli*, *Klebsiella pneumonia* and *Enterobacter aerogenes* were isolated and identified. *Escherichia coli* had the highest percentage frequency of occurrence as 52.9%, followed by *Klebsiella pneumonia* with 35.3% and *Enterobacter aerogenes* had 11.8%. This result highlights the fact that most well water in Sabon gida are not safe microbiologically for drinking without additional treatment such as boiling or disinfection and this could lead to outbreak of water borne diseases. Good and proper environmental and personal hygiene must be maintained especially by the users of those wells to prevent possible outbreak of water borne diseases.

Keywords: Bacteria, water, diseases, coliforms, wells

2nd UMYU Conf/2024/084

DETERMINATION OF BACTERIAL DIVERSITY OF PIPE WATER WITHIN GUSAU METROPOLIS, ZAMFARA STATE, NIGERIA

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ABSTRACT
Pipe water is portable drinking water that also carries both extremely diverse but poorly identified microbial flora and complex organic matter. The aim of this study was to determine the bacterial diversity of pipe water within Gusau metropolis Zamfara state. Twelve pipe water samples were assessed and physiochemical parameters such as color, odor and taste were observed physically, while thermometer and pH meter were used to determine temperature and pH respectively. After serial dilution, a loopful of water was spread on to the surface of Nutrient agar to determine the total viable count. MacConkey broth and Eosin methylene blue agar were used to isolate coliform bacteria. The organisms isolated were further characterized using biochemical procedures. The water samples were clear in appearance, odorless and tasteless. The temperature value ranges from 20°C- 24°C while the pH value ranges from 7.0-7.6. The total viable count ranges from $1.7X10^5$CFU/ml-$5.4X10^5$ CFU/ml. *Escherichia coli Shigella* spp *Staphylococcus aureus, Pseudomonas* spp *and Klebsiella* spp were the possible organism isolated. This result indicates that the deterioration of pipe water within the distribution system could be as a result of breaking or leaking of the distribution pipes and therefore contamination occurs. Hence prompt report of leaking pipes should be made to the appropriate authorities to prevent the spread of waterborne diseases.

Keywords: Pipe water, Thermometer, Coliform, *Escherichia coli*, pH

2nd UMYU Conf/2024/085

COMPARATIVE STUDY BETWEEN RAPID DIAGNOSTIC TEST AND MICROSCOPY IN THE DIAGNOSIS OF MALARIA AMONG STUDENTS OF FEDERAL UNIVERSITY GUSAU

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ABSTRACT
Malaria is the most devastating parasitic disease of humans caused by *Plasmodium falciparum*. The conventional microscopy is the gold standard in laboratory diagnosis of malaria but, it requires time and trained personal to carry out the test. However, Rapid Diagnostic Tests (RDTs) could be considered in endemic regions especially in poor settings, where there is shortage of power supply and less qualified personnel. The aim of this study is to compare between Microscopy and Rapid Diagnostic Tests. A total of 200 students were tested for malaria parasite infection using Rapid Diagnostic test (RDTs) and microscopic examination. Out of the 200-samples tested, 115 (57.5%) samples were tested positive using microscopic examination and 99 (49.5) were positive for Rapid Diagnostic. Based on the results obtained from this study, it demonstrated that, microscopic examination remains the gold standard for malaria diagnosis and suitable for use in management and control of malaria.

Keywords: Malaria, Microscopy, Rapid diagnostic tests, and Diagnosis.

2nd UMYU Conf/2024/086

APPLICATION OF BIOSURFACTANT IN AGRICULTURE: A MINI REVIEW

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ABSTRACT
Microorganisms naturally produce biosurfactants, which are surface-active agents with special qualities that have a great impact on different aspects of agriculture. The present thorough analysis delves into the several functions of biosurfactants in the agricultural sector, highlighting their capacity to transform sustainable farming methods. The critical function of biosurfactants is described, including enhanced water retention, nutrient solubilization, and reduction of soil erosion, in order to increase soil health and nutrient availability. Moreover, biosurfactants become important agents in stimulating plant development, developing relationships with rhizosphere microorganisms, and enabling the uptake of nutrients, particularly in stressful environmental

circumstances. Biosurfactants enhance biological control in pest management by breaking down pest cell membranes, increasing the effectiveness of biopesticides, and lowering dependency on chemical substitutes. Examining the effects of biosurfactants on the environment, it is shown how biodegradable and less harmful they are than synthetic surfactants, which helps to promote sustainable farming methods. While these encouraging results are motivating, the review highlights the need for more research and development by addressing current issues and knowledge gaps. In light of biosurfactants' pivotal role in promoting sustainability and ecologically friendly farming methods, the conclusion calls for the broad use of these substances in agriculture. With the help of this review, biosurfactants may be further investigated and used, opening the door to a more resilient and environmentally friendly agricultural future.

Keywords: Microorganisms, Biosurfactants, Agriculture, Sustainability, Pest

2nd UMYU Conf/2024/087

ANTIMICROBIAL RESISTANCE PROFILE OF *Escherichia coli* ISOLATES IN SCHOOL FOOD SAMPLES: IMPLICATIONS FOR PUBLIC HEALTH

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ABSTRACT

Foodborne pathogens are the leading cause of illness and death worldwide, making food safety a critical aspect of school feeding programs. Ensuring the supply of safe food for children and adolescents of school age is of concern to the government and other stakeholders. The study aimed to assess the bacteriological quality of food from school feeding programs and determine the antibiotic susceptibility profile of *E. coli* isolates. A total of twelve (12) food samples were collected from two different boarding schools in Zuru town of Kebbi State. Bacteriological analysis conducted included total plate count, coliform count, and salmonella count. Standard microbiological techniques, including culture and biochemical tests, were employed to isolate and identify the bacteria. The antimicrobial susceptibility patterns of *E. coli* isolates were assessed using the disk diffusion method. Antibiotics tested included Amoxicillin/clavulanic acid, Erythromycin, Gentamicin, Ampicillin, Streptomycin, Tetracycline, Cefotaxime, Trimethoprim, and Amikacin. The total plate count ranged from 2.1×10^3 to 8.0×10^3 CFU/g, coliform count ranged from 2.0×10^2 to 9.3×10^2 CFU/g, and salmonella count ranged from 1.0×10^1 to 4.0×10^1 CFU/g. The results revealed that bacteria isolated from food samples collected included *Escherichia coli* (33.3%), *Staphylococcus aureus* (12.7%), Salmonella spp (33.3%), Enterobacter sp. (16.6%), and Klebsiella spp. (4.1%). The antibiotic susceptibility pattern results indicated varying degrees of resistance. The antibiotics with the highest resistance among the tested *Escherichia coli* isolates are Tetracycline (30g) and Amikacin (30g), with 100% of the isolates being resistant, while antibiotics with the highest susceptibility are Gentamicin (10g), Cefotaxime (30g), and Trimethoprim (20g), with 100% of the isolates being susceptible to each of these antibiotics. The results suggest that the meals provided to boarding school students pose a significant health risk. Therefore, it is recommended that strict food safety protocols be implemented to minimize contamination risks during food preparation, storage, and serving in school feeding programs.

Keywords: Antimicrobial resistance, *Escherichia coli*, school food samples, public health, antibiotic susceptibility patterns

2nd UMYU Conf/2024/088

PROXIMATE COMPOSITION AND MICROBIOLOGICAL QUALITY OF FURA SOLD IN GIDAN KWANO CAMPUS, BOSSO CAMPUS, GIDAN KWANO OFF-CAMPUS AND BOSSO OFF-CAMPUS OF FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE

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ABSTRACT
Fura is an indigenous food made from millet a cereal crop, this work determined the proximate composition and microbiological quality of fura from four different location at federal university of technology campus and off-campus. The result of the study shows that fura is a good source of crude protein, fat, crude fiber, Ash, carbohydrate and moisture content. The percentage of the proximate parameters varies among the four samples as a result of different steps in production, type of soil in which the millet is grown, the blending process, storage and packaging. The microbiological quality was also evaluated and bacterial found are as follows Staphylococcus *aureus, Escherichia coli, Pseudomonas aeruginosa, Klebsiella spp, Proteus spp, Bacillus subtilis,* and *Lactobacillus spp* while fungal identified are *Saccharomyces spp, Candida spp, Aspergillus niger* and *Debaryomyces castellii.* The microorganisms isolated from the fura was characterized and identify into species level and the disease they can cause when present in food consumed and way they can be prevented. Fura sample from GKO has the highest bacterial load of 2.04×10^5 while sample from GK has the lowest bacterial load of 9.8×10^4 and GKO sample with the highest fugal load of 1.04×10^5 while GK sample has the lowest fugal load of 4.2×10^4 which is above the standard for microbiological limit and standard for cereals and cereals grains food products for fungal cfu/g 10^2 and Bacteria cfu/g $10^{4.}$ The result showed that the fura was contaminated due to lack of hygiene which result to diarrhea, vomiting, scaley skin and urinary tract infection. The evaluation of the fura samples help to indicate possible way to upgrade the processing of fura production to a level safe for consumption which involves practicing good personal hygiene, using clean source of water that is good for drinking, fura should be well packaged to avoid constant contact with hands.

Keywords: Fura da nono, proximate analysis and microbial quality

2nd UMYU Conf/2024/089

GENERAL PUBLIC PERCEPTION ON NEGLECTED TROPICAL DISEASES (NTDS) AMONG LOCAL RESIDENTS OF KURFI TOWN OF KATSINA STATE, NIGERIA

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ABSTRACT
There is higher burden of NTDs in sub-Saharan Africa. However, public awareness and participation in NTDs control activities are uncertain. Therefore, a survey was carried out among the public to assess their knowledge aptitude and practice on the general public perception on Neglected Tropical Diseases (NTDs) among residents of Kurfi town of Katsina State, Nigeria. A questionnaire was administered to the randomly selected individuals in Kurfi Local Government

residents of 341 respondents that aimed to access the information on the general public perception of NTDs to reduce morbidity. The findings (97%) show that NTDs remain a public health problem even though the vast majority of them 215(63%) known the full meaning of NTDs. Moreover, statistically, there is no significant difference between sex groups that are aware on WHO NTDs control measures (P= 0.052) as the result of inadequate government interventions towards the elimination and control of NTDs especially in local areas, as such NTDs remain the public health problem that is why there is need to provide enough funds, raise research grand and public sensitization is enormously encouraged to control NTDs in local areas.

Keywords: NTDs, WHO, public health, disease

2nd UMYU Conf/2024/090

A SYSTEMATIC REVIEW ON PREVALENCE AND ANTIBIOTICS RESISTANCE OF *Pseudomonas aeruginosa* FROM CLINICAL SAMPLES IN NIGERIA

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ABSTRACT

Pseudomona aeruginosa is a multidrug-resistant opportunistic pathogen that is well-known for its widespread distribution, causing acute and chronic infection in immunocompromised individuals, and correlation with severe hospital-acquired infections, including ventilator-associated pneumonia, sepsis, urinary tract infections, gastrointestinal tract infections, and skin infections. An electronic database that included PubMed, Medline, Web of Science, Scopus, Google Scholar, and African Journals Online (AJOL) was used to conduct a thorough literature search in order to find pertinent publications. Reviving sixty-five (65) publications from previous researches articles published between 2012 and 2023 and used for this review. Following a study of the titles and abstracts of the papers that were retrieved, fourteen (14) publications were chosen for further review of their entire contents. The six geopolitical zones of Nigeria were used to separate the articles. Pseudomonas aeruginosa accounted for 750 of the 7046 microorganisms that were identified from clinical samples, according to the findings of fourteen (14) carefully chosen publications. The various classes of antibiotics that have been tested against recognized Pseudomonas aeruginosa include: PIP: Piperacillin; MEM; Meropenem ATM: aztreonam; CXM: cefuroxime; CIP: ciprofloxacin; AMX: Amoxicillin; ERY: Erythromycin; CAZ: ceftazidime; GEN: Gentamicin; OFL: Ofloxacin; CHL: chloramphenicol NIT: Nitrofurantoin; TET: tetracycline CTX: cotrimoxazole; and AMK: amikacin. This research highlights the prevalence of Pseudomonas aeruginosa and the antibiotic burden throughout different regions of Nigeria. It is intended to act as a cautionary tale and an advice for healthcare practitioners when administering antibiotics.

Keywords: Sepsis, *Pseudomonas*, Patients, Antibiotics Resistance, Nigeria

2nd UMYU Conf/2024/091

PRELIMINARY PHYTOCHEMICAL SCREENING, INVITRO ANTICANCER ACTIVITY OF AQUEOUS LEAVES EXTRACT OF *Acacia ataxacantha*

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ABSTRACT

Cancer is the name given to a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues. Cancer can start almost anywhere in the human body, which is made up of trillions of cells. The *herb Acacia ataxacantha* which belongs to Fabaceae family has multiple medicinal properties which include anti-fungal, anti-bacterial, anti-oxidant, anti-inflammatory, anti-diabetic, anti-cancerous, and neuro-protective activity. Preliminary qualitative phytochemical screening of the extract confirmed the presence of flavonoids, alkaloids, tannins, saponins glycosides, and phenolic compounds. The study emphasizes cytotoxic activity of aqueous leaf crude extract of *Acacia ataxacantha* on *SKOV3* ovarian cancer cell lines by cell titre glo assay method. Aqueous leaf extract of different concentrations (25µg/ml, 50µg/ml, 100µg/ml, 200µg/ml, and 400µg/ml) were treated with cell lines for 24 hours and 48 hours, out of these concentrations 400µg/ml showed maximum inhibitory effect. The result indicated that treatment of the cell lines with extract has significance negative effect on growth and or survival of the cells. According to the results, the effect of the extract is dose dependant. The results indicated that long term exposure of the cells to the extract has higher decreased of survival of the cancer cells indicating high toxicity effect of the plant to the cells.

Keywords: cancer, SKOV3, cell lines, *A. ataxacantha*

2nd UMYU Conf/2024/092

ASSESSMENT OF BACTERIOLOGICAL QUALITY OF WATER SOURCES IN KADUNA STATE UNIVERSITY, MAIN CAMPUS

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ABSTRACT

Water is essential for all forms of life, as the provision of safe water to the populace cannot be overemphasized. This study examined the bacteriological quality of four different sources of water at Kaduna State University, Main Campus. A total of 10 water samples comprising sachet, borehole, bottle and well water were collected from different locations within the Campus. Determination of Heterotrophic Plate Count (HPC) and Coliform Count was accomplished using Pour Plate and Most Probable Number (MPN) techniques respectively. The Isolated bacteria were identified using conventional biochemical tests following their isolation on selective and differential media. The results indicated that borehole and sachet water samples had a higher HPC than those of bottle and well water. Similarly, the Mean MPN index/100ml of borehole and sachet water samples were significantly higher than those of bottle and well water samples. The isolates identified were *E. coli* (28.60%), *Shigella* (19.05%), *Staphylococcus aureus* (19.05%), *Bacillus* species (4.80%), *Enterococcus* species (4.80%), *Streptococcus* species (4.80%), *Salmonella* species (4.80%), *Klebsiella* species (2.40%), *Pseudomonas aeruginosa* (9.50%) and *Proteus* species (2.40%). The detection of pathogens such as *Salmonella* species and coliform in the four sources of water constitutes a public health threat and therefore calls for need intervention by the relevant authorities to address the problem.

Keywords: Bacteria, water sources, most probable number, Kaduna state university.

2nd UMYU Conf/2024/093

ELECTROCHEMICAL ANALYSIS OF A PHOTOTROPHIC BACTERIA (PTB) IN A GLUCOSE−FED TWO CHAMBER MFC BY FABRICATING A 3D ANODE ELECTRODE.

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ABSTRACT
Over the past decades, research on microbial fuel cells (MFC) has been intensified, yet low power densities were recorded. Various MFC configurations, electrode fabrication, substrate type, and electrogenic microorganisms were applied to improve MFC performance. Despite the dual advantage of phototrophic bacteria (PTB): metabolizing organic waste substances and generating electricity, less research was conducted. Although significant energies were generated using unsustainable materials in electrode fabrication, this study focuses on using sustainable materials to fabricate a 3D anode electrode to harness the maximum energy generated by PTB. The unidentified PTB was studied morphologically and via biochemical tests (catalase and oxidase). To further characterise the PTB, molecular technique: 16S rRNA sequencing was adopted. The results indicated that the PTB is gram-negative, circular, non−motile, and facultatively anaerobic in chain−like arrangements. Analysis of the 16S rRNA partial sequence was conducted in the GenBank databases, 100 significant sequences with the lowest and highest similarities of 84.10% and 98.76% were recorded respectively. Out of which 13 strains have the highest similarities of >90%, all belonging to the genus *Dysgonomonas* with *D. oryzarvi* Dy73 (98.76%) as the closest. Reduced graphene oxide (rGO) was prepared using Hummer's method by depositing the rGO on nickel foam (Ni) which resulted in a change of Ni's ash color to black after the depositing and annealing. In addition to the SEM images which showed a continuous multi−layered 3D scaffold on the Ni, CV analyses indicated an increase in the electrochemical activities of the rGO−Ni electrode in comparison to Ni. The CV also confirmed the bacterium to be electrochemically active. The glucose−fed two−chamber MFC was run in a batch mode for 11 days for Ni and rGO−Ni electrodes, while carbon cloth was the cathode used for both runs. An approximate 0.29 W/m^2 power density was recorded for Ni, but six−fold of Ni's, 1.6 W/m^2 was generated by rGO−Ni. Conc.

Keywords: bioelectricity, phototrophic bacteria (PTB), microbial fuel cell, *Dysgonomonas*, 3D electrode, wastewater

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DISTRIBUTION AND ANTIBIOTIC RESISTANCE IN *Salmonella* and *Shigella* Species AMONG DIARRHEAL PATIENTS ATTENDING FEDERAL MEDICAL CENTRE YOLA, NIGERIA

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ABSTRACT
Antimicrobial resistance of Salmonella and Shigella continues to be an utmost public health challenge worldwide, especially in developing countries like Nigeria. This study was carried out to determine the frequency and antibiotic susceptibility of Salmonella and Shigella species among patients with diarrhea attending Federal medical centre Yola, Adamawa State based on their morphological and biochemical features and their reaction to several antibiotics. A total of 78 stool samples were collected for culture using standard methods, out of the 78 samples, 37 (47.4%) showed growth of

Salmonella and Shigella species. Using suitable biochemical tests, the isolates were confirmed as Salmonella typhi (35.1%), Samonella typhimurium (8.1%) and Shigella species (56.8%) with Shigella having the highest frequency. The antibiotic susceptibility test was performed using ten selected antibiotics (Ampicillin, Ceftriaxone, Cephalexin, Chloramphenicol, Ciprofloxacin, Co-trimoxazole, Gentamicin, Nitrofurantoin, Ofloxacin and Tetracycline). Susceptibility of Salmonella Typhi isolates were 76.9% to Gentamicin and Ceftriaxone, 61.5% to Ofloxacin, 53.8% to Chloramphenicol, Ciprofloxacin, Nitrofurantoin, 38.5% to Tetracycline, 30.8% to Co-trimoxazole, 23.1% to Cephalexin and 0% to Ampicillin. Susceptibility of Shigella species were 95.2% to Ofloxacin, 90.5% to Gentamicin, 85.7% to Ciprofloxacin, 66.7% to Ceftriaxone, 57.1% to Chloramphenicol, 52.4% to Nitrofurantoin, 33.3% to Tetracycline, 28.6% to Co-trimoxazole, 19% to Cephalexin and 4.8% to Ampicillin. While Salmonella Typhimurium had sensitivities of 66.7% to Ofloxacin, 100% to Gentamicin, Chloramphenicol, Nitrofurantoin, Ciprofloxacin, then 33.3% to Ampicillin, Cephalexin, Tetracycline, Co-trimoxazole and Ceftriaxone. High levels of drug resistance were detected in all species. It is therefore evident that these pathogens are relatively high and have develop complete resistance to the first line antibiotics. However, Gentamicin, Ofloxacin and Ciprofloxacin are drugs of choice for the treatment of infections caused by these pathogens. Thus, availability of potable water supplies, embracing hygienic practices and incessant assessment would curb the spread of these organisms.

Keywords: Antibiotic resistance, pathogens, diarrhea infections, public health

2nd UMYU Conf/2024/095

EVALUATING GROUNDWATER SAFETY: HEAVY METAL CONTAMINATION OF BOREHOLES ACROSS UYO METROPOLIS, AKWA IBOM STATE

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ABSTRACT
In the context of escalating concerns over water quality and its impact on public health, this study provides a comprehensive assessment of heavy metal concentration in borehole water within Uyo Metropolis in Akwa Ibom State, highlighting its potential health risks. Utilizing a robust methodological framework, the investigation involved the collection of five borehole water samples from ten strategically selected locations, followed by meticulous chemical analyses using Atomic Absorption Spectrophotometry (AAS) to quantify the concentrations of copper, zinc, iron, chromium, and nickel. The results revealed that all water samples contained iron concentrations surpassing the guidelines set by the World Health Organization (WHO) and Nigerian Standard for Drinking Water Quality (NSDWQ), indicating a pervasive risk to consumers. Additionally, elevated levels of nickel were detected in several samples, further exacerbating the public health implications. The findings underscore the critical need for policy intervention and infrastructure investment to ensure the safety and sustainability of water resources in urban settings.
Keywords: Water, Boreholes, Heavy Metal, Heavy Metal Concentrations, Health

2nd UMYU Conf/2024/096

DETECTION OF AFLATOXIN B1-PRODUCING FUNGI IN DRIED DATE PALM FRUIT SOLD IN ZARIA

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ABSTRACT
Dates are very good sources of energy, vitamins, dietary fibres, some amino acids, essential minerals as well as phytochemicals. The date fruit is prone to pre harvest and/or post-harvest mould infestation just like other agricultural products and this may cause serious problem to human health due to the production of toxic metabolites called mycotoxins. The date fruits were purchased from the four major (Tudun wada, Sabon gari, Samaru, and Zaria) markets of Zaria. The study focused on isolation and identification of fungi producing aflatoxin B1 (AFB1) from dried dates sold in Zaria, Kaduna State. The dates samples were inoculated directly onto the surface of potato dextrose agar (PDA) and the resulting colonies were subcultured on PDA slants as pure isolates. The isolates were subjected to screening using Neutral Red Dessicated Coconut agar (NRDCA) for aflatoxin production. The aflatoxin producing isolates were identified using macroscopic and microscopic characteristics, and enzyme linked immunosorbent assay (ELISA) was used to quantify the AFB1 levels in the date samples. Eleven of the fungal isolates were positive for aflatoxin production by producing blue fluorescence under the UV light at 350nm and were identified as *Aspergillus flavus*. The proximate analysis showed that the date palm fruits have carbohydrate (75.98 – 81.86%), fibre (2.93 – 3.65%), protein (4.99 – 8.62%), lipid (4.1 – 6.27%), ash (2.20 – 3.50%), and (4.32 – 6.52%) contents. The highest amount of AFB1 was found in ZAR 1 sample (255µg/Kg) and the lowest was found in ZAR 17 sample (68.8µg/Kg), both of which are above the recommended level set by National Agency for Food and Drug Administration and Control (NAFDAC). From the findings of this study, it has been observed that date palm fruits could harbour aflatoxin-producing fungi, thus dates should be preserved in condition that prevent the proliferation of fungi.
Keywords: Date palm, *Aspergillus flavus*, Aflatoxin B1, ELISA, Zaria

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ENHANCING THE CONTROL OF MOSQUITO LARVAE USING *Bacillus Thuringiensis*

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ABSTRACT
Mosquito being a *Plasmodium* species vector is a major public health threat and economic burden to the endemic countries. The conventional way of reducing the incidences of *Plasmodium* Malaria involved the application of insecticides to Mosquitoes breeding places. The study aimed at assessing the Potential of *Bacillus thuringiensis* in the control of mosquito larvae. *Bacillus thuringensis* was isolated from soil samples in Katsina metropolis. Optimization of the Bacteria culture conditions was carried out using relevant selected parameters (pH, temperature, salinity and inoculum volume) based on single factor at a time analysis. The Mosquito larvae were

obtained from Kofar Marusa water outlet, Katsina and characterized based on its morphological and larvicidal stages (instar). The larvae toxicity test was carried out using the prepared inoculums of *B. thuringensis* as mortality rate among the larvae was recorded at intervals. The results obtained indicate the growth of *Bacillus thuringiensis* as $2.01 \times 10^3 \pm 0.03$ CFU/mL to $3.62 \times 10^3 \pm 0.02$ CFU/mL. The highest and lowest percentage toxicity obtained were 85% and 50% respectively. This indicates *B. thuringiensis* represents effective alternative to chemical insecticides in the control of mosquitos' larvae. The toxins were safe for non-target species and human health, and so far, no resistance among the target was detected. As integrated pest management system campaign on the use of bioinsecticide, enhancing the growth of this organism can serve as better alternative to chemical insecticides which are harmful in the ecosystem due to its specificity and eco-friendly nature.

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SCREENING FOR PLASMID MEDIATED ANTIBIOTIC RESISTANCE AMONG MULTI DRUG RESISTANT BACTERIA ASSOCIATED WITH LOWER RESPIRATORY TRACT INFECTIONS ATTENDING SOME HOSPITALS IN KANO METROPOLIS

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ABSTRACT

Lower Respiratory tract infections (LTRIs) are among serious infections in humans that have been worsen by the emergence of drug resistant bacteria and aggravated by plasmids transfer. The aim of the study was to screen Multidrug resistant bacteria (MDR) for the presence of Plasmid mediated antibiotic resistance from patients with LTRIs attending some hospitals in Kano. Sputum samples (400) were collected from patients with LTRIs and processed using standard microbiological procedure for the isolation of lower respiratory tract bacteria. The identified isolates were subjected to antimicrobial susceptibility testing using disc diffusion method. Multidrug resistant isolates were further subjected to Plasmid curing and the cured the isolates were tested for loss of drug resistance. Among the 400 samples, 185 (46.2 %) harbored significant bacterial growth with 83 (44.9 %) gram positive and 102 (55.1%) gram negative bacteria. Bacteria isolated include *Escherichia coli* (29), *Klebsiella pneumoniae* (46), *Moraxella catarrhalis* (13), *Pseudomonas aerugonosa* (14), *Staphylococcus aureus* (24) and *Streptococcus pneumoniae* (59). Higher infection rate was recorded in males (67.66%) and patients aged 41-50 years (32.9%). The highest resistance was exhibited by *Klebsiella pneumoniae* (93%) against cefuroxime, followed by *Streptococcus pneumoniae* against oxacillin (75%). Of the 185 isolates 37 (20%) were MDR, out of which 25 (67.6%) isolates had Plasmids. Following curing, 20 (80%) of the isolates retained their plasmids, most importantly *Escherichia coli* and *Klebsiella pneumoniae* were found to be sensitive to levofloxacin, gentamicin and imipenem, but retained their resistance to Cefuroxime, while *Streptococcus pneumoniae* was found to be sensitive to levofloxacin only with highest resistance to oxacillin, doxycycline, erythromycin. The study establishes a high prevalence of MDR isolates among LTRIs with some exhibiting plasmid mediated resistance and therefore recommends treatment options to be solely based antibiotic susceptibility testing and continuous plasmid profiling to detect plasmid mediated resistance to enable appropriate drug administration.

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PRODUCTION OF BIOETHANOL FROM BANANA (*Musa sapientum*) PEELS USING *Saccharomyces cerevisiae*

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ABSTRACT

Fossil fuels are the major sources of energy worldwide. The use of fossil fuel is associated problems including global warming, climate change, energy and security problems has necessitated the emergence of different approaches to clean energy generation. Using banana peels for bioethanol generation converts renewable substrates into useful products, to solve waste-related environmental problems. The banana peels were obtained from Ajiwa (Tinga) local markets, and the moisture, ash, protein, fat, crude fibre, and carbohydrate contents were determined using standard methods. *S. cerevisiae* was isolated from burukutu obtained from Mami market, Katsina and *A. niger* was isolated from a decayed bread sample. These were identified based on macroscopic (morphology)/microscopic (lactophenol cotton blue staining) characteristics and comparison with fungal atlas. The ability of the *S. Cerevisiae*was characterised using stress tolerance (thermo/ethanol tolerance), glucose utilisation and sugar fermentation test were evaluated according to standard methods. Thereafter, the banana peel flower was subjected to alkaline (NaOH) pre-treatment, autoclaved and filtered. Enzymatic hydrolysis using 0.4g of the Enzymes Complex of Novozymes Biomass Kit (Novozymes, Denmark), containing cellulase, xylanase, β-glucosidase and hemicellulase (cellobiase). Bioethanol was produced via simultaneous saccharification and fermentation, with setups FE and FA serving as controls, while set-ups FEB and FAB were fermented using *S. cerevisiae* obtained from burukutu, and FEY and FAY set-ups were fermented using baker's yeast. Fermentation set-ups were fermented for 5 days and ethanol production was monitored using optical density, after drawing the ethanol calibration curve, based on 10-100% ethanol concentrations. Temperature (20, 30 and 40℃) and pH (pH 6, 7 and 8) were optimised using Single factor optimizations (SFO). The fermentation product was distilled at 78℃ and the ethanol produced was confirmed by its sweet ester smell. The chemical compounds present in the various fermentation set-ups were analysed using GC-MS Analysis. The results showed that carbohydrates were the major components both before (61.67± 0.35) and after pre-treatment (66.81± 0.62). The isolates had good amylase production abilities (maximum = 45± 6.2 mm), exhibited thermotolerance, tolerated the ethanol and glucose concentrations tested, and fermented all tested sugars. Single factor optimizations (SFO) results showed that pH 6 and 30 °C were the best for bioethanol production. GC-MS results showed that the highest number of ethanolic compounds were detected at pH6 (4 compounds) and 30℃ (5), while at 40℃, only 1 compound was detected. Conclusively, this study aimed at determining the proximate compositions of banana peel flour, and producing bioethanol from it, the study proved that bioethanol can be produced using cheap substrates from local wastes, and upon further research about the economic cost analysis of converting banana peels to bioethanol, the large scale production of bioethanol in Nigeria can become a reality.

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Comparative Effects of Exclusive Breastfeeding and Formula Feeding on Neonatal Gut Microbiome within Katsina Metropolis

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ABSTRACT

Numerous studies performed in recent years have demonstrated the complexity of neonatal gut microbiome, as well as several endogenous and exogenous factors that affect its nature. Type of feeding, for instance, plays a major role in the shaping of intestinal microbiota in early life. The aim of this study was to compare the effects of breastmilk and infant formulae on gut microbiota of newborns in Katsina metropolis. Faecal samples collected from 46 neonates (33 exclusively breast-fed, 10 formula-fed, and 3 mix-fed) were analysed using culture-dependent method. Colony enumerations and pH measurements were carried out for intergroup comparison. Mean weight of study participants was 2.88±0.1 kg, with exclusively breastfed infants (BFI) weighing significantly higher (p = 0.03) than formula-fed infants (FFI). The selected bacteria for this study (*Bifidobacterium spp.*, *Staphylococcus spp.*, *Escherichia spp.*, and *Lactobacillus spp.)* were found in all feeding groups. Among BFI, nearly equal loads (24%) of *Escherichia spp. and Bifidobacterium spp. were observed. Staphylococcus spp.* dominated the overall bacterial load (32%) in BFI, as well as in FFI (34%) groups. Except in *Escherichia spp. (p = 0.01)*, no significant differences in loads of all cultivated bacteria across all feeding groups. This difference in *Escherichia spp. load was isolated between BFI and MFI (p = 0.01)*, as well as FFI and MFI *(p = 0.02) only.* There was no overall significant relationship between bacterial load and mode of delivery among feeding groups (p = 0.6). The average fecal pH of breastfed infants was (5.09±01), significantly lower (p = <0.001) than the formula-fed group (5.9±0.1). Despite recent breakthrough in enrichment of infant formulae with probiotics and other bifidogenic substances, its differences with breastmilk in terms of fecal bacterial load, although narrow, still exists, and both methods invariably exert important influence in composition and functions on neonatal gut microbiome.

Keywords: Breastfeeding, Formula-feeding, Fecal sample, Bacterial load

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MOLECULAR DOCKING OF PHYTOCOMPOUNDS FROM *Mentha Piperita* LEAF EXTRACT AS PROMISING INHIBITORY AGENTS AGAINST *Candida Albicans*'s GLUCOSAMINE-6-PHOSPHATE SYNTHASE

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ABSTRACT

Mentha piperita (Peppermint) plant is perennial aromatic herb belongs to family of Lamiaceae, cultivated in most part of the world and have been used traditionally in folk medicine. The aim of this research was to evaluate and identify the active phytochemical constituents of *Mentha piperita* leaf extract that inhibit *Candida albicans'* glucosamine-6-phosphate synthase. The plant materials were collected from Janyau, Gada Biyu area along Sokoto Road, Gusau, Zamfara, Nigeria and identified at herbarium section of Biological Science Department, Federal University Gusau. The plant leaf was extracted using soxhlet method and analyses the presence of

phytochemical constituents. The thin layer chromatography (TLC) of the extracts of *Mentha piperita* was performed on glass slides coated with silica gel (0.2mm Kiesel-gel 60 F254, Merck), the fraction obtained were analyzed using Bioautography Agar Overlay Technique and HPLC-DAD analysis in order to identify the bioactive compounds. The result of phytochemical analysis revealed the presence of secondary metabolite such as phenol, tanins, Saponins, Flavonoid, Alkaloid and Glycoside. Thin layer chromatography (TLC) separation of aqueous extracts provided one compound with R_f value 0.52 while methanol and n-hexane extract showed two compound each with R_f value of 0.79 and 0.74, 0.72 and 0.70. The most bioactive component among the five components is Q1 and M1 as showed by bioautography. The bioactive constituents were identified by high performance liquid chromatography are rutin, Apigenin, Luteolin, caffeic acid vanillic acid naringenin, Rosmarinic acid

Keywords: *Mentha piperita*, Molecular Docking, *Candida albicans*, Phytocompounds,

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MENACE OF EBOLA VIRUS DISEASE: A REVIEW

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ABSTRACT
Ebola Virus Disease (EVD) a deadly disease that affect human and apes like gorilla, chimpanzee antelopes and so on. The causative virus is found mostly in Africa. It had been uncovered first in mid 1970s on the brink of the River of Ebola village. Since from the primary inception of the strange disease in Democratic Republic of Congo, there has been a periodic outbreak of the disease in some African countries, affecting many people within the region. A systematic review was conducted using Google search Engine, Cochrane database systemic review (CDSR), Centre for Disease Control and prevention and World Health Organization EVD report Databases. The 2014-2016 Ebola outbreaks in West Africa were the most important and most complex, which began in Guinea and spread to Liberia, Nigeria and Sierra Leone. Before the disease is contained, it kills about 11,000 people and quite 28,000 people being affected from it first mid 1970s detection to late 2016. The virus is transmitted from fruit bat in touch of with other animals and passes on the infection to humans through handling infected, dead or sick animals found within the forest or through direct contact with bats. Human to human transmission occurs through direct contact with the blood, secretions and other body fluids. Symptoms of the virus are: sudden onset of fever, fatigue, muscle pain, headache, sore throat, vomiting, diarrhea, rash, impaired kidney and liver function, and bleeding from body openings. Recent advancements have been carried out in the form of effective Ebola Virus Vaccine Inmazeb and Ebanga for Zaire Ebola Virus and anti-Ebola virus drug rVSV-ZEBOV (Ervebo). However, the rapid geographic propagation, non-specific clinical presentation, lack of adequate vaccine and specific diagnostic assay are the possible challenges to combat the dreaded public health menace of Ebola Virus Disease.

Keywords: Ebola Virus, Disease, Transmission, Treatment, Vaccine.

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ANTIBIOTIC SUSCEPTIBILITY PATTERN OF BACTERIA ISOLATED FROM BROILER AND LOCAL CHICKEN CARCASSES

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ABSTRACT
The use of antibiotics in the poultry industry poses significant risks including an increase of antibiotic-resistant bacteria in the environment. In chickens through the food chain, resistant genes are transferred through meat and eggs. This study aims to assess the antibiotic susceptibility of bacteria isolated from broiler and local chicken carcasses in Katsina state. A total of 20 samples were collected and analyzed for bacterial isolation, identification using conventional methods and antibiotic susceptibility testing using the Kirby baurer method. The most prevalent bacteria isolated from broiler chicken were *Pseudomonas* and *Proteus spp* 10(27%) each while in local chicken *Proteus spp* had the highest prevalence of 10(32%). The least occurrence was recorded from *E.coli spp in* broiler 8(21.6%) and *Salmonella spp* 6(19.4%) in local chicken. The isolates exhibited various degrees of antibiotic resistance with high susceptibility to Erythromycin from broiler chicken isolates while isolates from local chicken were sensitive to Gentamycin, Zinacef and Erythromycin. Isolates from broiler chicken were resistant to Amoxicillin, Rocephin and Ampicillin while resistance in local chicken was recorded only in Amoxicillin. Findings from this study confirms the existence of antibiotic-resistant bacteria in broiler and local chicken carcasses with isolates from broiler chicken showing higher resistance and less sensitivity to the antibiotics tested as well as reduced presence of pathogens associated with poultry. This emphasizes the need for regular monitoring, the implementation of proper waste management practices, and the optimization of antibiotic use in the poultry industry.

Keywords: Antibiotic, Susceptibility, Poultry Chicken Carcass.

2nd UMYU Conf/2024/104

ISOLATION AND IDENTIFICATION OF BACTERIA IN PASTEURIZED POWDERED MILK SOLD IN OGUN, LAGOS AND OYO, SOUTHWEST, NIGERIA

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ABSTRACT
Milk is consumed by both young and old due to its nutritional benefit. However, it is a perfect medium for the growth of many microorganisms. This study was carried out to isolate and identify bacteria in milk powder sold in Ogun, Lagos and Oyo, Southwest, Nigeria. Three (3) samples each of five different brands were used for the analysis. 1ml of each milk sample homogenized with 10 ml of nutrient broth and incubated overnight at 37°C. After incubation, the bacteria were plated on Mac-Conkey, EMB and Nutrient agar. The identified organisms were identified by partial sequencing of 16SrRNA genes. They were tested against Cefuroxime (30 µg), Gentamicin (10 µg), Erythromycin (15 µg), Ofloxacin (5 µg), Augmentin (30 µg) , Ceftazidime (30 µg), Cefuroxime (30 µg), Acyclovir (1.3 µg), Cefotaxime (25 µg), Imipenem (10

µg), Ofloxacin (5 µg), Nalidixic Acid (30 µg), Cefixime (5 µg), Ceftriaxone(45 µg), Sulbactam (10 µg), Levofloxacin (5 µg), Nitrofurantoin (300 µg), Ciprofloxacin (5 µg), Nitrofurantoin (300 µg), Azthromycin (15 µg). The result from the molecular test revealed the presence of five bacterial species: *Pseudomonas aeruginosa*, *Bacillus cereus*, *Brevibacillus agri*, *Lysinibacillus sphaericus* and *Bacillus thuringiensis.* *Pseudomonas aeruginosa* was sensitive to Gentamicin and Cefuroxime but more sensitive to Nitrofurantoin (80.0%). *Brevibacillus agri* (LATC3) show sensitivity to Gentamicin and Cefuroxime but more sensitive to gentamicin (55.00%). *Bacillus cereus* (LAKG2 and LAC2) shows sensitivity to Ofloxacin, Cefotaxime, Augmentin, Acyclovir, Levofloxacin but more sensitive to Ceftriaxone 60%. The presence of the bacteria shows the presence of some pathogenic organisms in the microbial populations despite pasteurization. This can occur as a result of poor storage of milk products by retailers or poor sanitization of equipment and facilities during production and packaging. Therefore, it is essential to monitor the microbial quality of pasteurized milk to ensure its safety and shelf life.

Keywords: Antibacterial sensitivity, Homogenized, Pasteurization, Pathogenic, Spoilage.

2nd UMYU Conf/2024/105

ISOLATION, CHARACTERIZATION AND ANTIBIOGRAM OF *Staphylococcus aureus* ISOLATED FROM DRIED MEAT (KILISHI) SOLD IN SELECTED LOCATIONS IN GUSAU METROPOLIS

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ABSTRACT
Staphylococcus aureus, a Gram-positive bacterium, is a common foodborne pathogen associated with various meat products, including dried meat. Infections caused by this organism remain a serious threat to public health. In this study, we isolated and characterized *Staphylococcus aureus* strains obtained from dried meat (kilishi) samples. A total of twenty-five (25) kilishi samples were collected from five locations (Lalan, Nassarawa, Samaru, Tudun-Wada and Sabon-Gari) in Gusau Metropolis. Mannitol Salt Agar (MSA) was used for the isolation of *Staphylococcus aureus.* Twelve 12 (48.0%) isolates were characterized using morphological and biochemical tests and were tested for susceptibility against a panel of eight commonly used antibiotics which were Gentamycin (10 ug), Penicillin (10 ug), Ciprofloxacin (5 ug), Tetracyline (30 ug), Clindamycin (5 ug), Cefoxitin (30 ug), Linzolid (30 ug) and Rifampicin (15 ug) using the Kirby-Bauer method. Results revealed a higher prevalence 4 (16.0%) of *Staphylococcus aureus* in samples from Nassarawa as compared to 3 (12.0%), 2 (8.0%), 2 (8.0%) and 1(4.0%) for Samaru, Tudun-Wada, Sabon-Gari and Lalan respectively. For the antibiogram, high susceptibility was observed to Gentamicin (91.7%), Clindamycin (75%), Tetracycline (66.7%), and Linezolid (83.3%). The isolates were resistant to Penicillin (100%), Rifampicin (91.7%), and Cefoxitin (66.7%). The isolation of *Staphylococcus aureus* in kilishi samples, highlights the potential contamination of dried meat products. Varying degrees of resistance among the *isolated* strains to multiple antibiotics emphasize the need for controlled use of antibiotics in food production and the importance of continuous monitoring of antibiotic resistance in foodborne pathogens. There is need for underscoring the significance of food safety measures to mitigate potential health risks associated with it consumption.

Keywords: Foodborne Pathogens, Dried Meat Contamination, Antibiotic Susceptibility Testing, Meat Safety Assessment, *Staphylococcus aureus* Isolation

2nd UMYU Conf/2024/106

PLASMID CURING OF BACTERIA ISOLATED FROM UPPER RESPIRATORY TRACT INFECTIONS AMONG PATIENTS ATTENDING SPECIALIST HOSPITAL SOKOTO

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ABSTRACT
This study was aimed at curing of antibiotic resistant bacteria from cases of upper respiratory tract infections among patients attending Specialist Hospital Sokoto. One hundred (100) swab samples were collected from both male and females. The methods for the isolation and identification of the isolates were carried out according to standard methods. Susceptibility tests of the isolates to various beta-lactam antibiotics were carried out. Resistant bacteria were subjected to plasmid curing experiments followed by reassessment of the cured bacteria to the antibiotics to which they were previously resistant. The results of bacteria isolated and identified were *Staphylococcus aureus*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa* with the frequency of occurrence of 20 (57.2%), 9 (25.7%) and 6 (17.1%) respectively. The result of antibiotic susceptibility tests before plasmid curing showed that *Staphylococcus aureus*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa* are resistant to Cloxacillin, Cefuroxime, Cloxacillin and Augmentin. And result after curing showed that almost all bacteria have reverted to sensitivity to all antibiotics except Cloxacillin and Augmentin. The implication of this research is that the resistant possessed by the organisms isolated may easily be transferred to other non-resistant bacteria which may lead to an alarming rate of antimicrobial resistance in the study area.

Keywords: Plasmid curing, upper respiratory tract, bacterial isolate and infection

2nd UMYU Conf/2024/107

ANTIBACTERIAL SUSCEPTIBILITY OF GRAM NEGATIVE BACTERIA ISOLATED FROM STUDENTS URINE AT AL-QALAM UNIVERSITY.

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ABSTRACT
Gram negative bacteria are the major cause of urinary tract infections in humans. This study investigated the and antibiotic susceptibility of gram negative bacteria isolated from urine samples of students at Al-Qalam University Katsina, 15 early morning urine samples were collected and analyzed, Gram negative bacteria were isolated and identified using standard microbiological procedures, followed by antibiotic susceptibility testing using Kirby-Baurer diffusion method. Out of the 15 urine samples analyzed, 12 yielded significant bacterial growth. The gram negative bacteria identified were *E. coli* , *Klebsiella* spp. followed by *Enterobacter* Spp. Antibiotic susceptibility revealed that the mentioned bacterial species were sensitive to Ciprofloxacin, Ofloxacin and Gentamycin but resistant to Augmentin, Streptomycin, Chloramphenicol. Therefore, Septrin, Spiramycin and Gentamycin were recommended for the treatment of Urinary Tract Infection in that population.

Keywords: Urine, Gram negative bacteria, Antibiotic disc diffusion, Students.

2nd UMYU Conf/2024/108

In-Vitro ANTI-TUBERCULAR ACTIVITIES OF *ARCHACHATINA MARGINATA* SLIME EXTRACT AGAINST *Mycobacterium* species

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ABSTRACT
Current tuberculosis treatment is a long course of combination of two or more antibiotics that is often associated with toxic side effect and poor patient compliance which has led to the recent report of drug resistant strains of *Mycobacterium tuberculosis*. The problem of drug resistant is couple with the Mycobacterial persistent in mammalian cell, thus the need for the development of such drugs that will not only be active against the *Mycobacterium* species but as well kill persistent *Mycobacterium* species within the shortest possible time. In this study, In-vitro anti-tubercular activity of acetone extract of *Archachatina marginata* (snail slime) was investigated against *Mycobacterium tuberculosis* $H_{37}R_{v,}$ *M. bovis* (BCG) and *M. smegmatis* using micro-broth dilution method. The activity was compared with rifampicin (0.02µ/ml). The acetone extract at 50mg/ml concentration inhibited the growth of *Mycobacterium tuberculosis* $H_{37}R_v$, *M. bovis* (BCG) and *M. smegmatis* with minimum inhibitory concentration of 3.13mg/ml, 6.25mg/ml and 6.25mg/ml respectively and minimum bactericidal concentration of 6.25mg/ml, 12.50mg/ml and 12.50mg/ml respectively. The results obtained showed that *Archachatina marginata* extract is effective against *Mycobacterium* species and may have therapeutic value in the treatment of tuberculosis.

Keywords: *Archachatina marginata*, acetone extract, *Mycobacterium* species, MIC, MBC

2nd UMYU Conf/2024/109

BACTERIOLOGICAL QUALITY OF ROADSIDE ROASTED MEAT WITHIN KATSINA METROPOLIS

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ABSTRACT
Roasted meat is the perishable of all important foods since it contains special nutrients needed to support the growth of microorganisms. Consumption of roasted meat is a popular culinary practice, but concerns arise regarding the potential microbial contamination during the animal slaughter, meat processing and roasting. Understanding the microbial risks associated with roasted meat consumption is crucial for ensuring food safety and preventing potential health hazards among consumers. Foodborne infections and illnesses are the major international health problem with consequence economic losses. The study aims to determine the bacteriological quality of roadside roasted meat within Katsina metropolis. Fifteen (15) samples were randomly collected from three different locations (Rafindadi, Abbatoir, and kofarguga) and were analyzed microbiologically to determine bacterial contamination. The mean microbial count obtained from Rafindadi was 6.9×10^6 cfu/g, Kofarguga had $8.5x10^6$ cfu/g, and Abbatoir had the hihgest mean

count of $1.1x10^7$ cfu/g. *Escherichia coli*, *Staphylococcus aureus* and *Salmonella* species were isolated and identified using series of biochemical tests. *Escherichia coli* had the highest frequency of occurrence (65%) followed by *Staphylococcus aureus* (20%) and *Salmonella* spp. had the least frequency of occurrence (15%). Presence of these pathogenic bacteria in the samples analysed indicate public health hazard and give a warning signal for the possible occurrence of foodborne infections. Therefore, Proper meat inspection, screening and elimination of unhealthy animals should be strictly adhered to, also Regulatory agencies such as NAFDAC should ensure that adequate sanitary measures are strictly adhered from slaughter houses to meat processing.

Keywords: Roasted Meat, Food borne Intoxication, *Escherichia coli, Staphylococcus aureus, Salmonella spp.*

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BIOINFORMATIC SCREENING (*in-silico*) OF SUBTILISIN ENCODING-GENE AND PHYLOGENETIC ANALYSIS AMONG *Bacillus subtilis* GROUP.

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ABSTRACT
In-*silico* screening of subtilisin encoding-gene among members of *Bacillus subtilis* group was conducted to determine the presence of gene which code for the production of subtilisin protein from the whole genome sequences of *B. subtilis subsp. Subtilis strain SRCM101441*, *B.subtilis subsp.spizizenii strain TU-B-10*, *B. firmus strain T8*, *B. licheniformis strain BL1202*, *B. mojavensis strain UCMB5075*, *B. vallismortis strain NBIF-001*, *B. clausii strain KSM-K16 DNA*, *B. lentus strain NCTC4824*, *B. sonorensis strain PMC204*, *B. amyloliquefaciens strain HM618 and B. atrophaeus strain MBLB1156* retrieved from nucleotide database of the national center for biotechnology information using basic local alignment search tool (tBLASTn) between amino acid sequences of subtilisin protein retrieved from protein database of NCBI and complete nucleotide sequences of each strain of *Bacillus subtilis* group. Subtilisin is increasingly becoming an important valuable enzyme because of its industrial and medical applications, such as production of pharmaceuticals, biomedicals, food, detergent, cosmetics, wool and leather. The results of this study revealed location or region (1173298-1174440 nucleotides) having 99% similarities with subtilisin protein in the complete genome of Bacillus subtilis subsp. subtilis. Phylogenetic analysis of the members of *Bacillus subtilis* group using multiple sequence alignment showed high similarities which range from 99.55% - 92.54% with *Bacillus subtilis subsp. subtilis*. Its concluded that subtilisin can be produced for commercial and research purposes using *B. subtilis subsp. Subtilis strain SRCM101441*, *B. subtilis subsp. spizizenii TU-B-10*, *B. mojavensis strain UCMB5075 and B. amyloliquefaciens strain HM618.*

Keywords: Subtilisin, gene, genome, database, proteins, BLAST, *Bacillus*

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ANTI-BACTERIAL EFFECTS OF CRUDE EXTRACTS OF PEPPERMINT LEAF AND PERSLEY LEAF AGAINST *Methicillin-Resistant Staphylococcus Aureus* (MRSA)

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ABSTRACT
Methicillin-resistant Staphylococcus aureus is a major public health concern, causing significant morbidity and mortality worldwide. It is a Gram-positive bacterium that has developed resistance to most commonly used antibiotics, including methicillin, leading to limited treatment options and increased healthcare costs. MRSA poses a significant worldwide public health threat, presenting a therapeutic dilemma due to the limited and expensive antibacterial treatment options. The evolving epidemiology of MRSA infections, diverse resistance to community settings is impacting the utilization and effectiveness of existing anti-infective medications, hence the need for evaluation of the effects of extracts of medicinal plant extracts which have antimicrobial activity against MRSA strains. The research was carried out in the Microbiology Department Laboratory at Federal University of Technology Minna. In this study, crude extracts of peppermint (*Mentha piperita*) and parsley (*Petroselinum crispum*) underwent successive extraction using methanol, ethanol, and water (aqueous) through a soxhlet apparatus. Only peppermint extract with an aqueous solvent (PPaq) displayed moderate activity at 75 mg/ml, producing a 5 mm zone of inhibition, which increased to 7 mm at 100 mg/ml. The aqueous extract of parsley (paq) shows the strongest activity, with zones of inhibition reaching 8mm at 100mg/ml. The results obtained suggest the potential of these extracts to impede MRSA growth at specific concentrations.

Keywords: *Mentha piperita*, *Petroselinum crispum*, *Anti-bacterial*, Crude extract, MRS

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DETERMINATION OF SERUM CREATININE AND UREA LEVELS IN TYPE 2 DIABETIC PATIENTS ATTENDING ENDOCRINE CLINIC AT FEDERAL MEDICAL CENTRE NGURU, YOBE STATE, NIGERIA.

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ABSTRACT
Diabetes Mellitus (DM) is a chronic metabolic disease characterized by an increase level of blood glucose that leads overtime to serious damage to the heart, blood vessels, eyes, kidneys and nerves. It is an epidemic disease occurring in humans throughout the Universe and is the leading contributor of blindness, kidney failure, lower limbs amputation and heart attack. The study aimed to determine seroprevalence of urea and creatinine among patient with type 2 DM, to describe association between serum urea, creatinine levels, and sex in patient with type 2 DM and to establish relationship between blood sugar levels with creatinine and urea, in diabetic and non-diabetic subjects attending endocrine clinic at Federal Medical Centre Nguru. This is an experimental research conducted with total of 369 participants 265 of whom are type 2 diabetic

patients that served as "test" and 104 non-diabetic subjects as control who are within the age range of 30 years and above. Serum glucose was estimated by glucose-oxidase peroxidase (GOD-POD) method, creatinine was determined using Jaffe's method and urea was estimated using urease Berthelot's method. Among the 265 type 2 diabetic patients 118 (44.5%) were male and 147 (55.5%) were female, whereas amongst the control subjects 52 (50%) were male and 52 (50%) were female. The study findings revealed that creatinine and urea levels in type 2 diabetic patients were higher in comparison with non-diabetic subjects for both male and female. There was a positive and moderate relationship between urea and creatinine levels in the blood of type 2 diabetic patients +0.35 (P< 005). Among the type 2 diabetic patients 48 have high serum creatinine level, 102 of them have high serum urea level only, and among them 15 and 33 have both high serum creatinine and urea level respectively. This revealed that there is a strong correlation between blood creatinine with urea level in type 2 diabetes patients. Thus, renal damages as shown by elevated level of creatinine and urea in diabetic patient is likely due to high level of uncontrolled serum glucose. Therefore, it is concluded that good control of blood sugar levels is necessary to prevents development of diabetic nephropathy in patients.

Keywords: Type 2 Diabetes Mellitus, Glucose, Creatinine and Urea.

2nd UMYU Conf/2024/113

DETERMINATION OF PHYSICOCHEMICAL AND MICROBIAL PROPERTIES OF SOME DAIRY CATTLE PRODUCTS SOLD IN KWAMI L.G.A OF GOMBE STATE, NIGERIA.

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ABSTRACT

Milk is a white liquid produced by the mammary glands of female mammals to nourish their younger ones. Milk is obtained from certain animals especially cows, and serves as food for humans. The aim of the study was to evaluate the microbial and physicochemical properties of dairy products (Fresh milk & Kindirmo) sold in Kwami local government area of Gombe state, Nigeria. Samples of local milk products (Fresh milk and Kindirmo) were subjected to microbial and physicochemical screening. The microbial screening was carried out using serial dilution method while the physicochemical screening was done using standard methods.The result of microbial screening showed the occurrence of pathogenic microorganisms such as *Staphylococcus* aureus *(*3.00 x 10^5CFU/ml *)Escherichii* coli,*(*8.0 x 10^6CFU/ml*) Bacillus*) *subtillis (*2.80 x 10^6CFU/ml, *Lactobacillus bulgaricus (*5.0 x 10^5CFU/ml. The results of the hysicochemical screening indicated high mean pH value of 3.50 and 4.55, low protein content of 9.80±0.01% and 11.3±0.82%,high moisture content of 70.5±0.61% and 75.5±0.61%,and lastly high titratable acidity of 0.5254±0.03% and 2.6800±0.02% for Fresh milk and Kindirmo respectively. From the results of this study, it can be concluded that locally prepared Kindirmo and Fresh milk sold in different locations of Dukul ward, Kwami local government area of Gombe State contain potential pathogenic and spoilage bacteria.

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BIOFUEL PRODUCTION FROM MICROALGAE: AN UPDATE

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ABSTRACT

Algal biofuel is currently one of the promising biofuels that shows to be an alternative for fossil fuels that emit green-house gases, which causes global warming and some diseases. This paper review presents a thorough examination of the recent and current advancement and current state of research in the field of biofuels derived from microalgae. The methodology used in this paper involved a comprehensive analysis of existing literature and findings from previously published papers. It covered strain selection, and cultivation methods which include the light, temperature, and nutritional requirements of different species of microalgae. The focus is on producing and improving the lipid content of the organisms, advanced methods of harvesting, and drying, and the downstream processes for the production of algae biofuels. It also showed the hazardous impact of greenhouse gases and the importance of using biofuels to reduce such gases. Encouraging researchers to research more on the development of new and promising techniques that can be used to yield more fuel more than the current technique, to also help achieve the developmental goal of protecting our environment, and helping the field of biofuel to compete with fossil fuel, large industrialization practices to be encouraged and implemented more to see the feasibility of the field, and provides practical insight into sustainable bio-energy solutions.

Keywords: Microalgae, biofuels, cultivation, industrialization.

2nd UMYU Conf/2024/115

MICROBIOLOGICAL ASSESSMENT OF USED KITCHEN TOWELS IN SOME REFECTORIES AT RIVERS STATE UNIVERSITY

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ABSTRACT

Microorganisms are ubiquitous in nature and therefore can colonize any surface and materials. Within home surroundings there are so many microbes and the risk of microbial transmission and infection within the environment is high. This study is aimed at assessing the microbial contamination of used kitchen towels at the Rivers State University campus refectories. Thirty (30) swabbed samples were collected from different refectories in the school premises and transported to the Rivers State University Microbiological Laboratory for immediate analysis using aseptic methods. The samples were cultured according to standard microbiological procedures. Antibiotic Susceptibility pattern was carried out on both Gram positive and Gram-

negative bacteria using disk diffusion methods. The heterotrophic bacteria isolated includes *Bacillus* sp., *Shigella* sp., *Salmonella* sp., *Enterobacter* sp. and *Staphylococcus* sp. The total heterotrophic fungi isolated includes *Candida* sp., *Penicillium sp.*, *Aspergillus flavus* and *Aspergillus niger*. Biofilm test was carried out on all bacterial isolates and all were positive. For the Gram-negative bacteria, *E. coli* was resistant to Augmentin (AU), Ciproflox (CPX), Septrin (SXT), Streptomycin (S), Ampicillin, (PN), Nalidixic acid (NA) antibiotics, *Enterobacter* sp., was resistant to Reflacine (PEF), Augmentin (AU), Ciproflox (CPX), Septrin (SXT), Streptomycin (S), Ampicillin, (PN), Nalidixic acid (NA) and Nalidixic acid (NA) antibiotics. *Salmonella* sp. and *Shigella* sp. had a very high resistant to all antibiotics. For the gram-positive isolates *Staphylococcus* sp., was resistant to all antibiotics. The common occurrence of microorganisms on kitchen hand towels suggest they can play a role in the cross contamination of foods, fomites and hands by foodborne pathogens. It is recommended that kitchen towels are frequently replaced and properly disinfected before use.

Keywords: Microbes, Biofilm, *Shigella* sp, *Salmonella* sp, Hand towel

2nd UMYU Conf/2024/116

BACTERIAL CELL ASSESSMENT OF READY TO EAT FRUITS VENDED WITHIN KADUNA METROPOLIS

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ABSTRACT
The objective of this study was to assess the bacterial cell assessment of ready-to-eat fruits, specifically pineapple and watermelon, that are available for purchase in the Kaduna Metropolis. A total of 30 samples of ready-to-eat fruits were collected in a randomized manner from three distinct locations, namely Tudun Wada, Ungwan Mu'azu, and Ungwan Sarki. The samples were placed in sterile polythene bags to maintain their cleanliness and integrity. The preparation and analysis of all samples were conducted using established microbiological protocols. The pineapple sample obtained from the Tudun Wada region exhibited the highest bacterial cell mean count, measuring 8.76 x 10^4. The watermelon sample from Ungwan Sarki exhibited the lowest bacterial mean count, measuring 5.72 x 10^4. The bacterial isolates that were identified in this study included Staphylococcus aureus, various species of Bacillus, Lactobacillus, and Pseudomonas. The bacterium Staphylococcus aureus exhibited the highest occurrence in both samples, accounting for 8 occurrences (26.6%) in pineapple and 7 occurrences (23.3%) in watermelon. In the pineapple sample, the presence of Bacillus species accounted for 4 instances, representing 13.3% of the total. Similarly, in the watermelon sample, Bacillus species were observed in 5 occurrences, accounting for 16.6% of the total. The presence of Lactobacillus in pineapple was observed in 2 samples, accounting for 6.6% of the total samples. In watermelon, Lactobacillus was found in 3 samples, representing 10% of the total samples. On the other hand, the occurrence of Pseudomonas aeruginosa in pineapple was minimal, with only 1 sample (3.3%). No detection of Pseudomonas aeruginosa was observed in watermelon. The findings of this study indicate that the fresh cut fruit available for purchase in T/wada, U/muazu, and U/sarki areas within the Kaduna metropolis exhibit substandard microbiological quality. Consequently, it is imperative to enhance the packaging practices employed by these vendors in order to address public health concerns.

Keywords: Bacterial cell, ready-to-eat fruits, watermelon, Kaduna metropolis, *Pseudomonas aeruginosa*

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BACTERIOLOGICAL ANALYSIS OF OKPA (BAMBARA NUT MOI MOI) SOLD IN NKWO MARKET OF OKIJA TOWN NEAR LEGACY UNIVERSITY

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ABSTRACT
This research was conducted to ascertain the bacterial content of Okpa (Bambara nut moi moi) sold in Nkwo market in Okija town. This market is strategic as it is a popular market serving Legacy and Madonna Universities and the entire Okija town. Five samples were collected and analyzed using spread plate technique after tenfold serial dilution. Nutrient agar was used to enumerate total colony count while MacCokey agar was used for coliform count. After incubation for 24 hours at 37^{o}C, 1.2 x10^{5}, 2.1 x 10^{4}, 4.5 x 10^{4} and 2.0 x 10^{4} cfu/g were observed for nutrient agar. For the coliform count, 1.1 x 10^{2}, 2.1 x 10, 1.2 x 10 and 1.0 10^{2} cf/g were observed on MacConkey agar. The results showed that, though the Okpa were contaminated, the coliform count was not at the level of causing disease. Also, the research revealed that the sources of the pathogenic bacteria are through unhygienic actions of the people that prepares the food and those that hawk them. The research also recommended that adequate sanitary practices and procedures should be adopted during Okpa preparation**.**

Keywords: Okpa, Coliform, dilution, spread-plate, and incubation

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Comparative Analysis of Proximate Composition of Rotten Banana and Pineapple

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ABSTRACT
This study was aimed at determining the proximate composition of rotten banana and pineapple. Rotten banana and pineapple were purchased from Kofar Yandaka Junction and Katsina State Transport Authority (KTSTA) roundabout and transported directly to soil and water laboratory, Geography department of Umaru Musa Yar'adua University Katsina. The Proximate analysis was carried out based on (A.O.A.C 2010) protocol. The proximate compositions analyzed were moisture content, ash content, crude fat, crude protein, crude fiber and carbohydrates and recorded. Results showed the variation among the tested parameters with moisture contents ranged from 14.37%-25.99% in pineapple and banana, ash content 4.37%-4.39% in pineapple and banana, crude fat 24.96%-56.30% in banana and pineapple, crude fiber 0.83%-0.39% in pineapple and banana, crude protein 10.63%-19.38% in pineapple and banana and finally carbohydrates with range of 13.50%-24.89% in pineapple and banana respectively. It showed there is no significance difference between the proximate compositions of the two fruits samples (*P- value = 0.07345, Fcrit =4.387, F-Value =3.642, P ≤ 0.05*). It was also concluded that presence of high amount of nutrients in the tested samples make it a good candidate for energy and food supplements for both human and animals as it needed for cell growth and proliferation. Finally, it was recommended that further research should be conducted on both the fresh, rotten and dried to explore the differences between them for optimum utilization of their nutritional compositions.
Keywords: KTSTA, A.O.A.C, Kofar Yandaka.

2nd UMYU Conf/2024/119

INVESTIGATION OF THE MECHANISMS UNDERLYING THE GASTROPROTECTIVE EFFECT OF A*belmoschus esculentus (*Ex-maradi variety) IN EXPERIMENTALLY INDUCED ULCER RATS

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ABSTRACT

Peptic ulcer disease is one of the major gastro-intestinal disorders, which occur due to an imbalance between gastric acid secretions and gastric mucosal integrity factors. *Abelmoschus esculentus* is a known vegetable for its mucilaginous and nutraceutical properties in addition to its antacid effect. This study was designed to investigate and validate the antacid effects of fresh okra fruit mucilage (FOM) and dry okra fruit powder (DOP) of the Ex-maradi okra fruit variety on ethanol-induced gastric mucosal damages in albino rats. Rats were randomly divided into seven groups of six rats each. Rats in the FOM and that of the DOP group were pre- treated with 250 and 500 mg/kg bwt of the FOM and DOP respectively; the Drug Control (DC) group was pre-treated with 20 mg/kg bwt Cimetidine while the Normal Control (NC) group and the Ulcer control (UC) group were treated with normal saline (2mL/kg bwt). All treatments were done for seven days. Ulcer Index (UI), Percentage Inhibition (PI), Gastric Volume, Gastric pH, and Total Acidity and total antioxidant power were evaluated to assess the gastro protective effect of the FOM and DOP in the rats. Both FOM and DOP showed significant (P<0.05) protection with low ulcer index (2.41±0.12) and high ulcer inhibition (75.6 %) against the damaging effect of ethanol on gastric mucosa of the animals in addition to good total antioxidant effect with IC_{50} value (13.57±2.1 µg/ml) as compared to the ulcer control. These findings were supported by histologic studies. Both treatments with FOM_{500} and DOP_{500} demonstrated significant (P<0.05) gastro-protective effect with relatively good and continues epithelial surface of rat stomach in ethanol-induced gastric ulcer rats. Overall, the observed gastroprotective effects of the okra fruit may be possibly mediated by its potential to modulate antioxidant system and gastric acid levels.

Keywords: Peptic ulcer, *Abelmoschus esculentus*, Ethanol, Antacid, Gastro-protection, Antioxidant and Gastric mucosal damage.

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ANTI-FUNGAL ACTIVITY OF METHANOLIC- LEAF EXTRACT OF SOME *Vachellia* AND *Senegalia* species FOUND IN KATSINA STATE, NIGERIA.

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ABSTRACT

The use of plants and their extracts as remedies for curing many diseases have stimulated studies for investigating the presence of effective antimicrobial substances in them. The study was aimed to carry out antifungal screening of the methanolic leaf extracts of *V. seyal, V. sieberiana, S. Senegal, S. ataxacantha* and *S. polyacantha* against pathogenic fungi *P. infestant* extracted from

potato tubers. The leaf extracts was obtained after drying using cold maceration and percolation with methanol as the solvent. The extract was subjected to qualitative phytochemical screening as well as GC-MS analysis for the presence of bioactive constituents. The antifungal inhibitory effect of the leaf extracts was assessed by using agar well diffusion methods. The phytochemical screening revealed that the leaves contained secondary metabolites such as tannins, flavonoids, alkaloids, saponins steroids and tanning among others. The GC-MS analysis revealed the presence of thirty five (35) compounds out of which six (6) were found to be the most prevailing compounds based on their peak which includes 9-Octadecenoic acid (Z)-, methyl ester (23.35%), Squalene (11.84%), 9,15-Octadecadienoic acid, methyl ester, (Z,Z)- (10.63%), Pentadecanoic acid, 14-methyl-, methyl ester (7.95%), (E)-9-Octadecenoic acid ethyl ester (7.19%) and Butylated Hydroxytoluene (1.85%). The results obtained revealed that only *V. seyal* was found to be more active against the tested *P. infestant* fungal strain with growth inhibition zone of 37% while the remaining species were found to have shown weakest or no activity at all. The respond of *V. seyal* could be attributed to the presence of some recorded phenolic compounds from the GC-MS analysis in couple with the fact that methanolic crude extract was effective in controlling the activities of some fungal pathogens as compared with ethyl acetate extracts as methanol was effective in the extraction of active polar compounds from the plant which were more effective than the nonpolar compounds extracted by ethyl acetate. The study revealed that *V. seyal* possesses antifungal activity and should be considered as a potential antifungal agent in search of newer agents to address fungal infections.

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PREVALENCE OF MALARIA AND TYPOID CO-INFECTION AMONG PATIENTS ATTENDING DUTSE GENERAL HOSPITAL, JIGAWA STATE.

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ABSTRACT
Malaria and Typhoid fever are endemic febrile diseases with overlapping signs and symptoms notably fever, diarrhea, vomiting and headache. The study was aimed to investigate the Prevalence of co-infection of malaria and typhoid fever in Dutse General Hospital Jigawa State. A cross sectional study was conducted on 200 patients. Venous blood was collected for widal and malaria Test. The widal test was carried out using tile method and Malaria test was carried out using Microscopy. Of the 200 examined for Malaria test female had the highest prevalence rate of 40%. Based on age group 10-19 years old had the highest prevalence of 28% in male sex. however, the difference in the prevalence of infections between the genders were not statistically significant ($p>0.05$).200 samples was also used for typhoid fever, male sex had the highest prevalence rate of 35% and also based on age group 20-29 years old for male sex had the highest prevalence rate of 26%. For typhoid and malaria co-infection out of 200 samples examined Male had highest prevalence rate of 22.5% and 30-39 years old had highest prevalence rate of 18%. The incidence of typhoid and Malaria co-infection will greatly reduce when there is improved personal hygiene, targeted vaccination campaigns and intensive community health education on preventive and control measures against malaria and typhoid fever.

Keywords: Malaria, Typhoid, Coinfection.

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PHYSICOCHEMICAL ANALYSIS AND BACTERIOLOGICAL ASSESSMENT OF WATER COLLECTED FROM NILE STREAM ABUJA, FCT.

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ABSTRACT
In Nigeria, water scarcity and inadequate sanitation facilities remain significant challenge, leading to detrimental health outcomes for the population. This study aimed at studying the physicochemical and bacteriological quality of Nile stream water in the Federal Capital Territory (FCT) Abuja, Nigeria, focusing on the evaluation of water quality and its implications for public health. A total of six (6) water samples were collected at three different locations on the Nile stream in a sterile conical flask and taken to the microbiology laboratory of Nile University of Nigeria for analysis. The physicochemical properties and bacteriological assessment were analyzed using standard techniques. The physicochemical parameters result included pH 7.32 ± 0.58, turbidity 5.97 ± 0.87 NTU, total dissolved solids (TDS) 0.115 ± 0.05 g/L, conductivity 0.310 ± 0.05ms/cm, biological oxygen demand (BOD) 3.10 ± 0.19 mg/L, dissolved oxygen (D.O) 4.23 ± 0.24 mg/L, salinity 0.15 ± 0.03 psu and resistivity 3226 ± 20.55 Ohm-cm. The bacteria species identified were *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter* sp., *Bacillus* sp. and *Pseudomonas* sp. The study's findings demonstrate the urgent need for quick action to be made to raise the Nile stream water quality in Abuja Federal Capital Territory. It was discovered that the water samples taken from the stream were contaminated with bacteria, which poses serious health concerns to people who might be using it for domestic purposes.
Keywords: Physicochemical properties, Nile stream, bacteriological qualities

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STUDIES ON THE AVAILABILITY AND INVENTORY MANAGEMENT OF TUBERCULOSIS DRUGS AND DIAGNOSTICS IN KATSINA CENTRAL SENATORIAL DISTRICT OF KATSINA STATE

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ABSTRACT
Tuberculosis is the most common cause of death from a bacterial infection globally and Nigeria accounted for an estimated 4.4% of the global burden. The aim of this study is to access the availability and the inventory management of tuberculosis drugs and diagnostics at DOTS centres in Katsina central senatorial district. A cross-sectional survey using both qualitative and quantitative method was carried out using a semi-structured questionnaire adapted from the USAID logistics system assessment tool. Data was collected through direct observation and interview of the DOTS officers, local government Tuberculosis supervisors, logistics officer of

the Tuberculosis program and a pharmacist from the state drugs and medical supply agency. It was found that all the drugs for the treatment of Drug Sensitive Tuberculosis were available at the central store. For the treatment of Drug Resistant Tuberculosis, only moxifloxacin, clofazimine and protionamide were available. At the DOTS centres, all the drugs for the treatment of Drug Sensitive Tuberculosis were available in 90% of the facilities and 60% of the facilities have access to a diagnostic tool for initial diagnosis of Tuberculosis. Some drugs for the treatment of Drug Resistant Tuberculosis were available in 10% of the facilities and all the drugs available cannot complete any of the treatment regimen for Drug Resistant Tuberculosis. Only 30% of the facilities have the capacity to detect rifampicin resistance using either Gene Xpert or Trunat and none of the facilities have the capacity to detect resistance to isoniazid and other second line drugs. Stock cards were available in all DOTS centres where drugs were available but only 56% of the facilities update them on real time and 67% of the facilities conduct periodic physical inventory. Drugs for the treatment of Drug Sensitive Tuberculosis are generally available and the availability for initial diagnostics of Tuberculosis is above average, however, the drugs for the treatment of Drug Resistant Tuberculosis are generally not available. Furthermore, the inventory management of the Tuberculosis commodities needs improvement.

Keywords: Tuberculosis, Drugs, Availability, Diagnostics, Inventory Management.

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ASSESSMENT OF HAEMATOLOGICAL CONDITIONS AND OXIDATIVE STRESS ENZYMES ACTIVITY IN AFRICAN CATFISH (*Clarias gariepinus*) EXPOSED TO HERBICIDE TREATMENT

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ABSTRACT

Plants protection by incidental application of synthetic herbicides and insecticides have contributed significantly to crop production for food security and income in many parts of the world over the decades. However, frequent use and incidental spread in the habitat (land and water bodies) is bound to cause some ecological problems particularly on sentinel species such as fish. This research assessed the acute *in-vitro* toxic effect of herbicide (glyphosate) in African catfish. Symptoms of toxicity response, haematological and oxidative stress biomarkers were carried out using approved procedures. After range finding test, 330 test fish species were exposed to four days (96hr) acute toxicity to glyphosate concentrations (0.0 mg/L, 4.50 mg/L, 9.00 mg/L, 13.50 mg/L, 18.50 mg/L and 22.50mg/L) in a renewal bioassay using completely randomized design. The concentration that killed 50% (LC_{50}) of the test animals were 8.908mg/L for glyphosate. Thereafter, 1/5th, 1/10th, 1/15th and 1/20th of LC_{50} were derived and used for the chronic exposure. The results revealed that the test fish showed some symptoms of reaction such as nasal mucus secretion, random movement and irregular opercular movement with an increase in the test compounds concentrations compared with the control. Haematological parameters revealed significant decrease ($p<0.05$) in haemoglobin (Hb), Packed Cell Volume (PCV), Red Blood Cells (RBCs), Monocytes and Lymphocytes with an increase in the pesticides concentrations in a concentration-dependent manner. Significant increase ($p< 0.05$) in the highest concentrations compared with the control was recorded in the White Blood Cell (WBC), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin concentrations (MCHC), neutrophils and eosinophils. Mean Oxidative stress

enzymes values decreased significantly ($p<0.05$) in Glutathione Reductase (GSH) and Glutathione S-transferase (GST) in the gills, liver and kidney at higher concentrations compared with the control. A corresponding decrease ($p<0.05$) in a concentration-dependent manner for Catalase (CAT) and Superoxide Dismutase (SOD) were recorded. In conclusion, exposure to varying concentrations of the herbicide caused toxicity symptoms and considerable damage to tissues and organs of *C. gariepinus* over the study period. There is therefore the need to monitor levels released into the aquatic environment as well as vulnerable species.

Keywords: Acute toxicity, Glyphosate, *Clarias gariepinus*, Haematology, Herbicide, oxidative stress enzymes

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TISSUE CULTURE AND ITS APPLICATION IN CROP DEVELOPMENT

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ABSTRACT
All types of plants, as well as cells, tissues, and organs, are cultured under aseptic conditions under the heading of "plant tissues." The application of tissue culture methods in plant dispersion and genetic development is discussed. The following topics were reviewed: classifications, benefits and drawbacks, in vitro selection, anther culture, micropropagation, and embryonic culture. Biotechnology component techniques are widely applied for both fundamental and applied reasons, including research, agricultural development processes, genetic studies for practical applications, commercial micropropagation, and manufacture of genetically modified crops, crop breeding, and crop development. High-quality virus elimination, the preservation and conservation of vegetable propagated plants' genetics, and the protection of endangered plant species. In both basic and applied biological fields, the importance of plants has been expanding quickly. Utilizing in vitro technologies to extract plant material and incorporate bioactive components has frequently grown to be a profitable global enterprise. It plays a significant role in plant biotechnology.

Keywords: Biotechnology, tissue culture, in- vitro selection

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ISOLATION AND IDENTIFICATION OF BACTERIA ASSOCIATED WITH CAMEL FAECES AND URINE

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ABSTRACT
Faeces and urine are solid undigested waste and metabolic end products of higher animals resulting from their physiological activities respectively. Faeces and urine may contain some diverse species of microorganisms depending on the specie of animal, content of the food

consumed by the animal, and the condition of the animal itself. Camel urine is a liquid by-product of metabolism that has been used in the Arabian Peninsula for medicinal purposes for centuries, being a part of islamic prophetic medicine. For centuries, camel urine has been used for medicinal purposes and anecdotally proclaimed as a cure for a wide range of diseases. However, the apparent therapeutic actions of camel urine have yet to be subjected to rigorous scientific scrutiny. Consumption of camel faeces can be a major cause of several fatal diseases of the gastrointestinal tract and other systems of the body due to the occurrence of diverse microorganisms of which bacteria are the most dominant. The use of camel faeces and urine to prevent or treat diseases is deemed to be plausible, indeed it is extensively used by variety of populations worldwide. The study is aimed to isolate and identify bacteria associated with camel faeces and urine. Sixteen samples of urine and faeces were collected and processed for culturing on nutrient agar and MacConkey agar. The plates were subsequently incubated at 37°C for 24 hours. The bacterial load was determined on the basis of growth on nutrient agar, colonies that developed on MacConkey agar were subjected to gram staining techniques and biochemical tests to identify the organisms. The bacteria isolated includes Escherichia coli, *Klebsiella spp, Pseudomonas spp, Proteus spp, Enterobacter spp, Citrobacter spp, Salmonella spp, Shigella spp, Staphylococcus spp, Serratia spp, Yersinia spp. Enterococcus spp* all from both camel faeces and urine. *Escherichia coli* appears to the most abundant in both the faeces and urine. The occurrence of *klebsiella spp, pseudomonas spp,* and *proteus spp* were higher in urine sample than in faeces sample, likewise the occurrence of *salmonella spp. Shigella* spp. and *enterobacter spp* appears much higher in faeces sample than in urine samples.

Keywords: Camel, faeces, alternative medicine, infection, therapeutic effect, gastrointestinal tract, urinary tract.

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SEASONAL DYNAMIC OF PHYSICO- CHEMICAL PARAMETERS, PHYTOPLANKTONS COMPOSITION AND ABUNDANCE IN AJIWA RESERVOIR, KATSINA STATE, NIGERIA.

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ABSTRACT

Anthropogenic activities, climatic changes and geology have been reported to influence productivity of reservoirs. This study was conducted to determine the seasonal variability of physico-chemical parameters, phytoplanktons composition and abundance in Ajiwa Reservoir, Katsina State, Nigeria. Water samples were collected from December 2022 to September 2023 and analyzed for phytoplankton composition and physico-chemical conditions using standard methods. The result revealed that the mean water Temperature (25.12±3.76oC), pH (7.03±0.55), Dissolved Oxygen (6.84±0.75mg/L), Biochemical Oxygen Demand (3.00±0.79mg/L), Electrical Conductivity (119.67±14.40µS/cm), Total Dissolved Solids (16.55±4.80mg/L), Turbidity (100.47±14.56NTU), Hardness (86.46±4.93mg/L), Nitrate-Nitrogen (7.91±2.69mg/L) and Phosphate-Phosphorus (5.43±2.40mg/L) were significantly different across seasons ($P < 0.05$). The percentage compositions of phytoplanktons were Chlorophyceae (33.50%), Bacillariophyceae (22.36%), Cyanophyceae (12.57%), Cryptophyceae (12.48%), Euglenophyceae (6.58%) and Dinophyceae (4.55%) from four sampling sites during the study period. The phytoplanktons were found to be more abundant in wet season (858) than dry season (327).

Keywords: Ajiwa Reservoir, Physico-Chemical Parameters, Phytoplankton Composition, Abundance

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Enteric Bacteria Detected in Drinking Water from Parts of Kaduna State, Nigeria during the Wet and Dry Seasons

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ABSTRACT
This study aimed at detecting enteric bacteria in the drinking water sources as they could serve as markers of the potability of such water sources. Five hundred samples of water from a variety of sources such as wells, boreholes, pipe-borne water, packaged water and stream water were collected from six LGAs of Kaduna state, Nigeria during the rainy and dry seasons and subjected to enrichment in Tryptone soy broth and selenite F broth and then streaked on Eiosin Methylene Blue agar and *Salmonella-Shigella* agar. Incubation was done at 37 ºC for 24 h and colonies were purified and subjected to Gram staining, biochemical tests using cultural methods and also Microgen *Enterobacteriaceae* GN A ID kit. A total of 178 bacterial isolates were characterized and identified, out of which included 73 isolates of *Escherichia coli* (41.01 %), *Salmonella enterica* (6.74 %), *Proteus mirabilis* (19.67 %), *Klebsiella pneumoniae* (5.61 %), *Citrobacter freundii* (6.74 %), *Enterobacter aerogenes* (6.74%) and a host of others. These organisms were isolated from all the drinking water sources with the exception of packaged water where *Salmonella* species were not obtained. From the two hundred and fifty-four (254) samples were collected during the dry season, *E. coli* was isolated from 52 (20.47 %) while *Salmonella enterica* was isolated from 2(0.79 %). In the wet season, 246 samples were collected. *E. coli* was isolated from 12(8.54 %) and 10(4.07 %) isolates of *Salmonella enterica* were obtained These results show that the water sources were generally not fit for drinking except with further treatment. Much needs to be done to improve the potability of drinking water in the study area.

Keywords: Drinking water, enteric bacteria, *Escherichia coli, Salmonella enterica*

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PHYSICOCHEMICAL AND BACTERIOLOGICAL EVALUATION OF STREAMS

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ABSTRACT
Rural areas make use of the available streams as their drinking water source which is often contaminated by pathogenic bacteria. This study was aimed at determining the physicochemical and bacteriological nature of such streams. The study location was Otuoke, Kolo, Emeyal and Elebele. The physicochemical parameters determined were temperature, pH, BOD, COD, turbidity and salinity. THBC was done using the 10^{-5} dilution. The bacteria isolated were identified using morphological and biochemical characterization on NA, MAC, SSA and EMB and the isolates were *Staphylococcus aureus, Klebsiella* spp, *Salmonella* spp, *Enterobacter* spp, *Shigella* spp and *Escherichia coli*. The temperature ranged from 24.5 to 25.0ºC. The pH of the water samples ranged from 6.8 to 7.2. The biochemical oxygen demand (BOD) and chemical oxygen demand (COD) of the water samples ranged from 1.8 to 2.6mg/L and 3.2 to 4.6mg/L respectively. Turbidity of water samples was comparatively high and ranged from 163 to

248NTU. The salinity of the samples was low with range of 0.7g/kg for Stream sample D to 1.2g.kg for Stream A. Stream B and Stream C contained no *Salmonella* and *Shigella* spp while Stream A and D samples contained $0.4x10^6$ and $15.2x10^6$ (cfu/100ml) respectively. The total heterotrophic counts ranged from 1.6×10^6 to 23.6×10^6 (cfu/100ml). *Staphylococcus aureus* had 25% and 50% occurrence in Stream A and Stream C respectively while Klebsiella had 50% occurrence in Stream B. The pathogenic bacteria isolated from these streams makes the water unfit for human consumption and usage.

Keywords: Physicochemical, Bacteriological, Streams, Bacteria

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SCREENING OF LACTIC ACID BACTERIA ISOLATED FROM LOCALLY FERMENTED YOGHURT *Kindirmo* FOR FLAVOUR COMPOUNDS

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ABSTRACT
Yoghurt is known as cultured milk which is derived from the action of bacteria on lactose to produce lactic acid, carbon dioxide (CO_2), acetic acid, diacetyl, acetaldehyde and other flavour compounds. The aim of this research is to screen lactic acid bacteria isolated from locally fermented yoghurt (*Kindirmo*) for the production of flavour enhancing compounds. A total of five samples from two farm houses located in Daura local government of Katsina State, Nigeria. The samples were collected and transported inside ice coolers. Appropriate dilutions of the *Kindirmo* sample was plated using the pour-plate method on de Man, Rogosa and Sharpe (MRS) agar and incubated anaerobically at 37^0C for 72 hours. Yoghurt was produced using the isolated lactic acid bacteria and Volatile flavour compounds in the yoghurt were determined using GC-MS analysis. Among the total samples only three (3) were found positive for Lactic acid bacteria. The lactic acid bacteria detected were *Leuconostoc mesenteroides dextranicum, Lactobacillus acidophilus* and *Leuconostoc mesenteroides cremoris*. *Lactobacillus acidophilus* produces 14 volatile flavour compounds, followed by *Leuconostoc mesenteroides dextranicum* (12); while the least number was produced by *Leuconostoc mesenteroides cremoris* (10). Butanoic acid, Hexanoic acid, Acetaldehyde, Propane, Acetone, Ethylester, Lactic acid and Diacetone are some of the flavour compounds detected. The research shows the potentials of the isolated LAB to produce flavor compounds, which could be used to improve the taste of *Kindirmo*. It is recommended that the isolated be used for further study on how the produce *Kindirmo* with single and co – culture of the LAB.

Keywords: Lactic acid bacteria, *Kindirmo*, Flavour, GC-MS, Volatile compounds.

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SEASONAL DYNAMICS IN PHYTOPLANKTON DIVERSITY AND WATER CHLOROPHYLL CONTENTS OF AJIWA RESERVOIR

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ABSTRACT
Phytoplankton composition is an important quality indicator of aquatic environment. The changes in phytoplankton diversity and water chlorophyll contents in Ajiwa reservoir, Katsina was carried out in this study. Three sampling stations were chosen from the reservoir viz: agricultural

irrigation site, water inlet, and outlet areas. The phytoplankton composition of the water was analysed and identified to species level using standard method, while the chlorophyll content was also determined. The results showed the mean phytoplankton percentage composition of Chlorophyceae (33.50%), Bacillariophyceae (22.36%), Cyanophyceae (12.57%), Chryptophyceae (12.48%), Chrysophyceae (7.93%), Euglenophyceae (6.58%) and Dinophyceae (4.55%) from the three sampling sites. A significant higher diversity of phytoplankton ($p < 0.05$) was found in the wet season. The mean value of chlorophyll-a was 0.33 mg/L and 1.09 mg/L in the dry and wet season respectively, while the chlorophyll-b was 0.30 mg/L and 0.56 mg/L respectively. Chlorophyll had a weak negative correlation with Cryptophyceae (-0.92), Chrysophyceae (-0.76), and Dinophyceae (-0.53) in the dry season, whereas Bacillariophyceae, Chlorophyceae, and Cyanophyceae have positive correlation with chlorophylls a and b in both seasons. The results of this research indicated that phytoplankton in Ajiwa reservoir showed seasonality on abundance, and that Bacillariophyceae, Chlorophyceae, and Cyanophyceae are better indicator of water chlorophyll in the study area.

Keywords: Seasonal dynamics, Phytoplankton, Diversity, Ajiwa Reservoir.

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ASSESSMENT OF THE SENSITIVITY OF QUALITATIVE HBEAG ASSAY IN THE DIAGNOSIS OF CHRONIC ACTIVE HEPATITIS B VIRUS INFECTION

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ABSTRACT

Hepatitis B virus (HBV) infection is a major public health problem. Hepatitis-B-e- antigen (HBeAg) is a small polypeptide that exists in a free form in serum of individuals during early phase of hepatitis B infection. Serum HBV DNA level significantly declines after eliminating of HBeAg, it is, therefore, important to determine the extent to which qualitative HBeAg assay can identify presence of active HBV infection. This study will investigate the diagnostic utility of qualitative HBeAg assay to determine the sensitivity, specificity, and predictive values of qualitative HBeAg assay in the diagnosis of chronic active HBV infection. The research was conducted in covid laboratory of Aminu Kano Teaching Hospital, Kano. The study was carried out on 76 serum samples having high viral load of $\geq 10^5$ IU/ml. Subjects were tested using the Hospital standard for Hepatitis B surface antigen test strip. Combo rapid test cassette kit was used for qualitative detection of: Hepatitis B surface antigen and antibody, Hepatitis B envelope antigen and antibody, and Hepatitis B core antibody. Out of 76 serum samples tested for HBV-e-antigen status, 35 were positive, while 41 were negative. However, using HBV DNA PCR, 68 samples were found to be chronic active, and 8 samples were found to be inactive. The sensitivity for combo test in the diagnosis of chronic active HBV infection was found to be 52% while specificity was 100%. The positive predictive value of combo test was 100% while negative predictive value was 22%. It was concluded that the sensitivity of HBV combo kit in diagnosis of chronic active HBV infection is low, hence most negative results indicated by the HBV combo kit may be false negative. The specificity was 100%, meaning, positive results indicated by the HBV combo test cassette are truly positive for chronic HBV infection.

Keywords: HbeAg, Hepatitis

2nd UMYU Conf/2024/133

PREVALENCE OF ANTIBIOTIC RESISTANCE DIARRHEAGENIC *E. Coli* IN STOOL SAMPLES OF DIARRHEAIC CHILDREN 0-5 YEARS IN SOKOTO, SOKOTO STATE, NIGERIA.

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ABSTRACT
Diarrheal diseases continue to pose significant public health challenges, particularly in children under the age of 5 years. After rota virus Diarrheagenic *Escherichia coli* is the second most common cause of diarrhea in Children. This study aimed at assessing the prevalence of antibiotics resistant diarrheagenic *Escherichia coli* recovered from diarrheic children 0-5 years in children in Sokoto. Stool samples were collected from 300 diarrheic children attending two hospitals in Sokoto. Cultures were made on MacConkey and Eosin Methylene Blue agars and bacteria isolates that showed colonial morphology suggestive of *E. coli* were subjected to Antibiotic susceptibility testing. Molecular technique (PCR) was carried out to confirm the presence of DEC and resistant genes among the multiple antibiotic resistant isolates. Structured questionnaires were administered to determine the risk factors that predispose the children to diarrhea. The result revealed a 21% prevalence of *E. coli*. *E. coli* isolates showed occurrence of resistance to Ampicillin (75%), Nalidixic acid (75%), Gentamycin (30%), Ofloxacin (23%), Cefotaxime (74%), Ceftriazone sulbactam (23%), Nitrofurantoin (18%), Imipenem (10%), Cefoxime (73%) raising concern about misuse of commonly used antibiotic. This study highlights the need for implementing antibiotic stewardship programs and infection control measures to combat the growing threat of antibiotic-resistant DEC Sokoto.

Keywords: Diarrhea, *Escherichia coli*, Children, Antibiotic, Resistance

2nd UMYU Conf/2024/134

HEAVY METALS CONTENTS OF SOIL AND VEGETABLES FROM SELECTED DUMPSITES IN KATSINA METROPOLIS

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ABSTRACT
Experiment was conducted to find out heavy metals contents of soil and vegetables from selected dumpsites aimed at determining the total concentration of Cu, Cr, Cd, Ni and Pb in dumpsite soils and vegetables (cabbage and okra) planted on dumpsite soil in Katsina metropolis. The soil heavy metal content was determined using standard methods, by taken 5 grams of the grounded and sieved sample which was treated to 3.0ml of concentrated HNO_3, 9.0ml of HCl and 25ml of distilled water. Also, 2g of each vegetable was treated to 5ml of concentrated HNO_3 followed by 10ml each of concentration HNO_3 and $HClO_4$. The required metals determinations were done by aspirating it into Atomic Absorption Spectrometer (AAS), model SE 71906 instrument. Data

generated from this research were subjected to descriptive analysis to evaluate the mean concentration of heavy metals (Cu, Cr, Cd, Ni and Pb**)** contents in the soil and vegetable samples. The results are expressed as Mean ± Standard Error Mean (SEM). Analysis of variance (ANOVA) was used to compare the mean concentrations in the soil and vegetable followed by multiple comparison two tailed sample t test p-value at $\alpha = 0.05$. The findings reveal that the highest (mean ± standard error mean) recovery of (28.73±2.06mg/Kg) and (1.13±0.045mg/Kg) respectively were recorded for Pb in the soil and vegetables samples, while the lowest percentage recovery were (0.60±0.19mg/Kg) for Cr in the soil and (0.0125±0.00mg/Kg) for Cd in the vegetables which are both less than the maximum permissible limits according to WHO/FAO for both soil and vegetables respectively. The study concludes that the pattern of the recovery efficiency for the soil and vegetable samples followed the orders: Pb > Cu > Ni > Cd > Cr and Pb > Cu > Ni > Cr > Cd respectively. The study therefore recommends that for vegetables samples from the dumpsite in Katsina metropolis to have the required level of concentration of heavy metals (Cd, Cu, Ni, Pb and Cr) contents, the government and other stakeholders in the food and health sectors need to sensitize the farmers on the need to carry out soil analysis and choose suitable soil for planting of vegetables for consumption.

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DETERMINATION OF HEAVY METALS AND CONSUMPTION RISK OF *Lepidium sativum* LEAVES CULTIVATED ALONG RIVER GINZO, KATSINA

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ABSTRACT

Heavy metals occur naturally in the earth crust which can either be essential or non-essential. The non-essential elements and pose risk to human when ingested at level that is beyond permissible limit for a long period. This research assessed the human health risk from the consumption of carcinogenic and non-carcinogenic heavy metals in Lepidium sativum leaves cultivated along River Ginzo, Katsina by determining the Estimated Daily Intake of Metals (EDIM), Target Hazard Quotient (THQ), Hazard Index (HI) and Incremental Lifetime Cancer Risk (ILCR) from the consumption of Co, Cu Pb and Ni in the samples. Samples were obtained by using random sampling. Heavy metals in samples were determined using Atomic Absorption Spectrophotometry (AAS). Daily Intake of Co, Cu, Pb and Ni from consumption of L. sativum leaves were found to be 1.20E, 4.00E-2, 3.50E-3 and 2.00E-2 below the WHO/FAO, 2003 in both adult and children, which implies no health risk. Values of THQ for each metal and HI for all metals were >1, implying no health hazard. ILCR showed potential risk of contracting cancer from the consumption of L. sativum leaves cultivated in the study areas as ILCR values exceeded the acceptable and negligible range of 10^{-4}-10^{-6}particularly of Ni (2.23E-2). As a result, measures should be put in place to prevent disposal of wastes containing heavy metals into River Ginzo and de-contaminate the agricultural soils to eliminate the health risks.

Keywords: River Ginzo, Heavy Metals, Estimated Daily Intake of Metals, Target Hazard Quotient/Hazard Index, Incremental Lifetime Cancer Risk

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A STUDY OF HEPATITIS C VIRUS INFECTION AMONG PEOPLE LIVING WITH HIV/AIDS ATTENDING SPECIALIST HOSPITAL SOKOTO, NIGERIA.

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ABSTRACT
Hepatitis C virus remains a large health care burden to the world. HIV and HCV coinfection are major global health concern worldwide. The aim of this study was to assess the HIV/HCV coinfection and the potential risk factors amongst people attending Specialist Hospital, Sokoto. A cross sectional seroprevalence survey of HCV infection was carried out on 77 HIV/AIDS positive subjects attending Voluntary Counseling and Testing (VCT) Center Clinic of Specialist Hospital, Sokoto from 30th March, 2021-4th May, 2021. Serum samples were tested for anti-HCV antibodies using immunochromatographic test. Of the 77 study participants, the overall anti-HCV prevalence was 5.2%. The age group of 36-40 years revealed the highest seropositivity of 18.18%, followed by 51-55 years (14.29%) and least (11.11%) among 26-30 years. Females had highest seropositivity of 6.25% and males least (3.45%). Highest seropositivity was seen among Hausa tribe (7.14%) while least in Fulani (5.56%). Highest seropositivity was recorded among people with no formal education (6.82%) while people with formal education had the least (5.88%). Highest seropositivity was seen in self-employed individuals (6.52%) as regards to occupational status while employed individuals had least (4.17%). Married individuals had highest seropositivity of 7.69% while the divorced and widow/widower had 5.26% and 4.76% respectively. People who injected drugs recorded the highest seropositivity of 33.33%, multiple sex partner 6.90% while people who shared sharp objects had least (6.67%). *There were no significant differences statistically in HCV seroprevalence among the different categories of age, gender, tribe, education, occupation, marital and risk factors (p> 0.05).* **Conclusion:** The result of this study is within the prevalence rate of HCV in Nigeria; 5.8% to 12.3%. Nevertheless, routine screening of people living with HIV/AIDS should be instituted for early diagnosis and management of cases.

Keywords: *Hepatitis C*, AIDS, hospital, Sokoto, seroprevalence

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METABOLIC DIVERSITY OF THE METALLOTOLERANT BACTERIAL RHIZOBIOME OF *Sorghum bicolor* FACILITATES PLANTS GROWTH PROMOTION AND HEAVY METALS PHYTOREMEDIATION

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ABSTRACT
Microbially-assisted phytoremediation (MAP) is the best approach for controlling the repercussions of increased exploitation of hazardous heavy metals (HMs) in the Anthropocene. Research gaps exist concerning the identity and determinants of the distribution and functionality of the active bacteria governing MAP for HMs bioremoval in the rhizobiome of promising

metallophyte hyperaccumulators, such as local cultivars of *S. bicolor* L. Moench. This research isolated, metabolically characterised, identified and hierarchically clustered metallotolerant bacteria inhabiting the rhizobiome of *S. bicolor* during HMs phytoremediation. Bulk/rhizospheric/rhizoplane soil and endosphere samples were collected from experimental mesocosms treatments of 2-months-old plants in duplicate set-ups of variable concentrations of HMs (Cr, Cu, Pb and Zn), negative and positive controls (n = 3, respectively). Analyses were based on standard techniques. Upon multiple metallotolerance spectroscopic assays, six strains were screened out of 30, and identified based on 47 metabolic/enzymatic assays using VITEK-2.0 Compact System. Bacterial distribution/association was statistically studied using Generalised Linear Model (GLM), with repeated measures ANOVA and Bonferroni test as post-hoc. Metabolic diversity was elucidated by hierarchical clustering using SPSS 23.0, thorugh the nearest neighbor method. The strains were identified as *Shewanella putrefaciens* DRK 11, *Serratia marcescens* DRK 13, *S. marcescens* DRK 15, *S. marcescens* DRK 18, *Stenotrophomonas maltophilia* DRK 19 and *S. maltophilia* DRK 27. While GLM classified these bacteria into two groups, HCA/ASC analyses grouped them into three clusters; chiefly based on the metabolic diversity ($p < 0.0001$), followed by speciation ($p < 0.05$). The metabolic diversity allows surmising critical roles of these bacteria in plant growth promotion and HMs bioremoval irrespective of proximity to roots or HMs concentrations. Besides bridging the gaps, this work provides the background for further researches towards the design of a metallotolerant consortium for efficient HMs phytoremediation in contaminated soils, using *S. bicolor*.

Keywords: Metabolic Diversity, Rhizobiome, Metallotolerant bacteria, Phytoremediation, *S. bicolor*.

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MONITORING THE POPULATION DYNAMICS AND IDENTITY OF VITAL RHIZOBIA FACILITATING HEAVY METALS PHYTOREMEDIATION BY *Phaseolus vulgaris*

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ABSTRACT

Microbially-assisted phytoremediation (MAP) is increasingly recognized as the feasible alternative for removing hazardous heavy metals (HMs) from contaminated environments, however, the dynamics of rhizobial-plant interactions during phytoremediation remain unclear. This study investigated the HMs bioremoval potential of Phaseolus vulgaris grown in HMs-rich effluents within Katsina metropolis vis-à-vis the population dynamics and identity of its rhizobia. After 80 P. vulgaris samples from Lambun Sarki garden were exposed to 10 mL of 0.5-2g/L of Ni and Co, and 5-20 g/L Mn, respectively, in mesocosms, and the plants treated with 10 mL HMs solutions daily, for three weeks, indices of HMs toxicity on seeds and plants (4 and 3, respectively) were monitored in all treatments. Weekly rhizobial counts on Congo Red Yeast Extract Mannitol Agar (CRYEMA) were taken to monitor rhizobial population dynamics. Pure isolates obtained after three iterations were identified biochemically. One-way ANOVA, using AnalyStat (version 1.6.50) was employed for statistical analysis. Generally, Ni exerts the highest toxicity, with Mn having less toxicity. Average rhizobial counts increased weekly, with high counts obtained in Ni and Mn treatments, however they did not differ significantly between weeks ($p = 0.061$), thus, longer time intervals (>2 weeks) are required to observe significant shifts in population dynamics. Moreover, HMs concentration did not affect the colony counts ($p = 1.00$). Metabolism profile of the preliminarily identified Rhizobium sp. and Sinorrhizobium melliloti evidenced HMs removal and plant growth promotion ability. The research demonstrated

the phytoremediation ability of P. vulgaris and how rhizospheric population dynamics changes during phytoremediation; and contributed towards understanding HMs impact as environmental stressors on rhizospheric plantmicrobe interactions. Future researches targeting the mitigation of HMs in agricultural ecosystems through MAP, to enhance crop resilience and promote sustainable agriculture may also benefit from this research.

Keywords: Heavy metals, Phytoremediation, *Phaseolus vulgaris*, Rhizobia.

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ASSESSING THE PREVALENCE OF LATENT TUBERCULOSIS INFECTION IN HEALTHY AND IMMUNOCOMPROMISED INDIVIDUALS IN DUTSIN-MA METROPOLIS, KATSINA STATE, NIGERIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Latent Tuberculosis Infection (LTBI) is a widespread condition affecting a significant portion of the global population. People with LTBI have a 5-10% chance of developing active Tuberculosis (TB) during their lifetime. Blood samples were randomly collected from 145 participants across three (3) healthcare facilities in Dutsin-Ma in September 2023 and screened for anti-TB antibodies using the Rapid Tuberculosis Test Card™ (RTTC). The sociodemographic data of the participants were collected and analyzed using descriptive statistics and Chi-square to test for association. Among the 145 participants tested; 25 were healthy participants, 65 were pregnant women, 30 were HIV-positive patients, and 25 were diabetic patients. Of these, 15.17 % (22/145) were serologically positive for anti-TB antibodies. Risk factors associated with LTBI include; working as a cleaner in healthcare facilities (25%; 1/4), having a family history of the MTB infection (18.1%; 2/11), smoking (13.3%; 2/15), living in urban areas (12.0%; 3/25), and malnutrition (11.1%; 1/9). Interestingly, no case of LBTI was detected among vaccinated participants, people living with HIV, and health workers in this survey. The current study showed that a significant number of participants tested positive for anti-TB antibodies. Alarmingly, the prevalence of anti-TB antibodies was found to be higher in healthy individuals, diabetic patients, and those with a family history of MTB infections. Statistically, there was no enough evidence to conclude that any of the risk factors are significantly associated with prevalence at 95% CI and a P-value of ≤ 0.05. These findings underscore the need for routine screening and treatment of LTBI in both healthy and immunocompromised individuals in the study locality, as vital measure to reducing the global burden of MTB infections.

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SCREENING FOR KERATINASE PRODUCING BACTERIA FROM SOIL CONTAMINATED WITH POULTRY WASTE

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ABSTRACT

Keratin is a fibrous protein that found in the hair, nails, hooves, feathers, and horns of animals. It is also found in bird and reptile egg. Keratin is resistant to degradation but fortunately some keratinase degrading bacteria can break it into simpler molecule. This study was aimed to screen for the presence of keratinase producing bacteria from soil contaminated with poultry waste of Some Dump Sites of Sokoto metropolis, Sokoto State, Nigeria. Soil samples from two dumping sites of Kasuwar Dankure and UDUS Faculty of Agriculture, Department of Animal Science

Feather Dumping Sites were collected. Bacterial isolation was performed by serial dilution and spread plate method in the Department of Microbiology Undergraduate Microbiology Laboratory UDUS. Primary screening of. keratinolytic bacteria was carried out by checking proteolytic activity of the first set of the bacterial isolates using Skimmed Milk Agar and the positives isolates were morphologically and biochemically identified. The biochemically identified isolates were also subjected to secondary screening of keratinolytic bacteria by the use of feather as only sources of carbon and nitrogen in a Mineral Salt Medium. A total of twelve (12) bacterial isolates were isolated from the collected soil samples. All isolates were screened for primary proteolytic activities using Skimmed Milk Agar and only five isolates were positive based on transparent, clear zone seen in each isolate during the primary screening on Skimmed Milk Agar. These five strains were morphologically and biochemically identified as *Pseudomonas aeruginosa, Pseudomonas putida, Bacillus licheniformis*, *Bacillus subtilis* and *Bacillus cereus*. *Bacillus subtilis* was found to has the highest frequency of occurrence. The result of secondary screening was rated based on turbidity in MSM with four set of outcome as no degradation (-), partial degradation (+), moderate degradation (++), and complete degradation (+++). *Bacillus licheniformis* was the bacterial isolate recorded to has the highest turbidity as complete degradation (+++). It can be concluded that *Bacillus licheniformis* had the highest potential of keratinin degradation than the other isolates on media enriched with feather as source of carbon and nitrogen and it can be a good candidate for the remediation of feather contaminated soil.

Keywords: Keratin, Keratinase, Screening, Poultry waste, Soil, *Bacillus licheniformis*

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EVALUATION OF HEAVY METAL FROM HEAVY METAL POLLUTED AND SEMI PRISTINE ENVIRONMENTS

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ABSTRACT

This study compared the evaluation of heavy metal in semi-pristine and heavy metal-polluted environments. Samples of soil contaminated with heavy metals was obtained from Challawa industrial dump site Kano while semi-pristine soil samples were obtained from Bayero University Kano's Botanical and Ecological Gardens, and Jardin Botanique Geneva in Switzerland. Microbiological methods were used to isolate and identify the bacteria in the samples. The isolates were screened for their ability to tolerate Lead (Pb) and Chromium (Cr) salts separately at various concentrations of the heavy metals. Isolates that tolerated these heavy metals were subjected for bioremediation assay. Seven bacteria were isolated; 2 from the semi-pristine sites and 5 from the polluted site; 1 *Acinetobacter spp.*, 3 *Psuedomonas spp.*, 2 *Bacillus spp*., and 1 *Staphylococcus spp*. Of all the isolates, *Pseudomonas spp.* from polluted soil tolerated more heavy metals with Minimum Inhibitory Concentration 280mg/l for Cr and 420mg/l for Pb. It also had the highest heavy metal removal of 58.28% for Cr and 72.97% for Pb while *Pseudomonas spp*. from Geneva had the least Cr removal of 25.79% and *Bacillus spp.* from the ecological garden had the lowest removal efficiency for Pb with 18.53%. The most efficient isolate for removing heavy metals was *Pseudomonas spp*. from the Challawa industrial dump site. The isolate showed the greatest reduction at an ideal pH of 7; the isolate removed heavy metals most effectively when incubated for 48 hours; the same isolate removed Pb and Cr efficiently at an ideal temperature of 37^{o}C. Using bacteria in the bioremediation of heavy metals does not always require them to be able to withstand the heavy metals. Therefore, relevant regulatory organizations should regulate the careless dumping of untreated wastes by industries to improve the environment.

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DÉTERMINATION OF TOTAL COLIFORM IN STREAMS

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ABSTRACT
Water is vital for the survival of livingthings. Total coliform is often used as an indicator of faecal contamination in surface water. This study was aimed at determining the total coliform in streams. A total of four samples, one each from four streams namely; Kpande Kon, Jov Torugh, Uavande, and Jov I Asema. MPN was performed on the isolates. Stream A sample had the highest value of 14 MPN/100ml. Stream B, C, and D samples had MPN values of 9, 7 and 9 MPN/100ml respectively. The total coliform count for water samples collected from different streams is shown in Table 2. The highest count of $7.2x10^6$ cfu/100ml for total coliform was obtained from Stream A. Stream B and C samples contained no coliform while Stream D sample had a total coliform count of $0.7x10^6$ cfu/100ml. Bacterial isolates identified in water samples collected from the different streams include; *Staphylococcus aureus*, *Staphylococcus* spp, *Staphylococcus faecalis*, *Klebsiella* spp, *Enterobacter* spp, and *Escherichia coli*. The provision of safe and reliable potable water supplies is highly recommended to the rural dwellers to avoid any serious health problems.

Keywords: Total colifirms, Faecal coliforms, Streams

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EFFECTS OF INTRAMUSCULAR ADMINISTRATION OF SNAKE VENOM (*Echis oceltus*) AND DIMENAZENE ACETURATE ON THE BODY WEIGHT OF WISTAR RATS INFECTED WITH *T.B. Brucei*.

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ABSTRACT
Trypanosomiasis remains a major infectious disease of great threat to animal and human health in Nigeria and sub-saharan Africa. Snake venom (*Echis oceltus*) is a complex mixture of many substances, such as toxins, enzymes, growth factors, activators and inhibitors with a wide spectrum of biological activities. To evaluate the effects of intramuscular administration of snake venom and Dimenazene aceturate of the body weight of wistar rats infected with *T.b. brucei*. Thirty wistar rats were taken randomly and divided into five rats per cage with cage 6 as a control group. The other cages were infected with *T.b. brucei* and treated with snake venom and dimenazene aceturate. Body weight was recorded initially and during the experiment. The weight of wistar rats decreases when infected with the parasite and Snake venom, $p<0.05$. When treated with Dimenazene aceturate the body increases compared to pre-infection weights, Stastically $p<0.05$. It is established from this study that Snake venom *Echis oceltus* have less effect on body weight as compared to when treated with Dimenazene aceturate, there was a rapid increase in the body weight of the Wistar rats. This treatment regime shows no significant difference in body weight of rats when using snake venom as to the case of using the commercial anti-trypanocide in rats infected with *T.b. brucei*.

Keywords: Trypanosomiasis, Snake venom, Dimenazene aceturate.

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BIODEGREDATION POTENTIAL OF BACTERIA ASSOCIATED WITH PESTICIDE CONTAMINATED SOIL

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ABSTRACT
Some bacteria play a key role in the removal of pesticide chemicals in soil and water bodies because of their dynamic enzymatic systems give them ability to degrade these chemicals. This study was aimed to screen and test for the biodegredation potential of pesticide by bacteria associated with pesticide contaminated soils. Isolation of bacteria was carried out using Lambda-cyhalothrin (LC) and pesticide contaminated soil enrichment techniques with Mineral Salt Medium (MSM). Screening for the biodegradation process of the six isolates was also carried out in accordance with the standard methods and procedures. The most potent bacterial isolates in biodegradation activity were morphologically and biochemically identified. The results of the isolation revealed six (6) bacterial isolates that were given isolate codes as ILCA1, ILCA2, ILCB1, ILCB2, ILCC1 and ILCC2. Isolate ILCA2 and ILCC1 were found to be the most potent for their potential to degrade LC at 100 mg/L that the other isolates. The two isolates (ILCA2 and ILCC1) were morphologically and biochemically isolated as *Pseudomonas aeruginosa* and *Bacillus subtilis* respectively. It can be concluded that the result obtained after seven days' incubation at 35^{o}C showed that the bacterial strains *Pseudomonas aeruginosa* and *Bacillus subtilis* have efficiently degraded lambda cyhalothrin at 100mg/L concentration as highest optimum. The finding from this study suggest that thus bacteria strain could be potentially promising as low cost effective technology in the biodegradation of pesticide (Lambda cyhalothrin) from the pesticide contaminated soil environments.

Keywords: Soil, Pesticide, *Pseudomonas aeruginosa*, *Bacillus subtilis*, Biodegradation

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A SURVEY OF AFLATOXIGENIC MOULDS IN STORED CEREAL GRAINS AND LEGUMES IN ZARIA, KADUNA STATE

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ABSTRACT
Food availability has recently been threatened by many factors including spoilage of food crops or contamination by mycotoxins due to poor storage conditions and facilities, most especially in developing countries. Aflatoxins are a group of mycotoxins which are secondary metabolites produced by some fungi of the *Aspergillus* species; notably *Aspergillus flavus* and *Aspergillus parasiticus* which are a serious problem of public health concern, and also affect food quality leading to economic loss. The aim of this study was to make a survey of aflatoxigenic moulds in stored grains and legumes in some locations of Zaria, Kaduna state. A total of 12 samples (groundnuts, soybeans, tigernuts and rice) were collected from 3 different locations: Sabon-Gari, Samaru and Shika. The samples were analysed for proximate composition, and prepared for isolation and identification of fungi following standard microbiological procedures using Potato Dextrose Agar as growth medium. Results of proximate composition reveal that the crops have varying values of moisture content, crude proteins, lipids, crude ash and fibre content as well as carbohydrates which have the highest values in

all the crops. The different fungal isolates found after 3-7days incubation were observed under the microscope, identified and screened for aflatoxin production using Dessicated Coconut Agar and viewed under 365nm of ultraviolet light. Isolated fungi were identified as *Aspergillus flavus* (50%), *Aspergillus fumigatus* (33.33%), *Aspergillus niger* and *Penicillium* species (both 8.33%) respectively. The occurrence of A. *flavus* in groundnuts, tigernuts, soybeans and rice, was respectively found to be 100%, 66.67%, 33.33% and 0%. Four out of the six A. *flavus* were found to be aflatoxin producers, with percentage occurrence of 100% and 50% respectively in groundnuts and tigernuts. It was concluded that most of the crops used for this study (especially groundnuts) were contaminated with moulds, some of which were aflatoxigenic, which indicates a serious health hazard to consumers. It was therefore recommended that improved storage facilities should be provided for farmers in order to protect public health.

Keywords: mycotoxins; aflatoxins; *Aspergillus* species; grains; legumes

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SERUM LIPID PROFILE PREVALENCE IN MALE AND FEMALE ADOLESCENTS IN KATSINA STATE, NORTH WEST NIGERIA

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ABSTRACT

Modifiable unhealthy behaviors with consequential adverse health outcomes are usually established and nurtured during the adolescent stage with the resulting effects, usually presenting as chronic degenerative diseases seen in adulthood. Studies have associated Lipid levels in adolescence with cardiovascular events risk in adulthood, but there is paucity of recent data for lipid levels for Katsina state adolescents' lipid levels. A descriptive cross-sectional study was conducted among male and female adolescent subjects attending the General Out-Patient Department of the Federal Medical Centre in Katsina metropolis Katsina State- Nigeria in the year 2017. A total of 296 (male 150; female 146) adolescents aged 11 to 19 years were selected for the study. The adolescents were subjected to anthropometric measurement, social classification of each participant was determined based on the occupational status and highest educational attainment of the parents, serum lipid levels were measured using enzymatic methods. From the result, 39% of the respondents falls within the upper social class and 31% falls within the lower class; 21% male and 18% female were under weight, 10% male and 9% female were overweight, and 5% male and 2% female were obese, there exist an age trend for increasing weight in both groups. For both sexes, body mass index (BMI) and age were positively correlated to total cholesterol (TC) and low density lipoprotein cholesterol (LDL-C). There were no significant differences in the measured parameters between the sexes. The positive correlation of BMI/age with serum TC and LDL-C and the low HDL-C values in the subjects is a cause for concern as it may likely predispose them to cardiovascular complications in adulthood.

Keywords: Lifestyle; non-communicable diseases; modifiable behaviors; social status; Africans; Cholesterol

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IDENTIFICATION AND ANTIBIOTIC RESISTANT PATTERN OF *Staphylococcus aureus* INFECTIONS FROM ORTHOPEDIC PATIENTS IN SIR YAHAYA MEMORIAL HOSPITAL BIRNIN KEBBI, NIGERIA.

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ABSTRACT
Staphylococcus aureus is considered as non-pathogenic bacteria but opportunistic bacteria, responsible for various nosocomial infections. Individuals that are colonized by *S. aureus* are potential reservoirs for transmission of nosocomial infections, which could be detrimental to public health especially when antibiotic resistant strains are present. The aim of this research was to detect *S. aureus* using phenotypic method, from patients admitted in orthopedic ward of Sir Yahaya Memorial Hospital, Birnin Kebbi, Kebbi State Nigeria. A total of 117 wound swab samples were collected from orthopedic patients, of which 18 isolates of *S. aureus* were identified using colony morphology, Gram staining, and biochemical tests. The isolates were examined with antibiotics using disc diffusion method and Clinical Laboratory Standard Institute Modified Kirby Bour techniques were used to determine the resistant status of recovered bacterial isolates. The prevalence of *S. aureus* from orthopedic patients was 18 (15.38%), and the results showed that the isolates were 100% resistant to Cefpodoxime, Cefepime, Cefotaxime, Amoxicillin/clavulanic acid and 94.44% resistance to Meropenem. Although the isolate were only 83.33% susceptible to Imipenem. *S. aureus* was among the major agent of wound infection at Sir Yahaya memorial hospital, Birnin Kebbi, Nigeria. *S. aureus* isolates exhibited resistance to most of the antibiotics tested in this study. The high incidence of *S. aureus* isolates resistant to antibiotics tested in the hospital calls for urgent need to put in place measures to curtail the spread of nosocomial pathogens especially *S. aureus* that has high proportion of antibiotic resistance in the hospital. However further studies are recommended to detect the resistance gene of *S. aureus.*

Keywords: *Staphylococcus aureus*, Antibiotics Resistance, orthopedic patients.

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A REVIEW ON FORENSIC MICROBIOLOGY: THE NEGLECTED ASPECT OF MICROBIOLOGY IN NIGERIA'S CRIME INVESTIGATION

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ABSTRACT
Forensic microbiology despite its crucial role in modern criminal investigations, remains largely overlooked within the realm of microbiology in Nigeria. This review explores the significance of forensic microbiology in elucidating crime scenes and abiding in the pursuit of justice. Beginning with an overview of its definition and importance, the review delves into the historical

development of forensic microbiology and its early applications in Nigeria. It highlights the various types of microbial evidence encountered in forensic investigations, along with the method of collection, analysis and their implications through case studies. However numerous challenges hinder the progress of forensic microbiology in Nigeria, including limited awareness, resources and technical expertise, compounded by legal and ethical considerations. Despite this hurdles, opportunities for advancements exists through education training and collaboration with law enforcement agencies. Drawing upon case studies from Nigeria, the review showcases successful applications of forensic microbiology, offering insight into lessons learned and best practices. Looking ahead the review discusses future prospects, including emerging technologies, policy recommendations, and the potential impacts on crime investigation and the justice system in Nigeria. In conclusion, it underscores the critical need to address the neglected aspects of forensic microbiology and advocates for concerted efforts to promote its integrations within the Nigerian context, thereby enhancing the efficiency of criminal investigations and ensuring justice for all.

Keywords: Microbial evidence, Criminal justice, Neglected, Microbiology.

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MULTI-DRUG RESISTANT BACTERIA IN URINE SAMPLES OF WOMEN ATTENDING ANTENATAL UNIT OF GENERAL HOSPITAL DUTSIN-MA, KATSINA STATE, NIGERIA.

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ABSTRACT
Urinary tract infections (UTIs) have been a public health challenge globally, impacting the increase in the growth of antibiotic resistance among uropathogenic microorganisms. Knowledge about the possible causative agents of UTIs can give a guide on the right treatment for the infection. The objective of this study was to analyze the MDR patterns of bacteria isolated from urine samples from women Attending Antenatal Unit of General Hospital Dutsin-ma. Midstream urine samples of 50 patients which were sent to the Microbiology Laboratory were processed. Cultured specimens with growth of bacteria were sub-cultured, biochemically identified and purified. Antibiotic susceptibility tests were performed using Kirby-Bauer disc diffusion technique, Antibiotic susceptibility testing was done on all identified uropathogens. Twenty-five (25) bacterial pathogens were isolated with *Escherichia coli* being the most prevalent (50%). Twenty percent (20%) were *S. aureus*, 20% were *Klebsiella* spp. and 10% were *Proteus* spp. Most isolates of Gram-negative bacteria showed resistance to Ampicillin (54%), Ceftriaxone (62%), Gentamicin (54%). Among Gram-positive bacteria evaluated for antimicrobial drug resistance, *S. aureus* showed resistance to Ampicillin (60%) and Ceftriaxone (50%), while low level of resistance was detected against Ciprofloxacin, Norfloxacin and Amoxicillin and hence could be used as empirical therapy for UTI in the study area. For more accurate description of the etiology of urinary tract infection on women whom visit antenatal, further well designated studies are needed with increased number of samples, and to control drug resistance, the use of antibiotics should be restricted and be given only after doing culture and sensitivity test.

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COMPARISON BETWEEN RAPID DIAGNOSTIC TEST (RDT) AND MICROSCOPIC EXAMINATION IN THE DIAGNOSIS OF MALARIA PARASITE AMONG STUDENTS OF FEDERAL UNIVERSITY, GUSAU.

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ABSTRACT
Management of malaria requires prompt diagnosis of malaria by microscopy, Rapid Diagnostic Tests (RDTs), or other available tools. The aim of this study was to compare the effectiveness of RDT and microscopy examination in detection of malaria parasite among students of Federal University Gusau. Microscopy is the gold standard for laboratory diagnosis of malaria parasite, but it requires adequate training and the time to get results is longer than that for Rapid Diagnostic Tests (RDTs). Use of RDTs is an alternative diagnostic method. This method is quick and easy to carry out. The cross sectional study was conducted on 100 Students who were directed to the laboratory department for blood screening for malaria parasites at Federal University Gusau Zamfara State. Blood samples were collected and screened for malaria parasites microscopically using Giemsa stain on a thick film and by using immunochromatographic test coated with monoclonal antibody that recognizes the specific Histidine Rich Protein-2 (HRP-2) associated with the presence of *P. falciparum.* The prevalence of malaria obtained through microscopy (57.5%) was significantly higher than in RDT (49.5%). Of the 100 enrollees, 49 were tested positive with malaria using the RDT, 57 were tested positive with microscopy and 43 were negative using microscopy while 51were negative using RDT. The developmental stages microscopically observed out of the 100 samples 30 were early trophozoites, 23 were mature trophozoites, 4 gametocytes and 0 were schizonts of *P. falciparum.* This study confirms the superior sensitivity of microscopy to RDTs in diagnosis of malaria. Although RDTs are very useful for quick diagnosis of malaria, particularly in areas where access to the use of microscopy is not available, the possibility of a low performance by RDTs in malaria diagnosis should be emphasized on health practitioners and microcopy should be encouraged as much as possible.

2nd UMYU Conf/2024/151

ANTIBACTERIAL EFFECT OF GINGER AND GARLIC ON SOME BACTERIAL ISOLATES

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ABSTRACT
The antibacterial properties of garlic (Allium sativum) and ginger (Zingiber officinale) were investigated against various gram-positive and gram-negative bacterial strains including *Bacillus* spp, *Streptococcus* spp, *Staphylococcus* spp, *Escherichia coli*, *Klebsiella* spp, and *Salmonella* spp, obtained from the Department of Microbiology Laboratory Federal University Gusau. Phytochemical analysis of garlic and ginger showed the presence of alkaloids, saponins, flavonoids, terpenoids, and tannins, while steroids, resins, and glycosides were absent. The disc diffusion method was employed to assess the microbial activity. Results showed that ginger ethanol extract exhibited the highest zone of inhibition (19 mm) against *Bacillus* spp, while garlic ethanolic extract showed the highest zone of inhibition (20 mm) against *Staphylococcus* spp

among gram-positive isolates. For the gram-negative isolates, garlic ethanol extract demonstrated the highest zone of inhibition (20 mm) against *Klebsiella* spp. Additionally, the methanol extract of ginger exhibited the highest inhibition zones (15 mm each) against *Salmonella* spp and *Klebsiella* spp. Antibiotic susceptibility tests revealed the effectiveness of garlic and ginger extracts against *Klebsiella* and *Bacillus* strains. Minimum inhibitory concentration (MIC) results showed that both ginger and garlic methanol extracts inhibited the growth of Bacillus spp at a concentration of 75, whereas only ginger ethanol extract inhibited the growth of Salmonella spp at a concentration of 18.75. For gram-negative isolates, ginger methanol extract inhibited the growth of *Klebsiella* spp and *Salmonella* spp at concentrations of 37.5 and 18.75, respectively, while ginger ethanol extract inhibited the growth of *Klebsiella* spp at a concentration of 37.5. Minimum bactericidal concentration (MBC) results indicated that only ginger methanol extract was able to kill *Klebsiella* and *Bacillus* spp at concentrations of 150 and 75, respectively. In conclusion, garlic and ginger extracts possess antibiotic properties against both gram-positive and gram-negative organisms. However, their use should complement antibiotics to prevent multidrug resistance.

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LARVICIDAL EFFECT OF SPORES AND METABOLITES EXTRACTS OF *Aspergillus fumigatus* AGAINST *Culex Mosquito* larvae

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ABSTRACT

Culex mosquito species are vectors of diseases like malaria, lymphatic filariasis, Japanese encephalitis, Ross River viral and West Nile Virus. About 120 million people were infected in the worldwide. Repeated use of chemical insecticides has led to emergence of insecticide resistance developed by *Culex* mosquito species, environmental pollution and deleterious effects on non-target organisms. This research is aimed to test the larvicidal effect of metabolites and spores extracts of *Aspergillus fumigatus* against *Culex* mosquito. The fungal spores' concentrations were ascertained after 5 days of fungal culturing by measuring its optical density (OD). Equal amount of methanol and ethyl acetate has been used for the extraction of metabolites at four different test concentrations (10, 20, 30, and 40 mg/mL). The crude metabolites chemical constituents were characterized using GC-MS analysis and FTIR analysis. The lethal concentrations (LC_{50} and LC_{90}) were calculated by Probit analysis. The highest mortality rate (100%) was recorded at highest concentrations of metabolites (40 mg/mL) extracts of *Aspergillus fumigatus*. A remarkable mortality rate (100%) was recorded at spores' concentration of 4.5×10^8 CFU/ml. The major bioactive compounds include 9-Eicosene, (E)-, 1-Octadecene, 3-Eicosene, (E)-, Oleic Acid, 1-Nonadecene, cis-Vaccenic acid, Octadec-9-enoic acid, and Squalene. The findings of this study showed that *Aspergillus fumigatus* derived crude metabolites and spores extract have potential for controlling the mosquito vectors.

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MYCOSES IN A CHANGING WORLD: CLIMATE RELATED ISSUES IN FUNGAL INFECTIONS

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ABSTRACT
All aspects of the ecosystem including humans and microorganisms are affected by climate change. It has become one of the most important global challenge in this era with detrimental effects on the ecosystem, human health and biodiversity. Common manifestations of climate change include rising temperatures and shifts in the distribution of plant and animal species. Fungi are especially sensitive to climate change which alters attributes of the fungus, the environment and the host leading to emergence of novel or adapted fungal pathogens. Fungi can readily adapt to changing environments leading to alterations in the epidemiological landscape of pathogens. Fungi play a fundamental role in nutrient cycling and exchange and also regulate key ecosystem processes. Therefore, it is crucial to understand how climate changes affect their processes. A warmer planet leads to proliferation of emerging fungal diseases. This paper provides some insight on the impact of climate change on emergence and spread of fungal diseases. It discusses the multifaceted ways in which environmental factors, fungal pathogens and human health are interconnected.

Keywords: Climate, Diseases, Emerging, Fungi, Health, Pathogens.

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EFFICACY OF *Moringa Oleifera* SEED EXTRACTS ON PENTYLENETETERAZOLE-INDUCED CONVULSIVE ALBINO RATS

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ABSTRACT
Moringa oleifera, commonly known as drumstick tree has been used from time immemorial in traditional medicine for the treatment of many ailments. Among these ailments is convulsion that is believed by many to be associated with demons. Thus far, there is little evidence supporting the use of the plant for the treatment of convulsion. Therefore, the current study was carried out to determine the efficacy of the *Moringa oleifera* seeds extracts on pentyleneteterazole-induced convulsive albino rats. Convulsion was induced intraperitoneally in rats using pentyleneteterazole and the effect of the extract on the onset of convulsion was monitored in a dose dependent manner. The effect of the extract on the level of glutathione and malondiadehyde in the brain tissues was also monitored in a dose dependent manner. The methanolic extract of M. oleifera delayed the onset of convulsion in the petyleneteterazole-induced convulsive rats. The mortality rate also decreased ($p<0.05$) as the dose of the extract was increased. Similarly, the extract increased the level of the antioxidant, glutathione and decreased the level of malondialdehyde in the treated rats. Therefore, the findings lend credence to the sustained use of the concoction of *M. oleifera* as an anti-convulsant agent in traditional medicine in northern Nigeria.

Keywords: Moringa oleifera, anti-convulsant, antioxidant, malondialdehyde, mortality

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BIOETHANOL PRODUCTION FROM SUGARCANE BAGASSE OBTAINED FROM KATSINA METROPOLIS USING *Saccharomyces cerevisiae*

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ABSTRACT

Lignocelluloses materials, including sugarcane bagasse, are potential sources of renewable energy. This study was aimed at producing bioethanol using sugarcane bagasse as a substrate obtained from Katsina metropolis. Counts of Saccharomyces cerevisiae and yeast were obtained and isolated locally and confirmed through biochemical and fermentation properties. The proximate and physiochemical composition of the bagasse were carried out using standard methods. The processed substrate was used for concurrent scarification and fermentation in a closed vessel fermentation system, for 120 hours, at varying pH levels (pH 4, 5 and 6, for acidic pretreatment, and pH 8, 9 and 10, for basic pretreatment). The bioethanol produced was subsequently distilled and measured using high performance liquid chromatography. The results showed viable count of the yeast ranged from 32.1 ± 1.5 × 107 CFU/g to 11.0 ± 2.0 × 109CFU/g. The proximate analysis of the bagasse revealed the composition of the substrate as: moisture (5.8%), protein (2.8%), ash (2.2%), crude fiber (28.6%), nitrogen (0.44%) and carbohydrate (60.15), which indicate high potential for bioethanol creation, high carbon gratified, and potential for longer storage without microbial attack, due to the low moisture content. The physicochemical composition of the sugarcane bagasse shows the pH as 5.4 and the electrical conductivity as 109.3. The presence of organic carbo n (1.9) and organic matter (3.3%), were detected. The bioethanol produced was distilled, and analyzed using HPLC analysis using varying concentrations (25%, 50%,75% and 100%) of the ethanol standard. The ethanol production was found to vary with regards to pH, at $p < 0.05$ ($p = 0.023$), with the highest production obtained at pH 5, and the lowest production at pH 10. The research exhibited sugarcane bagasse as substrate for bioethanol production, with the production being pH dependent in ideal pH for the production of the bioethanol at pH 5.

Keywords: Sugar cane bagasse, Bioethanol, Fermentation, Proximate, Chromatography

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PREVALENCE OF TUBERCULOSIS IN A SELECTED SECONDARY HEALTH CENTER IN ABUJA AND PHENOTYPIC RESISTANCE PROFILE OF CLINICAL *Mycobacterium tuberculosis* Isolates

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ABSTRACT
Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*. TB is broad illness comprises of array of symptoms including fever, headache, chest pain, weight loss, coughing with and without blood. TB infected over 10 million people globally with 1.7m deaths annually and Nigeria contributing 4.6% TB cases. The study is aimed to establish the phenotypic resistance profile and the TB prevalence in a selected health center in Abuja. The medical record data of presumptive TB patients attending National Institute for Pharmaceutical Research and Development Direct Observed Therapy Clinic from 2006 to 2020 was analyzed for demographic data. One hundred (100) TB were recruited based on answering health questionnaires and provided sputum each for microscopy, culture and susceptibility testing on first line anti-TB drugs using standard techniques. 9128 patients visited the health center and 1478 were positive for TB. In which were 941 (61%) males and 534 (39%) females. The TB prevalence was 16% in this period. The age bracket of 20-40 years was most affected. The sputa screened were identified to be *M. tuberculosis* based on Ziehl-Neelsen, aryl-sulphatase, heated catalase and nitration reduction tests. The phenotypic resistance revealed mono-resistance rifampicin (6%), isoniazid (14%), pyrazinamide (23%) and Ethambutol (17%) and multidrug-resistance (2%) were detected in the isolates. The TB prevalence obtained from this study was found to be of health concern and need to improve on advocacy and increase diagnostic centers. There is high mono-drug-resistant TB and these may influence treatment failure, prolong and development of multidrug resistance if susceptibility profile not performed.

Keywords: Tuberculosis, *Mycobacterium tuberculosis*, Prevalence, Phenotypic resistance, first line TB Drugs, DOTS

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ANTIBACTERIAL ACTIVITY OF RHAMNOLIPID PRODUCED BY *Enterobacter Cloacae* AYF 1 STRAIN AGAINST SOME CLINICAL ISOLATES FROM SPECIALIST HOSPITAL SOKOTO

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ABSTRACT
Rhamnolipids are significant industrial bioactive agents due to their strong capacity for emulsification, antibacterial activity, and resistance to biofilm formation. This research was aimed to determine the antibacterial property of rhamnolipid produced by *Enterobacter cloacae* AYF1 strain against some clinical isolates sourced from Specialist Hospital Sokoto (SHS). Three

(3) isolates of *Klebsiella pneumoniae, Escherichia coli* and *Staphylococcus aureus* were collected from Specialist Hospital Sokoto (SHS) as clinical bacterial samples, then biochemical test was carried out on the isolates to confirm them based on morphological and biochemical characteristics. The isolates were subjected to rhamnolipid with varying concentration to determine the effects of rhamnolipids on these isolates using paper disc diffusion method. The results of the morphological and biochemical characteristics confirmed them as *Klebsiella pneumoniae, Escherichia coli* and *Staphylococcus aureus*. Also the results of rhamnolipids antibacterial activity on the three clinical bacterial isolates (*Klebsiella pneumoniae, Escherichia coli* and *Staphylococcus aureus*) revealed *Staphylococcus aureus* to be more susceptible to rhamnolipid with the highest diameter of zone of inhibition of 15mm at 125mg/ml concentration, 20mm at 250mg/ml concentration, and 25mm at 500mg/ml concentration than the other two isolates. Rhamnolipid biosurfactant produced by *Enterobacter cloacae* AYF1 strain has been proven to have antibacterial property against three clinical isolates (*Klebsiella pneumoniae, Escherichia coli* and *Staphylococcus aureus*) with much effect on Gram positive *Staphylococcus aureus* than the two Gram negative bacterial isolates of *Klebsiella pneumoniae, Escherichia coli.* Rhamnolipid biosurfactant used in this study has proven to be promising bioactive antibacterial agent.

Keywords: Bacteria, Rhamnolipids, Biosurfactantant, Antibacterial agent, *Enterobacter cloacae* AYF1 strain

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BACTERIOLOGICAL AND PHYSICOCHEMICAL ASSESSMENT OF HOSPITAL WASTEWATER FROM SELECTED HOSPITALS IN BIDA METROPOLIS, NIGER STATE

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ABSTRACT
The discharge of untreated hospital wastewater into the environment of public health concern as the discharge can lead to the spread of pathogenic bacteria and pharmaceutical residues that could be a potentially a threat to components of environment. This present study was carried out to determine the contamination of effluents The Federal Polytechnic Bida Medical Center and Sokoge Hospital in Bida, Niger state. The samples were collected from five different wards: female and male ward, laboratory, operating and labour room. Parameters for physicochemical analysis such as pH, Temperature, Total Suspended Solid, Biological Dissolved Oxygen, Dissolved Oxygen, Total Dissolved Solid, e.t.c. The results of physiochemical analysis obtained at Federal Polytechnic Bida Medical Center and Sokoge hospital effluent are recorded as follows, temperature (23.89^0C -28.12^0C), pH (4.77-6.37), TDS (75.38 – 131.07 mg/L), COD (80 mg/L - 123 mg/L) and BOD_5 (456 mg/L - 599 mg/L). The temperature and total suspended solids were within the WHO acceptable limit while the values for DO, COD BOD_5 and pH from both hospitals were above the WHO acceptable limits. Five-fold serial dilution of the samples was carried out (10^{-1}-10^{-5}) to determine the total bacteria count of HWW. The TBC results showed a Mean±SD for The Federal Polytechnic Bida Medical Center (2.47±0.4 - 6.77±5.87 cfu/mL) and Sokoge hospital (1.1±2.72-9.53±0.64 cfu/mL). These hospital waste waters represent a great risk for the environment as well as for human well-being and therefore require adequate treatment for the elimination of the greatest possible number of contaminants. Waste management policy should be reassessed and reviewed where necessary so as to keep it up-to date. There should be

proper monitoring by government agency by enforcing and regulating the activities of hospital on proper waste management practice.

Keywords: Bacteria; Hospital wastewater; Physicochemical; Total Bacteria Count

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CHROMIUM TOLERANCE BY BACTERIA ISOLATED FROM UNGUWAR ROGO TANNERY CONTAMINATED SOIL OF SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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ABSTRACT
Heavy metals have fundamental effect on biological system and they are straightforwardly harmful to living creatures, particularly human. The leakage of chromium due to anthropogenic activities of humans Nigerian local tannery industries is on rise with detrimental consequences. This study was aimed to determine some physicochemical properties from tannery contaminated soil of Unguwar Rogo of Sokoto metropolis and test for the chromium tolerance by bacteria isolated from tannery contaminated soil of Unguwar Rogo of Sokoto metropolis, Sokoto Syaye Nigeria. Some physicochemical properties from tannery contaminated soil samples of Unguwar Rogo were determined using standard procedures. Bacteria were morphologically and biochemically identified. Chromium tolerance by *Bacillus subtilis* was assessed (Table 4.2). Chromium tolerance by bacterial isolates was assessed by growing it on nutrient broth medium containing varied concentrations of chromium (VI) heavy metal from $K_2Cr_2O_7$ compound at 1400, 1200, 1000, 800, 600, 400, 200 and 0 mg/l for 24 and 48 hours at 600nm wave length and 180 rpm in an incubator shaker. The result of mean temperature, pH, electrical conductivity and percentage organic carbon recorded as 30.0±1.30°C, 6.81±0.85, 14.37±0.61 and 0.63±0.18 respectively. A total of five bacterial species were identified based on results of various morphological and biochemical reactions as *Brevibacillus brevis, Bacillus circulans, Bacillus pumulus, Bacillus sphearicus* and *Bacillus subtilis.* Out of the five bacterial isolates *Bacillus subtilis* exhibited chromium tolerance to all of the chromium concentrations used. Concentration of chromium (VI) heavy metal from $K_2Cr_2O_7$ compound at 1400, 1200, 1000, 800, 600, 400, 200 and 0 mg/l were reduced for 24 and 48 hours and bacterial growth was determined by taking optical density using spectrophotometer at 600nm for each concentration used. The wave length recorded in the negative control shows increase from 24 to 48 hours. The chromium reduction by potential of *Enterobacter cloacae* AYF1 strain to reduce chromium was also tested. Investigation into bacterial growth in the presence of heavy metals was performed on liquid (nutrient broth, NB) media with 0, 1, 10 and 100 ppm of Cr. For test in NB, A loopfull starter innocular was inoculated into NB (total volume of 10 ml) and incubate under static conditions at room temperature for 24h, bacterial growth was determined by taking optical density using spectrophotometer at 600nm. However, among the five bacterial isolates *Baccillus subtilis* had shown an excellent ability to reduce chromium at varying concentrations. Chromium resistance bacteria may offer an effective tool of for bioremediation of heavy metals contaminated sites.

Keywords: Chromium, Bacteria, Tolerance, Bioremediation, *Baccillus subtilis*

2nd UMYU Conf/2024/160

PREVALENCE OF HEPATITIS B SURFACE ANTIGEN AMONG HIV/AIDS PATIENTS ATTENDING NATIONAL TUBERCULOSIS AND LEPROSY TRAINING CENTRE, SAYE-ZARIA, NIGERIA

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ABSTRACT
Despite the public threat posed by Hepatitis B Virus and Human Immunodeficiency Virus (HIV) infections in Nigeria, the data on the frequency of their co-infection are scanty in some locations. In this study, 120 individuals living with HIV receiving care and treatment at the National Tuberculosis and Leprosy Training Centre (NTLTC) in Saye-Zaria, Nigeria, who consented were enrolled in the study to provide information about their socio-demographic characteristics using structured questionnaire. From each patient, 5ml of venous blood sample was collected and centrifuged using ROTOFIX 32A at 40RPM/RCF×100 for 30minutes. The plasma was used for the determination of HIV status (Alere Determine HIV-1/2 rapid test kit), quantification of HIV-1 RNA (AmpliPrep/COBAS TaqMan) and detection of HBsAg (OnSite HBsAg rapid test kit); the data were analyzed using SPSS. The results confirmed that all the patients recruited were HIV positive (100%), and the sero-prevalence of the HBsAg among them was 10.8%. The variables statistically identified as significant ($p \leq 0.05$) in relation to the infection were high HIV viral count, never being transfused with blood, intravenous injection with illicit drugs and history of the infection in the family, as well as unprotected sex and irregular use of HAART. Conclusively, the prevalence of the HBV infection among HIV patients is within the same range as previously reported in the country; there is a need to create more awareness on the dangers associated with unprotected sex, sharing of sharp objects, intravenous injection with illicit drugs and suboptimal commitment to HAART.

Keywords: Co-prevalence, HIV, HBsAg, HAART, demographic factors, Zaria, Nigeria, Vepatitis B

2nd UMYU Conf/2024/161

COVID-19-INDUCED INTERLEUKIN 18 (IL-18) CHANGES AMONG PATIENTS IN KANO, KANO STATE, NIGERIA

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ABSTRACT
Coronaviruses are responsible for life-threatening outbreaks, including Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), andthelatest coronavirus disease 2019 (COVID-19). COVID-19 first broke out in Wuhan (from a Huanan seafood wholesale market), China, in December 2019andwasreported by the China Centre for Disease Control and Prevention (CDC). The diseasewas later declared a pandemic, and so far, more than 222 countries havebeenaffected, with over 771 million confirmed cases and total deaths of over 6.9million. Some immunological markers were reported elsewhere to be directly related to COVID-19 pathophysiology and stand a chance to be considered as biomarkers. Interleukin 18 (IL-18) is a proinflammatory cytokine and a member of the interleukin- 1 family, produced by macrophages at the early stage of viral infections and induces the production of IL-6 and IFN, which are considered critical for optimal viral-hostdefense. However, aberrant IL-18 production can lead to severe pathological injury. Markedly elevated serum IL-18 levels have been linked to severe disease and mortality in some viral infections characterized by cytokine storms, such as dengue fever. Hence, this study assessed the levels of IL-18 among patients with COVID-19in Kano. A total of 45 individuals diagnosed with

COVID-19 and 145 apparentlyhealthy controls were recruited for this study. Nasopharyngeal swab and blood samples were collected from the patients and controls, and the sampleswereanalyzed for IL-18. The findings of this study revealed significantly higher levels of IL- 18 in COVID-19-positive patients compared to the control group. The study emphasizes the importance of IL-18 in COVID-19, suggesting its potential useinearly identification, patient triage, and efficient management.

2nd UMYU Conf/2024/162

PREVALENCE OF MALARIA AMONG PREGNANT WOMEN AND CHILDREN UNDER FIVE YEARS IN IDP'S IN KATSINA, KATSINA STATE, NIGERIA.

ABSTRACT

Internally displaced persons (IDP) represent vulnerable populations whose public health conditions merit special attention. Internally displaced persons (IDPs) in Nigeria face numerous health challenges. In Katsina State violent conflict has caused the displacement of millions of people into camps where they are exposed to poor living conditions and high rates of infectious diseases. Malaria, in particular, is a major cause of mortality in pregnant women and children under five; however, the burden of disease in displacement camps has not previously been described. This study aimed to investigate the prevalence of malaria among pregnant women residing in IDP camps within Katsina State, Nigeria.

2nd UMYU Conf/2024/163

ISOLATION AND IDENTIFICATION OF HEAVY METAL RESISTANCE BACTERIA FROM TANNERY EFFLUENT OF MAJEMA ANGUWAN ROGO SOKOTO METROPOLIS, SOKOTO STATE

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ABSTRACT

Tannery effluents are known to contain high levels of heavy metals due to the processes involved in leather production. The heavy metals, such as chromium, lead, cadmium, and mercury, pose significant environmental and health risks when discharged into water bodies. Isolation and identification for Heavy Metal Resistant Bacteria from Tannery Effluent of Majema Anguwan Rogo Sokoto Metropolis, Sokoto State aimed to investigate the microbial composition and potential heavy metal resistance in tannery effluent. Tannery effluents are known sources of heavy metal contamination, with significant environmental and public health implications. The study involved the collection of effluent samples, enumeration of bacteria, morphological and biochemical characterization of bacterial isolates, and the determination of the frequency of bacterial occurrences. The viable counts of heterotrophic viable aerobic bacteria in the effluent samples ranged from 2.65 to 4.90 x 10^6 cfu/ml, highlighting the substantial microbial presence in tannery effluent. Various bacterial species, including *Bacillus cereus*, *Bacillus smithii*, *Bacillus subtilis*, *Bacillus novalis*, *Bacillus endophyticus*, *Aeromonas veronii*, *Bacillus firmus*, and *Pseudomonas aeruginosa*, were identified through morphological and biochemical characterization. *Bacillus smithii* and *Bacillus firmus* were the most prevalent species in the effluent, indicating a diverse microbial community. This research contributes to the understanding of the microbial ecology in tannery effluents, which is essential for addressing environmental challenges associated with these wastewater sources. The findings lay the groundwork for further investigations into the potential role of these bacteria in heavy metal resistance, which will provide valuable insights into strategies for mitigating the environmental impact of tannery effluents.

Keywords: Heavy metals, tannery effluent, water bodies, public health

2nd UMYU Conf/2024/164

ISOLATION AND CHARACTERIZATION OF ANTIBIOTICS RESISTANT ENTERIC BACTERIA FROM BOREHOLES LOCATED IN PRESCO CAMPUS, EBONYI STATE UNIVERSITY, ABAKALIKI NIGERIA

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ABSTRACT

Water is essential to life. An adequate, safe and accessible water supply must be available to all. Hence, this research was aimed at isolating and characterizing bacteria from borehole water samples located at Presco campus, Ebonyi State University, Abakaliki and testing the antibiotics susceptibility patterns of the bacteria isolated. Twelve (12) water samples were collected from six (6) different locations in duplicates and analyzed using standard microbiological methods. Serial dilutions were performed on the samples and dilutions of 10^3 were plated out using pour plate method. After the incubation periods, colonies were counted and expressed in CFU/mL, biochemical tests were carried out and the antibiotics susceptibility profiles of the bacteria isolated were evaluated. From the results, the total microbial counts ranged from 1.0 x 10^4 to 5.9 x 10^4 indicating high contamination of the water samples. The morphology and biochemical tests revealed the presence of *Shigella* species 5 (45.5 %) and *Salmonella* species 6 (54.6 %). *Shigella* species were highly resistant to trimethoprime- sulphamethoxazole and amoxicillin (80 %) respectively and tetracycline (100 %), but were susceptible to ceftriaxone (100 %) and ciprofloxacin (80 %). On the other hand, *Salmonella* species showed a resistant pattern of 83.3 % to tetracycline, ciprofloxacin and ceftriaxone respectively, but were susceptible to levofloxacin (100 %) and cefepime (83.3 %). The antibiotics to which the organisms were resistant cannot be used in the treatment of infections caused by these bacteria. This result is of public health importance as these resistant genes of these organisms can be transferred between species making treatment a difficult task.

Keywords: Water, antibiotics, resistance, susceptibility, bacteria.

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Assessment of Carbapenemase Resistance and Types of Carbapenamases Expressed by Multidrug Resistant Gram-Negative Bacteria from UTI Patients within Katsina Metropolis

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ABSTRACT

Multidrug resistant bacteria (including carbapenamase-producing gram-negative bacteria) are increasingly reported, affecting >150 million people diagnosed with urinary tract infections (UTIs), yearly, leading to >$6 billion economic losses and consequently affecting therapy. This study assessed and typified carbapenamases of gram-negative bacterial isolates among UTI patients within Katsina metropolis. Cultured isolates from 150 urine samples were identified using VITEK-2 system. Antibiogram was conducted using carbapenems (meropenem, imipenem and ertapenem) and other common antibiotics for treating UTIs. Carbapenamases were phenotypically detected and quantified using (EDTA)- and modified carbapenamase inactivation methods. One-way ANOVA and chi-square tests were used for statistical analysis. From 13 predominant gram-negative isolates, 10 (66.67%) were multidrug resistant, of which 8 (53.33%)

produced carbapenamases. Carbapenems resistance ranged from 61.54% (imipenem) to 38.46% (meropenem). Isolates resisted antibiotics from various classes differently (p = 0.0226)). Class A (serine) carbapenamases were elaborated by most of the isolates (5/8 = 62.5%), while three (37.5%) of the isolates produced Class B (metallo-betalactamase) carbapenamases. Chi-square test confirmed that tendency of elaborating type A/type B carbapenemases does not differ significantly among the isolates (p = 0.077, χ^2 cal = 3.13, χ^2 crit = 3.84). After VITEK identification, Class A (serine) carbapenamases were found to be produced by *Stenotrophomonas maltophilia*, *Pseudomonas aeruginosa* strain E3D, *Pseudomonas oleovorans* strain 4, *Providencia rettgeri* strain EP34, and *Pseudomonas aeruginosa* strain 2; while *Chryseobacterium indologenes*, *Alcaligenes faecalis* and *Pseudomonas oleovorans* strain EN3a produced Class B (metallo-beta lactamases). This study is among the first to identify/categorise carbapenamases in the study area. Similarly, it is among the first reports of carbapenamases production in *C. indologenes* and *Pseudomonas oleovorans*. Further researches in other healthcare centres, using different samples, and antimicrobial stewardship are recommended to checkmate the incidence of carbapenem resistance and to enhance public health.

Keywords: Carbapenamases, Carbapenems, Multidrug Resistance, UTIs

2nd UMYU Conf/2024/166

FACTORS ASSOCIATED WITH MALARIA INFECTION IN PREGNANT WOMEN LIVING IN INTERNALLY DISPLACED PERSONS CAMPS IN KATSINA STATE, NIGERIA

ABSTRACT

Malaria is a serious health problem in Africa, especially for pregnant women and young children. In Nigeria, recent crises have displaced millions of people, creating crowded living conditions that increase the risk of malaria. This study looked at factors that contribute to malaria infections in pregnant women and children living in camps for displaced people in Katsina State, Nigeria. Many malaria infections in this area have no symptoms, so they often go undiagnosed and untreated, harming both mothers and their unborn babies. Even though large-scale efforts are underway to fight malaria using bed nets, insecticides, and medications, it's important to understand the specific risks faced by people living in displacement camps. This study aimed to identify the factors that make pregnant women in these camps more likely to get malaria.

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DETERMINATION OF ANTIBIOTIC SENSITIVITY PATTERN OF BACTERIA ASSOCIATED WITH URINARY TRACT INFECTION (UTI) AMONG ADULT MALES IN KANO, NIGERIA

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ABSTRACT

Urinary tract infections (UTIs) is one of the serious infection that affects human population especially men. The study was aimed to characterize and determine the antibiotic sensitivity pattern of bacteria associated with urinary tract infection among adult patients in Kano, Nigeria. A total of 200 samples were collected from adult male patients attending urology clinic of Aminu

Kano Teaching Hospital Kano for period of 6 month from December 2016 to May, 2017. The samples were inoculated on plates of Cystine Lactose Electrolyte Deficient media (CLED) by method of streaking. Cultures were incubated at 37°C aerobically overnight for bacterial isolation. Isolates were identified using Gram staining, biochemical (catalase, coagulase, DNase, indole, methyl-red, VP, Citrate utilization and urease) tests and motility test. The bacteria isolates were subjected to antibiotic susceptibility testing using agar disc diffusion method. The result indicated that *E. coli* is the most prevalent isolate with total 105 occurrences accounting for 35%. This is followed by *Klebsiella* 66 (22%), *P. aeruginosa* 27 (9%), *Staphylococcus aureus* 26 (8.66%), *Proteus* sp 23 (7.66%), *E. faecalis* 22 (7.34%), *S. epidermidis* 20 (6.67%) while the least prevalent organism is *Salmonella* sp 11 (3.67%). The highest susceptibility was recorded in Perfloxacin antibiotic with highest susceptibility to *E. coli, Proteus, P. aeruginosa and Staphylococcus aureus* to highest resistance was in Chloramphenicol with about 90% resistance to the bacterial isolates. It is concluded that bacteria is one of the major causative agent of urinary tract infections**.**

Keywords: Antibiotics, bacteria, sensitivity, urinary tract infections.

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DETERMINATION OF ANTIBIOTIC SUSCEPTIBILITY PATTERN AND MULTIDRUG RESISTANCE UROPATHOGENIC ISOLATES OF *E. coli* and *Klebsiella* spp. AGAINST THE COMMONLY PRESCRIBED ANTIBIOTICS

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ABSTRACT

The emergence of antibiotic resistance in the management of urinary tract infection (UTI) is a serious public health issue worldwide particularly in the developing countries. The study was aimed to determine antibiotic susceptibility pattern and multidrug resistance uropathogenic isolates of *E. coli* and *Klebsiella* sp against the commonly prescribed antibiotics. A total of one hundred and thirty-one (131) suspected *Klebsiella* sp. and *E coli* isolates were collected from the Microbiology laboratory of all the 3 study sites i.e., Murtala Muhammad Specialist Hospital (MMSH), Muhammad Abdullahi Wase Teaching Hospital (MAWTH) and Aminu Kano teaching hospital (AKTH) all in Kano State, North West Nigeria. Isolates were subjected to Gram staining, morphological and biochemical characterization as well as MicrogenTM Gram negative Identification A system. Antibiotic susceptibility testing was conducted using modified Kirby-Bauer disc- diffusion method. Result showed that all the isolates were susceptible to gentamicin (100%), 75% and 67% susceptible to ciprofloxacin and amoxicillin-clavulanic acid respectively. The resistance pattern of the isolates was observed to be cephalothin (77.5%), cefpodoxime (72.5%), ampicillin (57.5 %), tetracycline (52.5%), sulfamethoxazole-trimethoprim (50%), ceftriaxone (40%), amoxicillin-clavulanic acid (32.5%) and ciprofloxacin (25%). *Klebsiella* sp. showed higher resistance to cephalexin (90%), ampicillin (90%), cefpodoxime (80%), and then tetracycline (60%) while resistance of *E. coli* to cephalexin, cefpodoxime, and tetracycline were 73.3%, 70%, and 50% respectively. Out of the 22 MDR isolates, 14 (63.6%) were *E. coli* and 8 (36.4%) were *Klebsiella* sp. Eight (8) (20 %) were XDR with no PDR strain detected. Eight (8) of these XDR were *E. coli* while 6 were *Klebsiella* sp. **Keywords**: Antibiotics, *Escherichia coli*, *Klebsiella*, Kano, susceptibility pattern

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ANTIBACTERIAL ACTIVITY OF *Sclerocarya birrea* A. RICH, HOCHST (MARULA) STEM BARK EXTRACTS AGAINST CLINICAL ISOLATES OF SOME MULTI DRUG RESISTANT ENTERIC BACTERIA CAUSING DIARRHEA IN CHILDREN

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ABSTRACT

The recent discovery of novel drugs from medicinal plants implies that vast potential still exists for the production of numerous more novel drugs. The study was aimed to screen for phytochemical and to determine antibacterial activity of aqueous and ethanol extract of *Sclerocarya birrea* stem bark against clinical isolates of some multi drug resistant enteric bacteria causing diarrhea in Children isolated from patients attending Murtala Muhammad Specialist Hospital Kano. Agar well diffusion method was used to determine antibacterial activity of the extract while dilution method was employed to determine the Minimum inhibitory concentration (MIC) of the extract. Preliminary phytochemical screening of the stem bark extract revealed the presence of alkaloids, flavonoids, phenol, terpenoid, anthraquinone, saponin and tannin except Steroid. The leaf has highest percentage of flavonoid with total composition of 8.5% of the extract, followed by alkaloid 6.9%, phenol 5.5%, terpenoid 3.8% Tannin 2.3 %, Anthraquinone and saponin constituting 1.4% and 1.7 % respectively. The overall sensitivity of the isolates to the extract indicated that *E. coli* was the most sensitive isolate with average zone of inhibition of 15.16 mm, followed by *Klebsiella* spp with 13.88 mm, *Salmonella* spp with 13.50 mm while least sensitivity was shown by *Shigella* spp with 12.38 mm. it is concluded that the stem bark of *Sclerocarya birrea* contained bioactive components that possess antibacterial activity.

Keywords: Antimicrobial Activities, Diarrhea, Inhibition, Phytochemical, *Sclerocarya birrea*

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ANTIBACTERIAL ACTIVITY OF *Boswellia dalzielii* LEAVES EXTRACTS AGAINST SOME PATHOGENIC BACTERIAL ISOLATES

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ABSTRACT

The study was conducted to investigate the antibacterial activity of *Boswellia dalzielii* leaves extracts and its major phytochemical constituents. The aqueous, methanol and chloroform extracts from the leaves of the plant was tested using agar well diffusion method for their antibacterial activity against some members of Enterobacteriaceae family isolated from diarrheic stool sample (*Escherichia coli, Shigella* spp, *Salmonella typhi* and *Klebsiella* spp). Preliminary phytochemical analyses showed that the leaves extracts contain alkaloids, tannins, terpenoid, Anthraquinone, reducing sugar, amino acid, flavonoid, saponins, glycosides and phenols. The results of antibacterial activity of the leaves extracts shows that the plant extracts were active against the microorganisms tested. The methanol extract showed the highest zones of inhibition

against tested organisms compared to aqueous and chloroform extract. Statistical analysis of the result showed that an average zone of inhibition of 15.44 mm, 14.78 mm, 12.92 mm and 11.31 mm for *E. coli*, *Shigella* spp *S. typhi* and *Klebsiella spp*, respectively were found. The Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of the extracts ranged between 6.25 – 100 mg/ml. The extracts of the plant leaves demonstrated antibacterial activity against microorganisms causing diarrhea stool due to presence of phytochemical constituents hence, the application of the decoction of leaves of the plants in ethno medicine is justified.

Keywords: Enterobacteriaceae; antibacterial activity; phytochemicals, *Boswellia dalzielii*

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ANTIBACTERIAL ACTIVITY OF *Mangifera indica* EXTRACTS AGAINST COMMUNITY AND HOSPITAL ACQUIRED METHICILLIN RESISTANT *Staphylococcus aureus* (MRSA)

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ABSTRACT
Natural products such as plants have been an integral part of traditional medicinal system in ancient cities such as Chinese, Indian Ayurvedic and Egyptian. The study was aimed to determine the antibacterial activity of *Mangifera indica* extracts against community and hospital acquired methicillin resistant *Staphylococcus aureus* (MRSA). Agar well diffusion was used to determine the antibacterial activity of the extracts against the isolates while broth dilution method was employed to determine Minimum inhibitory concentration (MIC) of the extracts. The antibacterial activity of the extracts is dose dependent with 120 mg/ml having the highest activity. The activity showed by ethanol extract (15.80 mm) is higher than that of aqueous extract (13.40 mm). From the result, lowest MIC was 6.25 mg/ml from ethanol leaf extract against isolate IWH_3 and IWH_{43}. Most of the result ranged from 12.50mg/ml to 50 mg/ml. The result showed that ethanol extracts have lower MIC values when compared to aqueous extracts. The MBC of the extracts ranged between 50mg/ml to 100 mg/ml. However, the MBC of some isolates against certain extracts was not found which indicated that the extracts con not kill the isolates at the concentrations used in the study. It concluded that the extract of M. indica contain antibacterial agents

Keywords: Antibacterial activity, *Mangifera indica*, methicillin resistant *Staphylococcus aureus*

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ANTIBACTERIAL ACTIVITY OF *Vernonia amygdalina* (BITTER LEAF) AGAINST CLINICAL ISOLATES OF *SALMONELLA* SPECIES

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ABSTRACT
Antibiotic resistant strains of *Salmonella* spp have been a major foodborne pathogen threat to human and amplify significant food safety hazard. The emergence of multiple drug resistance *Salmonella* in food has necessitated a search for new antimicrobial substance from other sources, including plants. This study evaluates antibacterial activity of different concentrations of

Vernonia amygdalina (bitter leaves) extract against ten (10) clinical isolates of *Salmonella* species. The phytochemical evaluation showed that compounds such as alkaloids, cardiac glycosides, saponins, steroids, tannins, and glycosides were present. The extracts showed antibacterial activity against the bacteria with highest zone of inhibition of 11mm and 9mm for the ethanolic extracts and aqueous extract. All the *Salmonella* isolates exhibit a minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) at 50 mg/ml and 100 mg/ml concentrations for both extracts. This study showed that *V. amygdalina* possesses antibacterial activity against *Salmonella* and should be further explored for use in *Salmonella* drug development and treatment of salmonellosis.

Keywords: Antibiotic resistance, *Salmonella* species, *Vernonia amygdalina,* Phytochemical, Antibacterial activity

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ADVANCEMENTS IN ARTIFICIAL INTELLIGENCE FOR MALARIA PARASITE DETECTION AND QUANTIFICATION: A COMPREHENSIVE REVIEW

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ABSTRACT
Malaria is a serious and life-threatening disease that is caused by *Plasmodium* parasites. It poses a significant global health concern, especially in tropical and subtropical regions. To effectively manage and control malaria, it is crucial to diagnose it promptly and accurately. Recent advancements in artificial intelligence (AI) technologies, especially in image processing and machine learning, have enabled utilizing AI to detect and quantify malaria parasites. This review aims to provide a comprehensive overview of the current state-of-the-art AI-assisted methods for detecting and quantifying malaria parasites in various biological samples such as blood smears and digital images. The review discusses the different AI algorithms and techniques employed, such as convolutional neural networks (CNNs), deep learning, and computer vision approaches, highlighting their strengths and limitations. Additionally, the review addresses key challenges and future directions in developing and implementing AI-based malaria detection systems, including dataset availability, algorithm robustness, scalability, and deployment in resource-limited settings. By critically examining the existing literature and research findings, this review showcases the potential of AI-driven technologies to revolutionize malaria diagnosis and surveillance. Ultimately, this will contribute to more efficient and accurate disease control strategies.

Keywords: *Plasmodium*, Artificial Intelligence, Detection, Quantification

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EFFECT OF TOMATO PASTE PRESERVED USING SODIUM BENZOATE ON LIVER AND KIDNEY FUNCTIONS OF WISTAR RATS

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ABSTRACT
Sodium benzoate is a sodium salt that is used as a preservative in food industry. When sodium benzoate mixed with ascorbic acid in tomato, benzene is formed. This study aimed at investigating the effect tomato paste preserved using sodium benzoate on liver and kidney functions. Tomato paste was preserved using sodium benzoate at 0.05 g/100 mg for 30 days.

Twenty-four (24) male wistar rats of about 120g were grouped into four (4) groups of six rats each. Group 1 (Control group), group 2 (Test group), group 3 (Gino tomato paste), and group 4 (Sonia tomato paste) were maintained on normal rodent diet, sodium benzoate preserved tomato paste (5% inclusion), 5% Gino tomato paste and 5% Sonia tomato paste respectively. At the end of six (6) weeks feeding trials, the blood samples of each group collected were used for liver and kidney function parameters tests. The activity of Alkaline phosphate (ALP) and Alanine transaminase (ALT) significantly decrease ($p<0.05$) when compared with the control and the groups that received tomato paste from two different companies. The bilirubin concentration in the test group significantly increased ($p<0.05$) as to the other groups. The kidney function parameters revealed that there is significant decrease ($p<0.05$) in serum chloride ion (Cl^-) concentration as compared to the other groups. There is no significant difference ($p>0.05$) on the other liver and kidney function parameters when compared between the groups. The findings of this study show that administration of 5% tomato paste preserved using sodium benzoate to wistar rats for six (6) weeks does not significantly affect liver and kidney.

Keywords: Sodium benzoate, Alkaline phosphate, Alanine transaminase, Chloride ion and Bilirubin

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PREVALENCE OF EXTENDED-SPECTRUM BETA-LACTAMASES (ESBLS) AMONG QUINOLONE-RESISTANT *Enterobacteriaceae* CLINICAL ISOLATES

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ABSTRACT
Antimicrobial resistance is a global public health threat, leading to the reduced efficacy of many antibiotics, thus making infections more challenging to treat and increasing the risk of disease spread and mortality. Beta-lactam and quinolone antibiotics are among the most prescribed antibiotics around the globe. However, many bacteria have developed varying multidrug resistance (MDR) traits that render most of these important antibiotics inefficient. This study was carried out to evaluate the prevalence of Extended-Spectrum Beta-Lactamase (ESBL) among quinolone-resistant *Enterobacteriaceae* isolates. *Enterobacteriaceae* pathogens isolated from different human samples were obtained from Federal Teaching Hospital Katsina and then identified using the VITEK-2 Compact automated identification system. Ninety-five (95) *Enterobacteriaceae* were screened for ESBLs using the VITEK-2 system, and 53 (55.79%) tested positive. *Escherichia coli* (44, 46.31%) and *Klebsiella pneumoniae* (9, 9.47%) were the only positive and predominant groups among the 13 groups screened. Moreover, among the 95 enterics, 50 (52.63%) isolates were quinolone-resistant and ESBL-positive (co-resistance). *Escherichia coli* showed the highest prevalence, 42/67 (62.69%), followed by *Klebsiella pneumoniae*, 8/67 (11.94%). Chi-square analysis confirmed statistical significance between quinolone resistance and ESBLs among the enterics, $\chi^2(7) = 47.82$, $p < .001$. Thus, this study showed that an average number of quinolone-resistant *Enterobacteriaceae* tends to be ESBL-positive. Therefore, this calls for continuous surveillance and stewardship for improved and good health, thereby contributing towards achieving the Sustainable Development Goals (SDG 3).

Keywords: Antibiotic resistance, *Enterobacteriaceae*, ESBLs, multidrug resistance, quinolone resistance.

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PHYTOCHEMISTRY AND BIOLOGICAL ACTIVITIES OF MEDICINAL PLANTS WIDELY USED IN THE ETHNOPHARMACOLOGICAL TREATMENT OF PECTIC ULCER DISEASES

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ABSTRACT
Peptic ulcer is a comprehensive term used to describe a set of chronic conditions affecting the mucosal integrity of the stomach and/or duodenal lining. The condition is marked by symptoms like pain, perforations, bloating, nausea, blood in stool or vomit, loss of appetite, and weight loss. The two most prevalent types of peptic ulcer disorders are known as "gastric ulcer" and "duodenal ulcer," named based on the location of the ulceration. While traditional treatments such as antihistaminics, proton pump inhibitors, prostaglandins, antacids, and antimicrobial agents exist for managing peptic ulcer, they often come with adverse reactions like hypersensitivity, arrhythmia, impotence, gynecomastia, galactorrhea, hematological abnormalities, and kidney disease, making them intolerable for many patients. Herbal drugs are emerging as alternative remedies for various pharmacological conditions. A literature search was conducted across Scopus, Web of Science, PubMed, and Google Scholar for relevant information. The search employed **Keywords** such as "phytomedicine for peptic ulcer," "anti-ulcer plants," "peptic ulcer," "plant-derived drugs for peptic ulcer." "herbal drugs," and "anti-ulcer,". This review delves into the diverse array of medicinal plant extracts known for their anti-ulcer properties, highlighting their various modes of action and potential therapeutic benefits. The examined extracts, ranging from *Curcuma longa* (Turmeric) to *Trema orientalis* and *Moringa oleifera*, showcase a rich reservoir of phytochemicals, including saponins, alkaloids, tannins, simple phenols, and polyphenols, particularly flavonoids. Despite shared gastroprotective effects against ulcerogenic agents and common modes of action such as anti-inflammatory, mucus secretion promotion, antioxidant, and anti-*H. pylori* activities, significant differences emerge in their mechanisms and efficacy. Therefore, it is essential to conduct additional research to characterize bioactive compounds, evaluate efficacy, assess mechanisms of action, and examine the toxicity of these medicinal plants.
Keywords: Peptic ulcer; Medicinal Plants, Bioactive compounds, Anti-ulcer activity

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ASSESSMENT OF WATER QUALITY AND PHYTOPLANKTON DISTRIBUTION IN DUKKU RIVER, KEBBI STATE, NORTHWESTERN NIGERIA

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ABSTRACT
The aquatic ecosystems' water quality mirrors the diversity of organisms within them. This quality significantly influences the composition of phytoplankton species, varying with the water's condition. This study aimed to identify the physicochemical parameters influencing phytoplankton availability in the Dukku River water, Birnin Kebbi. Twenty-four water samples

were collected weekly from three sampling points (upper, mid, and downstream). The analysis followed the standard methods outlined by APHA (2010), measuring parameters such as temperature, pH, dissolved oxygen (DO), biological oxygen demand (BOD), and phytoplankton availability. The results revealed that the highest recorded temperature at both sites was 33.0°C in April, while the lowest was 23.7°C in January for the upper stream. pH levels remained neutral to slightly acidic across all sampling points, falling within the acceptable range for inland waters (pH 6.5 – 8.5), suitable for tropical fish species and domestic use. A total of twenty-four phytoplankton species were identified in the study, classified into four classes: Bacillariophyta, Chlorophyta, Cyanophyta, and Euglinophyta. Synedra japanicum of the Bacillariophyta class exhibited the highest diversity (48.1%) in the upper site, followed by *Nostoc commnitum* of the Cyanophyta class (28.3%) downstream, and *Dinobryon bararicum* of the Chlorophyta class (22.5%) midstream. To mitigate potential threats to water quality and organism diversity, it is recommended that state Ministries of water resources and environment establish monitoring and controlling units to regulate sewage discharge into the river. Additionally, further research into water quality's impact on phytoplankton, zooplankton, and fish availability and distribution should be prioritized.

Keywords: Aquatic, Birnin-Kebbi, Dukku, River, Phytoplankton

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A SURVEY FOR EXTENDED SPECTRUM BETA-LACTAME PRODUCING *Escherichia coli* AMONG UTI PATIENTS IN SELECTED HOSPITALS IN ZARIA-NIGERIA

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ABSTRACT

Extended spectrum beta lactamases are important cause of transferable resistance in gram negative bacteria throughout the world. This bacteria resistance has spread rapidly and has become a serious threat to human health worldwide. This study was carried out to determine the prevalence of extended spectrum Beta Lactamase producing Escherichia coli among urinary tract infection patients in selected hospitals in Zaria-Nigeria. A total of 310 urine samples were collected from three different hospitals selected randomly, cultured on Eosin methylene blue (EMB) agar and then followed by biochemical identification of *Escherichia coli* isolates. Antibiotic susceptibility testing was carried out for all the *Escherichia coli* isolates by disc diffusion (Kirby Bauer) method. Isolates that showed all resistance to more than two of the third generation cephalosporins were initially screened for extended spectrum Beta Lactamase production. Confirmatory test for extended spectrum-Beta lactamase production was conducted using double disc synergy test. Polymerase chain reaction was conducted to detect bla CTX-M gene in the extended spectrum-Beta lactamase producing *Escherichia coli* isolates. Sixteen (16) Escherichia coli isolates were identified accounting for a prevalence rate of 5.16%. High level of resistance wase expressed against Ticarcillin-clavulanate (100%), ampiallim (93.25%), streptocymin (75.00%). The multiple drug resistance indices of the isolates were between 0.18 to 1.00. Five (5) out of eight (8) ESBL producing *Escherichia coli* isolates were resistant to both of the third generation cephalosporins. Five (5) out of eight were found to be positive for ESBL production. Two (2) out of the five (5) isolated *Escherichia coli* showed bands in the PCR corresponding to 588bp for CTX-M gene. The overall prevalence of *Escherichia coli* among UTI patients in selected hospitals in Zaria-Nigeria was found to be 5.16 and that of EBSL producing Escherichia coli isolated was 1.51%. The prevalence rate of CTX-M gene among UT I patients in in study area was found to be 0.6%.

Keywords: *Escherichia coli*, Urinary tract infections, Eosin Methylene Blue, Extended Spectrum Beta Lactamases, Cefotaximase-Munich, Polymerase Chain Reaction, Double Disc Synergy Test

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COMPARISON BETWEEN GLUTAMINASE PRODUCTION POTENTIALS OF WILD AND MUTANT STRAINS OF *Aspergillus flavus SR02* USING A COMPOSITE OF SOYBEAN AND WHITE WHEAT BRAN AS SUBSTRATE

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ABSTRACT
This study focuses on comparison between the glutaminase production potentials of wild and mutant strains of Aspergillus flavus SR02 using a composite of Soybean and Wheat bran as substrate. The enzyme L-Glutaminase (EC.3.5.1.2) finds many applications across many facets of human endeavours currently, the most prominent of which are in food industry and in therapeutics notably as alternative therapy for Lymphoblastic Leukaemia. Proximate composition analysis was obtained for the Soybean and Wheat bran substrate used. The isolate SR02 was obtained following direct sample inoculation on MCD plates and identification was made via scanning electron microscopy, The DNA extraction and amplification using PCR and sequenced employing Sanger's DNA sequencing and BLAST search in NCBI database. The mutants were obtained by exposure to UV rays at 254 nm from a UV light source located 30 inches above the colonies for three (3) different periods (20, 40 and 60 min). The mutants that survived the UV mutagenesis were further exposed to Nitrous acid (2M, pH4.4) for the same duration as above. The glutaminase production potentials was assayed by inoculating the samples in MCD broth containing phenol red as indicator for 7days and the absorbance was read at 450nm. The data obtained was tested by paired sample T-test and the differences observed are statistically significant at $p \leq 0.05$.
The proximate composition analysis of the white wheat bran and the soybean substrates are; (moisture: 2.330 and 1.820), (ash: 6.282 and 5.321), (fat: 3.542 and 15.056), (protein: 16.165, and 39.737), (fibre: 51.063 and 36.267) and (Carbohydrates: 20.618 and 1.798). For identification, SEM micrographic images reveals such characteristics as metullae, phialides, conidial heads and hyphae and following the NCBI BLAST search, the identity of the organism is confirmed to be Aspergillus flavus. Overall, protein quantification using Lowry had absorbance of 2.375 at 660nm and the activity absorbance had 0.773 at 450nm. In conclusion, the composite of white wheat bran and the soybean yielded the highest protein of 2.375 and activity of 0.773 from the mutant muSR02. Isolate SR02 was confirmed to be *Aspergillus flavus* after the microscopy, sequencing and blast search.

Keywords: Fungi, Wild and Mutants, Wheat Bran, Soy Bean and Glutaminase Production.

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INSECTICIDE RESISTANCE OF *Aedes, Anophelex*, AND *Culex* IN MASHI LOCAL GOVERNMENT AREA OF KATSINA STATE

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ABSTRACT
This study aimed to determine the insecticidal resistance of *Aedes*, *Anopheles*, and *Culex* mosquitoes to Primophos mythyl, DDT, Beniocarb and Permithrin from Mashi Local Government of Katsina state. The larvae were collected from various sources and reared at a temperature of 27°C ± 2°C and

relative humidity of 78% ± 3% to adult. The mosquitoes were morphologically identified using characteristics outlined by Gilles and Coetzee (2010). Resistance was tested using WHO standard of 2022. The results showed the mortality rate of the mosquitoes after 1- and 24-hours exposure. Most treatments resulted in an uptick in mortality rates over the 24-hour period. For *Aedes*, the PMT treatment showcased an increase from 1.75 to 2.75, PRM from 1.5 to 2.25, DDT from 1.5 to 2.75, and BND from 2 to 3.25. This rise in mortality is statistically significant (t-statistic = -7.33263, p-value = 0.000921). For *Culex*, there is a similar trend of mortality over the 24-hour period. Under the PMT treatment, mortality surged from 2.5 to 3.5, and from 1.25 to 2.25 in PRM, from 1.75 to 3 in DDT and finally 1.5 to 2.75 in BND. The statistical indicators (t-statistic = -25.6571 and p-value = 6.85E-06) underscored the significance of these findings as well. Finally, in *Anopheles* species, the PMT treatment reflected a marginal increase in mortality from 1.5 to 2, likewise in the DDT treatment, mortality increased from 1.25 to 2.25, while a decrease was recorded in the PRM and BND treatments, from 1.5 to 1.25 and 1.5 to 1, respectively. These variations are statistically significant as well (t-statistic = -3.91965 and p-value = 0.008626). In conclusion, the study revealed an increased resistance to the tested insecticides, which warrants control measures to ensure effective mosquito control.

Keywords: Insecticide, permenthrin(PMT), Bendiocarb(BND), primopos methyl (PRM), Dichlorodiphenyltrichloroethane (DDT), Resistance

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ISOLATION AND IDENTIFICATION OF FUNGI FROM HEAVY METAL CONTAMINATED SOIL AND THE EVALUATION OF THEIR HEAVY METAL TOLERANCE LEVEL

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ABSTRACT

There has been a considerable increase in the discharge of industrial waste to the environment with the increasing growth of industries. The indiscriminate release of heavy metals into the soil is a major health concern worldwide, as most of these heavy metals cannot be broken down to non-toxic forms. This study isolated fungi from soil gotten from mining site and their heavy metal tolerance level were tested against iron (Fe), arsenic (Ar), and chromium (Cr). The frequency of occurrence of the isolates were *Aspergillus niger* (38%), *Aspergillus fumigatus* (9%), *Aspergillus flavus* (9%) *Penicillium* sp (11%) *Fusarium* sp (9%), and *Rhizophus* sp (24%). The tolerance index (TI) of *A. niger* against Fe was found to be 0.95 (high tolerance/HT), 0.87 (HT) and 0.82 (HT) at 50, 100, and 200 ppm respectively; the TI of *A. niger* against Ar was found to be 0.85 (HT), 0.69 (medium tolerance/MT) and 0.54 (low tolerance/LT) at 50, 100, and 200 ppm respectively; the TI of *A. niger* against Cr was found to 0.47 (LT), 0.39 (very low tolerance/VTL) and 0.34 (VLT) at 50, 100, and 200 ppm respectively. The TI of *A. fumigatus* against Fe was found to 0.77 (MT), 0.71 (MT), and 0.66 (MT) at 50, 100, and 200 ppm respectively; the TI of *A. fumigatus* against Ar was found to be 0.93 (HT), 0.88 (HT), and 0.83 (HT) 50, 100, and 200 ppm respectively; the TI of *A. fumigatus* against Cr was found to be 0.95 (HT), 0.87 (HT), and 0.82 (HT) at 50, 100, and 200 ppm respectively. The TI of *Fusarium* sp against Fe was found to be 0.96 (HT), 0.85 (HT) and 0.48 (LT) at 50,100, and 200 ppm respectively; the TI of *Fusarium* sp against Ar was found to be 0.93 (HT), 0.91 (HT) and 0.84 (HT) at 50, 100, and 200 ppm respectively; the TI of *Fusarium* sp against Cr was found to be 0.94 (HT), 0.90 (HT) and 0.86 (HT) at 50, 100, and 200 ppm respectively. From the findings of the study these isolates were found to be tolerant against Fe, Ar, and Cr and therefore could be potential bioremediators.

Keywords: Heavy metals, bioremediation *A. niger*, *A. fumigatus*, *Fusarium* sp.

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MOLECULAR CHARACTERIZATION OF *Leishmania* SPECIES FROM SELECTED STATES OF NORTHWESTERN ZONE IN NIGERIA

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ABSTRACT
Leishmaniasis is considered one of the neglected tropical diseases (NTD) of man, caused by a protozoan parasite of the genera *Leishmania*. The dixenous life cycle of *Leishmania* species consists of the vertebrate and vector stages resulting in the differentiation of metabolic processes, morphological forms, and remodelling of genes. The study was aimed at identifying species of *Leishmania* responsible for cutaneous leishmaniasis in Northwestern, Nigeria. *Leishmania* species were isolated from patients with suspected lesions of cutaneous leishmaniasis in Kaduna and Katsina states, molecularly characterized by amplifying the ITS rDNA genes and subjecting it to restriction fragment length polymorphism (RFLP) technique. Although there was no positive case obtained from patients with suspected lesions in Kaduna state. Out of the seven (7) patients with suspected cutaneous lesions in Katsina, ITS rDNA genes were amplified from six patients, and *Leishmania major* was molecularly confirmed as the prominent species affecting individuals with RFLP digestion. The study reported *L. major* as the suspected species responsible for leishmaniasis within the north-western zone of Nigeria.

Keywords: Leishmaniasis, NTD, Patients, fragments

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Antibacterial Activity and Phytochemical Properties of Murayya *keonigii* (Curry leaf) on *Staphylococcus* aureus and *Escherichia* coli

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ABSTRACT
Curry leaf *(Murayya keonigii)* is a natural flavouring agent with numerous health benefits. It is a green leafy vegetable native to India and reported to certain several phytochemical constituents including Triterpenes, Tannins and Flavonoids but lack Alkaloids, Steroids and Phenolic compounds. The fresh leaves were dried at room temperature and pulverized to make curry leaf powder. This was used to prepare the methanol extract used to test the antimicrobial activity on *Staphylococcus aureus* and *Escherichia coli* by the agar well diffusion method. The extract showed a significant antibacterial activity against *Staphylococcus aureus* (Gram Positive bacteria) but not so on the *Escherichia coli* (Gram Negative bacteria). The minimum inhibitory concentration (MIC) of the extract against *Staphylococcus aureus* was 100mg. compared with conventional antibiotics, the extract showed better antibacterial activity against gram positive bacteria than Ciprofloxacin used in the test. The phytochemical test confirmed the presence of Tannins and Flavonoids and absence of Steroids and Alkaloids. In all, *Murayya koenigi*i (curry leaf) demonstrated a clear antibacterial effect on *Staphylococcus aureus* and can therefore be a potential agent for the control of Gram positive bacteria, especially *Staphylococcus aureus.*

Keywords: Curry leaf, *Staphylococcus aureus*, Antibacterial activity, Extract, Phytochemical, Gusau.

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STUDY OF THE FUNGI ASSOCIATED WITH POST HARVEST SPOILAGE OF ONIONS IN GUSAU ONION MARKET ZAMFARA STATE

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ABSTRACT
Onion (*Allium cepa*) is an important vegetable crop in Nigeria based on its consumption and economic value to farmers, these onions are mostly packed locally in baskets, jute bags and sacks which provide no barrier to dust and mechanical damage leading to rot and loss of the bulbs. A study to isolate and identify fungal contaminants responsible for spoilage of onions sold in Tudun Wada vegetable market in Gusau metropolis was carried out wherein the spoilt sample of the onion bulbs were cut with sterile razor into pieces, which were than cultured onto Potato Dextrose Agar (PDA) media & incubated at room temperature for 7 days and observed for fungal growth. The insolates were further purified on to fresh PDA media. macroscopic and microscopic examination of the fungal isolates as well as the determination of percentage frequency of occurrence of the different types of isolated fungi was done. A total of thirty-seven (37) fungal isolates found to be associated with contamination of the onions were obtained from fifteen (15) samples from 3 different market stations. The fungi isolated & the frequency of occurrence included *Aspergillus Niger* (40.54%), *Aspergillus alternate* (16.22%) *Basidiobolus ranarum* (13.51%), *Fusarium oxysporum* (10.81%), *Aspergillus flavus* (8.11%), *Aspergillus Nidulans* (8.11%) and *Aspergillus fumigatus* (2.70%). The study recommended that proper drying, better packaging and more careful handling of onions as well as storage at appropriate cool dry temperature should be applied, in order to minimize the level of contamination of the onions.
Keywords: Onions, Fungi, Potato-Dextrose Agar, Gusau.

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ISOLATION AND MOLECULAR CHARACTERIZATION OF HEAVY METALS TOLERANT-BACTERIA WITH BIOREMEDIATION POTENTIALS FROM SELECTED FARMLANDS IN BORNO STATE, NIGERIA.

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ABSTRACT
The environmental and economic impacts of heavy metal pollution on soils are enormous which causes serious damages to vegetations, soil fertility and microorganisms. The exploitation of microbes to remediate heavy metal polluted soils can be of great benefits in reclaiming such environments. The aim of this study was to isolate heavy metal tolerant bacteria from potentially heavy metal contaminated agricultural soil in Maiduguri, Nigeria and to evaluate the organisms' ability to reduce heavy metal contamination in a media. Bacterial isolates from agricultural soils were screened for their ability to tolerate heavy metals (Pb and Zn). Viable counts were done on Nutrient Agar and Mineral Salt Media (MSM) supplemented with each metal. Maximum Tolerable Limit (MTL) was determined by growing the isolates on MSM with different concentrations of each metal (100 to 1000 mg/L). *Proteus mirabilis* GN2a, *Proteus vulgaris* GN2b and *Bacillus subtilis* GN2c showed maximum tolerance at 700 mg/L of the heavy metals and were therefore selected for

bioremediation process. Nutrient broth was supplemented with initial concentration of 700 mg/L of each metal. AAS was used to assess the remediation process by evaluating the residual heavy metal in the broth after 18 days of treatment. *B. subtilis* GN2c exhibited high remediation of 88.10% for Pb, while *P. vulgaris* GN2b reduced Zn at 57.13%. However, higher Pb remediation of 93.03% was observed by *P. mirabilis* GN2a when glucose was added to the medium. Addition of sucrose to Zn supplemented media also increased the remediation to 69.78% by *P. vulgaris* GN2b. Molecular detection of 16S rRNA of the three (3) bacterial isolates revealed that the results obtained in this study show that the bacterial species isolated from the agricultural soils had high potential for bioremediation of heavy metals particularly Pb and Zn and the effectiveness of remediation can be enhanced through addition of substrate.

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PREVALENCE OF COAGULASE NEGATIVE STAPHYLOCOCCI AMONG SOME PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN YOLA, NIGERIA

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ABSTRACT

Coagulase negative staphylococci have been reported to be a frequent causative agent of uncomplicated UTI in young sexually active women which can also lead to symptomatic infection, low birth weight (LBW) babies and preterm delivery. This study was undertaken to determine the prevalence and characterize coagulase negative *staphylococci* among pregnant women in public health facilities in Yola. A total of 250 urine samples were collected from pregnant women attending antenatal clinic at Specialist Hospital and Boshang Clinic and Maternity both in Yola for a period of five months. The urine samples were cultured on cysteine lactose electrolyte deficient medium, examined microscopically and characterized using phenotypic methods. Out of the 250 urine samples analysed, potentially pathogenic microorganisms were isolated from 112(56%). The prevalence of coagulase negative *staphylococci* from this study *was* 26.97%, *Staphylococcus aureus* 16.29% and the most abundant isolate was *Escherichia coli* 36.51%. The frequency of CONS was highest among age group of 36-40 years and least among 16-20 years (12.5%). The frequency of CONS was higher in the third trimester (26.7%) followed by the second trimester (20%). Prevalence of CONS in relation of gravidae status of study subjects, showed that Primigravidae had the highest frequency of CONS (75.86), followed by second gravidae (28.30%). CONS isolated from this study demonstrated high susceptible to Pefloxacin, Ciprofloxacin, Erythromycin, Ceftriaxone and Streptomycin. Some isolates showed high resistance to ampiclox, cefuroxime and amoxicillin. About 83% of the isolates had multiple antibiotic resistant indexes greater than 0.2 with about 25% of the antibiotic resistance being plasmid mediated. Furthermore, phenotypic screening using the double disk synergy test showed that 20 (40%) of the isolates were extended spectrum beta lactamase (ESBL) producing. This study revealed the presence of multi-drug resistant and ESBL producing coagulase negative staphylococci among pregnant women in the study area. There is therefore the need for pregnant women to be screened for coagulase negative *staphylococci* to avoid complications during gestation period.

Keywords: Coagulase negative, *Staphylococcus*, Pregnant women

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SCREENING PHOSPHATE SOLUBILIZING RHIZOBACTERIA (PSB) FROM UMYU AGRICULTURAL SOILS, KATSINA, NIGERIA FOR POTENTIAL APPLICATION AS PHOSPHATE-BASED BIOFERTILIZERS (PBB)

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ABSTRACT
Inorganic fertiliser use decreases soil quality and pollutes the groundwater, thus necessitating the search for viable alternatives. This study isolated rhizobacteria from agricultural soils and evaluated their potential as PBB. Soil samples and root nodules of *Vigna unguiculata* were obtained from three sampling points within UMYU botanic garden. Total rhizospheric count was obtained through serial dilution. Root nodules treated using standard methods were aseptically inoculated onto Yeast Extract Mannitol agar (YEMA), Congo Red Yeast Extract Mannitol Agar (CRYEMA) and Yeast Extract Mannitol Agar with Bromothymol blue (YEMA+BTB). The twenty-three (23) bacteria isolates recovered were further screened for phosphate solubilization through direct phosphate solubilization using Pikovskaya (PVK) medium and additional (indole acetic acid and siderophore production; and pH, temperature and salt tolerance tests) assays. Results showed that total rhizospheric bacterial count ranged from ($1.35 \pm 6.36 \times 10^{13}$ CFU/g – $2.65 \pm 3.54 \times 10^{12}$ CFU/g. Nodulation count ranged at 96 to 36, indicative of excellent nodulation. Nine (9) out of the twenty-three (23) isolates: M3, M5, M6, M9, M11, M12, M14, M18 and M23 satisfied PSB pre-requisite criteria. The diameters of the phosphate solubilization clearance zones ranged from $16.5 \pm 0.5 – 17.0 \pm 1.0$ mm. Similarly, the isolates thrived in up to 10% (w/v) salinity and a temperature of 50^0C with counts ranging from $2.46\times10^{12} – 1.1\times10^{11}$ CFU/ml. Moreover, siderophore, indole acetic acid, ammonia production and nitrogen fixation were qualitatively assessed from the nine isolates. It was concluded that these isolates (M3, M5, M6.M9, M11, M12, M14, M18 and M23) have potential of being used as PBB in sustainable agriculture.

Keywords: Phosphate Solubilizing Bacteria (PSB), Rhizobacteria, Bromothymol blue, Phosphate based biofertilizer (PBB)

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REVIEW ON TOXICOLOGICAL STUDIES OF CYANOBACTERIUM (*Microcystis aeruginosa*) PRODUCING MICROCYSTIN (TOXIN).

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ABSTRACT
Cyanobacteria (Blue green algae) are one of the oldest dated life-forms on earth. Their mass occurrence in freshwater lakes and ponds reservoirs due to eutrophication is of major environmental, economic, ecological and scientific importance. Cyanobacteria are aquatic and occurred worldwide especially in calm, nutrient-rich water bodies, they can manufacture their own food, because they have characteristics of both algae and bacteria, although they are now classified as microalgae. Toxicity of Cyanobacterium (*Microcystis aeruginosa)*, a microalgae,

was studied and reviewed that, the alga has a lethal effect on aquatic organisms, mainly freshwater lakes and ponds organisms, by producing a natural toxins called "microcystins", in their cells and then released to the water bodies when the cells died or disintegrated, and the cells are very small (microns diameter), and organized into colonies that forms a floating masses on the water called "blooms" which can be easily ingested along with water. Ones these microcystins were ingested or consumed by any form of organism, they would attack the liver and other internal organs, which can cause death, and they can also be transferred through the food web, where they may kill other life forms such as invertebrates and vertebrates (including humans) when feed either directly or indirectly on them and even the growth and survival of aquatic plants.

Keywords: Cyanobacteria, *Microcystis aeruginosa*, Microcystins and Algal blooms

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PHENOTYPIC CHARACTERIZATION AND RELATIONSHIP BETWEEN FUNGAL FRUIT SPOILERS OF SWEET ORANGE AND BITTER LEMON SOLD IN DUTSIN-MA TOWN, KATSINA STATE.

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ABSTRACT
The Fungal fruit spoilers pose significant economic challenges in the post-harvest handling, storage of citrus fruits, particularly sweet and bitter lemon varieties and to the citrus industry worldwide. Understanding the phenotypic characteristics and relationships among fungal species affecting sweet oranges *(Citrus Sinensis L* and bitter lemons (*Citrus limon L*) is crucial for effective disease management and preservation of fruit quality. This study investigates the phenotypic characterization and relationship between fungal fruit spoilers of sweet oranges and bitter lemons obtained from Dutsin-Ma Wednesday market and Tsohuwar Kasuwa and to determine whether there is a relationship between the fungal species infecting the fruits. A total of Forty (40) spoiled samples of which twenty (20) are sweet oranges and twenty (20) are bitter lemons were collected in this research from different sellers, the collected samples was taken to Microbiology laboratory for analysis. Each of the spoiled sweet orange and bitter orange were cut (1 cm) and inoculated on potato Dextrose Agar at 35^0c (room temperature) and observed for 3-14 days after which the different colonies were observed and identified. Pathogenicity test were carried out by inoculating healthy sweet orange and bitter lemon with pure culture of the fungal colonies isolated and incubated at 37^0C for seven days. The fungal isolates were obtained from spoiled fruits, characterized based on morphological are *Aspergillus fumigatus* with frequency of (10%), *Fusarium* (30%), *Mucor* (40%), *Aspergillus niger* (44.4%). And for bitter lemon is *Alternaria* with frequency of (30%), *Aspergillus niger* (40%), *Aspergillus flavus* (25%) and *Lichetheimia coryambefera* (10%). The result of the Pathogenicity test shows that *Aspergillus flavus* and *Aspergillus niger* were the most active with rots diameter of 25 mm and 30 mm, respectively. The presence of these fungi may pose a serious threat to human health as the organism could produce mycotoxin when consumed.

Keywords: *Aspergillus* spp., Fruit spoilers, Sweet orange, Tsohuwar Kasuwa and bitter lemon

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DETERMINING MINIMUM INHIBITORY CONCENTRATION (MIC) AND MINIMUM BACTERICIDAL CONCENTRATION (MBC) OF BLACK SEED (NIGELLA SATIVA) EXTRACTS AGAINST *SALMONELLA TYPHI*

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ABSTRACT

Salmonella typhi, the causative agent of typhoid fever, poses a significant global health burden, particularly in regions with limited access to clean water and proper sanitation. The emergence of antibiotic-resistant strains of *S. typhi* has further complicated the management of this disease. Alternative therapeutic strategies, such as the use of natural products with antimicrobial properties, are gaining attention. Black seed (*Nigella sativa*), a plant known for its diverse medicinal properties, has been explored for its potential antimicrobial effects against a variety of pathogens, including *S. typhi*. This study aimed to investigate the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of black seed extracts against *S. typhi*. The research employed an experimental design where clinical isolates of *Salmonella typhi* were collected from patients diagnosed with typhoid fever at healthcare facilities in Katsina, Nigeria. Having transported appropriately, the isolates were sub-cultured on MacConkey agar, gram stained and re-identified for confirmation. The plant materials were aseptically collected around Katsina city and transported to the Microbiology laboratory, air-dried and pounded to powder form. Aqueous extract was prepared and standardization of test organism was done using the 0.5 McFarland standards. For MIC, series of n*ine test-tubes for each test organisms were used and* the MBC was determined by sub-culturing the minimum inhibitory tubes that show no growth on the Mueller-Hinton broth on the surface of freshly prepared Nutrient agar. The results revealed that black seed extracts exhibited notable antimicrobial activity against *S. typhi*, with MIC values ranging from 25mg/ml - 50mg/ml and MBC values ranging from 12.5mg/ml - 25mg/ml, depending on the solvent used for extraction. These findings suggest that black seed extracts have the potential to serve as effective natural antimicrobial agents against *S. typhi* as an alternative treatment for typhoid fever, especially in regions where antibiotic resistance is a growing concern.

Keywords: *Nigella sativa*, *Salmonella typhi*, Minimum Inhibitory Concentration, Minimum Bactericidal Concentration, antimicrobial, typhoid fever.

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BACTERIOLOGICAL QUALITY OF READY-TO-EAT SHAWARMA, MEATPIE AND BURGER SOLD WITHIN KATSINA METROPOLIS

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ABSTRACT

Ready-to-eat foods are type of foods that are prepared and available for immediate consumption when they are offered for sale. Consumers who rely on such foods often prioritize convenience over safety, quality, and hygiene. The research aimed to determine the bacteriological quality of ready-to-eat shawarma, meat pie and burger sold by vendors within Katsina metropolis. A total of 19 ready-to-eat food samples including shawarma, meatpie and burger were collected from three

food vending sites which serves as the major ready-to-eat vending centers to people in Katsina. After a serial dilution and aseptic plating method, aerobic bacterial count and fungal count were determined by counting the colonies on nutrient agar plates and potato dextrose agar plates respectively. The identification of organisms was determined by their morphology, culture characteristics, gram-reactions, microscopy and biochemical profile. The result shows a total of five species of microorganisms including *Escherichia coli, Salmonella spp, Staphylococcus aureus, Bacillus cereus, Klebsiella spp,* were isolated from the food samples. The mean total aerobic plate count and fungal plate count from SITE 1 ranges from 2.51×10^4 to 4.71×10^4 and 3.73×10^5 to 6.41×10^5 respectively. While SITE 2 had aerobic plate count and fungal plate count ranging from 2.56×10^4 to 4.61×10^4 and 3.0×10^5 to 4.91×10^5 respectively and SITE 3 had aerobic plate count and fungal plate count ranging from 3.17×10^5 to 5.51×10^5 and 4.21×10^5 to 6.29×10^5 respectively. From the results obtained in this study, it can be concluded that: The RTE samples provided by these 3 locations (i.e. Bilnaf Kitchen, S. Café and K. Cuisine) are of tolerable microbiological quality, according to the International Commission for Microbiological Specification for Foods (ICMSF) (viz., 0-10^3 = acceptable, 10^4 - $\leq10^5$ = tolerable and 10^6 and above = unacceptable).

Keywords: Shawarma, meat pie, burger, Food-borne diseases, *E. coli, Salmonella spp, S. aureus, B. cereus, Klebsiella spp.*

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ANTIBIOTIC SUSCEPTIBILITY PATTERN OF MULTIDRUG RESISTANT *ESCHERICHIA COLI* FROM WASTE WATER WITHIN DUTSIN-MA TOWN, KATSINA STATE

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ABSTRACT
The emergence of *Escherichia coli* isolates with multiple antibiotic-resistant phenotypes, involving co-resistance to four or more unrelated families of antibiotics, has been previously reported and is considered a serious health concern. Hospital wastewater is not only a devastative hazard in environment, but also a potential risk to general people if the waste is not managed in the right way. This study is aimed to isolate and identify multi-drug resistance *Escherichia coli* from effluents collected in Dutsin-Ma General hospital. A total of ten samples were collected for a period of two weeks (five per week). The wastewater samples were collected from the effluent of Dutsin-ma General Hospital. The samples were collected in sterile universal bottles and transported immediately to the laboratory for microbiological analysis. The result demonstrated that 55 isolates were detected from the effluents in Dutsin-ma general hospital. This study revealed that the prevalence of multi-drug resistant *E. coli* from the effluents in Dutsin-Ma general hospital (56.4%) is high and can cause failure in the treatment of infectious diseases, resulting in high rate of mortality and a great health burden. The antibiotics; *Augmentin* and *Streptomycin* were the most effective antibiotics against the isolates in this study. The proper disposal of hospital effluents should be encouraged to prevent the emergence of antibiotic resistant bacteria in humans, animals and environment to encourage the One Health approach.
Keywords: Antibiotic resistance, MDR *E. coli*, Wastewater, Dutsin-Ma.

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ANTIBIOTIC SUSCEPTIBILITY PATTERN OF BACTERIA ISOLATED FROM COMPUTER SURFACES OF ICT CENTER FEDERAL UNIVERSITY DUTSIN-MA, KATSINA STATE.

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ABSTRACT

Staphylococcus aureus, Escherichia coli, Salmonella and *Pseudomonas* are pathogenic bacteria that can contaminate environmental surfaces and, as a result, humans by means of cross-contamination. This study was performed to determine the degree of Microbial contamination on the keyboard and mouse use in FUDMA CBT computer center. A total of 35 samples were collected randomly and aseptically swabbed from computer keyboard and mouse. Results revealed keyboard with the highest number of mean Bacterial Count (7.12×10^5) as 55 Bacteria were isolated from Keyboard and Mouse, with *Staphylococcus aureus* (21) as the highest in occurrences compared with *Escherichia coli* (15), *Salmonella spp* (10) and *Pseudomonas aeruginosa* (9). The Prevalence of Bacteria Isolated from Keyboard and Mouse shows *Staphylococcus aureus* has the highest prevalence (38.2%). Antibiotics Susceptibility of Gram Negative Bacteria reveals that *Salmonella spp.* was highly sensitive to Sparfloxacin (70), Ofloxacin (100), Augmentin (100) and resistance to Gentamycin (70), Perfloxacin (100) Streptomycin (100). *Pseudomonas aeroginosa* shows resistant to Sparfloxacin (55.6), Ciprofloxacin (100) Streptomycin (77.7) and Perfloxacin (77.7) and sensitive to Amoxicillin (88.9), Augmentin (100), Ofloxacin (88.9), Chloramphenicol (100) and Gentamycin (100). *Escherichia coli* were observed to be sensitive to Gentamycin (100), Ciprofloxacin (100), Amoxicillin (100) and Perfloxacin (73.3) and resistance to Chloramphenicol (80), Sparfloxacin (66.7) and Streptomycin (66.7). Antibiotics Susceptibility of Gram positive bacteria *Staphylococcus aureus* reveals resistances to Amoxacillin (85.7) and Ampicolox (85.7) and sensitive to Perfloxacin (71.4), Gentamycin (71.4), Ciproflaxocin (100), Erythromycin (100) and Streptomycin (57.1). Micro-organisms isolated such as *Staphylococcus aureus*, *Escherichia Coli*, *Pseudomonas aeruginosa*, *Salmonella* spp. can cause different diseases to students and other computer users. Prevalence of *Staphylococcus aureus* is of medical importance, as it is a causative agent of human diseases. The incidence of *Salmonella* species could have been as an outcome of community-acquired infections. Thus, these organisms could have come in contact with the computer through soil, clothing, food and/or hands of the users.

Keywords: Antibiotic resistance, Fomites, *Staphylococcus aureus*, *E. coli*.

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ASSESSMENT OF TOXIC METALS LEVEL IN BLACK SOIL USED IN LOCALLY MADE FERTILIZER AT KATSINA-NIGERIA

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ABSTRACT

The high costs of fertilizers in Nigeria led to the production of locally made fertilizers using black soil in Kankara local government, Katsina-Nigeria. The assessment of heavy metals in the black soil is very important due to the practical implications of heavy metals to health and environment. Heavy metals can become toxic by mixing with the environment through water, soil and air.

Human body is exposed to heavy metals through ingestion, inhalation and absorption through organs and systems of the body. The toxicity of heavy metals depends on the absorbed doses, the route and duration of exposure. Toxic metals such as Cadmium, Mercury, Lead, Chromium and Arsenic are known to cause detrimental effects to health which includes kidney, lungs and liver damage, cancer, anemia, neurological impairment, respiratory infections and allergic reactions at low exposure. This research is aimed to assess the concentration of heavy metals such as lead, arsenic, cadmium and mercury in locally produced fertilizers. The samples were collected from various industries of locally produced fertilizers at Kankara local government area, Katsina state, Nigeria. Three (3) samples from six different industries were collected. The samples were analyzed using Energy Disperse X-ray Fluorescence (EDXRF) in order to determine the metal content in the samples. The results showed that the concentration of Fe, K, Ca, Cu, Zn, Rb, Sr, Zr and Si were found in all the 3 collected samples. The results for sample A showed that 2000 ppm, 1000 ppm, 2900 ppm, 1000 ppm and 800 ppm for Cu, Zn, Fe, Zr and Ga respectively. For Sample B, 4200, 500, 300, 200, 2500 and 2300 ppm for Fe, K, Ca, Cu, Zr and Sr respectively. For sample C, 300, 400, 1000, 500, 200, 500 and 800 ppm for Si, K, Fe, Cu, Zn, Rb and Sr respectively. The results showed that there is no any toxic metal found in the samples. However, at a high rate, the Zr and Sr can cause lung cancer. The research recommends that the workers should adhere to the safety precautions during the working hours by using facemasks and googles. So also, by avoiding long staying and inhaling the dust from the local fertilizer.

Keywords: Toxic metals, local fertilizer and EDXRF

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Microbial Quality of Liquid of Herbal Products Hawked within Kaduna Metropolis

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ABSTRACT

Herbal medicine also called botanical medicine or phytomedicine refers to the use of any plant seeds, berries, roots, barks, leaves or flowers for the treatment of illness. The aim of this study was to assess the microbial quality of liquid herbal products hawked within Kaduna metropolis. A total of 28 herbal samples were collected from different markets (Central market, Kawo market, Unguwan Rimi market and Sabo market) and were analyzed for the presence of bacteria and fungi using standard method of spread plate method. The isolated bacteria were further test for antibacterial susceptibility to commonly used antibiotics using disc diffusion technique. The result showed Kawo market had the lowest bacterial count of $3.17\pm2.16 \times 10^6$, while Unguwan rimi market had the highest bacterial count of $4.45\pm2.49 \times 10^6$. Unguwan Rimi market had the lowest fungal count of $2.27\pm1.76 \times 10^3$, while Sabo market had the highest fungal count of $3.18\pm1.82 \times 10^3$. Seventeen 17(60.71%) of the products were contaminated with different bacterial species including *Escherichia coli*, *Salmonella spp*, *Staphylococcus aureus* and *Pseudomonas sp* with percentage occurrence of 100%, 35.29%, 76.47 and 58.82% respectively. Fifteen 15(53.57) of the products were contaminated with different fungal species including *Aspergillus niger*, *A. flavus*, *A fumigatus*, *Mucor sp* and *Rhizopus sp* with percentage occurrence of 20.0%, 26.67%, 13.33%, 20.0% and 13.33% respectively. All the bacterial isolates were resistant to ampicillin and ceftazidine, 59% of *E. coli* were susceptible to gentamicin and nitrrofurantoin. *Staphylococcus aureus* had a 100% susceptibility to ciprofloxacin and ofloxacin. Eighty (80%) of *Pseudomonas sp* were susceptible to gentamicin, while 83% of *Salmonella spp* were susceptible to gentamicin. The herbal medicine sold within the study area were microbiologically unsafe for consumption.

Keywords: Bacteria, Fungi, Herbal medicine, Market, Susceptibility

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THE INTERRELATION OF OEDEMA AND FLUID-ELECTROLYTE DISRUPTION IN BODY TISSUES

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ABSTRACT
Oedema, characterized by fluid retention in the body leading to swelling of affected tissues, commonly affects areas such as the legs, feet, and ankles. It is prevalent among adults over the age of 50, with a higher occurrence in women due to hormonal fluctuations during pregnancy and menopause. Oedema not only causes discomfort but can also leads to secondary complications like fungal or bacterial infections, and in severe cases, sepsis. This study aims to explore the significance of fluid and electrolyte balance in the body, the repercussions of imbalance of intra- and extracellular fluids, as well as the diagnosis and treatment of oedema. A comprehensive literature review was conducted using recent articles from databases such as PubMed, Google Scholar, Web of Science, and ScienceDirect, focusing on **Keywords** like edema, oedema, fluid, and electrolyte. The findings indicate that electrolyte imbalance can stem from factors like malnutrition, dehydration, kidney and liver diseases, and certain medications, exacerbating fluid retention in specific tissues. Strategies such as diuretic therapy, addressing underlying conditions contributing to oedema, maintaining proper hydration, following a balanced diet, and engaging in regular exercise are advocated to alleviate fluid and electrolyte overload in both intracellular and extracellular compartments.

Keywords: Oedema, electrolyte, diuretics, sepsis, tissues

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PHYSICOCHEMICAL AND BACTERIAL QUALITY ASSESSMENTS OF AJIWA DAM WATER SOURCES IN BATAGARAWA LOCAL GOVERNMENT AREA OF KATSINA STATE.

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ABSTRACT
The quality of water supply is assessed by its physicochemical and bacteriological properties. Continuous consumption of raw and treated water in Katsina state is of public health significance as the potential bacterial water contaminants could develop resistance to commonly used antibiotics. This study was carried out to assess the physicochemical and bacteriological qualities of raw and treated water from Ajiwa dam. A total of 30 (comprising 15 raw water and 15 treated water) samples were collected from 10 different locations, 5 sampling points from the dam and 5 within Katsina metropolis. The physicochemical parameters were analyzed using standard methods. Isolation and enumeration of bacteria was carried out using Most Probable Number method. The bacterial isolates were screened and identified using Automated VITEK Assay. The results showed that the pH values of raw water samples ranged from 6.32 ± 0.1 - 6.9 ± 0.04 and that of treated water ranged from 6.3 ± 0.6 - 7.16 ± 1.32. The values of electrical conductivity for

raw water and treated water samples ranged from 1-3.3mg/L and 2.0 - 3.7mg/L respectively. The turbidity values for raw water and treated water sample ranged from 166 -300NTU and 5-150NTU respectively. The value of DO for raw water ranged from 12.0 - 23.53mg/L and for treated water the values ranged from 13.80 - 22.7mg/L. The BOD for raw water ranged from 10.93 - 16.70mg/L and that of treated water ranged from 11.20 - 12.93mg/L. The TDS of raw water samples ranged from 0.13 - 0.9mg/L and that of treated water sample ranged from 0 - 0.36mg/L while The TSS of raw water samples ranged from 3.1 - 7.15mg/L and that of treated water sample ranged from 2.50 - 5.85mg/L. The MPN results ranged from 33-300 for raw water and 0-5 for treated water. The bacterial isolates were identified as *Escherichia coli, Klebsiella pneumoniae, Enterobacter cloacae, Kocuria kristinae* and *Klebsiella pneumoniae*. Results of the sensitivity test showed that the *E. coli* isolate produced Extended Spectrum Beta Lactamases (ESBLs) and was resistant to Ampicillin, piperacillin, ceftazidime and ceftriaxone, while *K. pneumoniae* was negative for ESBLs and resistant to ampicillin, piperacillin and gentamicin. Based on 16S rRNA analysis, *Serratia marcescens* strain JW-C Z2 was identified from the water sample. The study recommends that serious attention should be paid to water treatment in the study area since people use untreated water for a wide range of domestic purposes including drinking. This is also necessary to checkmate diseases related to contamination of drinking water constituents and subsequent major burdens on human health. Health authorities should inform the public about the potential danger in using untreated water as a source of drinking water and encourage in-house treatment of the raw water. In addition, continuous monitoring is highly recommended before consumption of both the raw and treated water to ensure maximum safety and a healthy living for all. Further studies to determine the presence of other species of *Enterobacteriacea* in water samples from the study area were also recommended.

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IMPACT OF TEMPERATURE ON BIOGAS PRODUCTION FROM GUINEA CORN HUSK

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ABSTRACT
This study aims to explore the impact of temperature on the anaerobic digestion process of guinea corn husk, a widely available resource in the northwest region of Nigeria. Currently, these husks are underutilized and often disposed of improperly, leading to environmental pollution and health issues. In this research, a substrate was created by blending guinea corn husk with chicken droppings for biogas production on a laboratory scale. The anaerobic digestion process was conducted at two distinct temperatures: 35°C and 45°C, achieved through the use of a water bath. Additionally, the study investigated the effect of temperature on the kinetic rate constant. Results indicate that biogas production rises with increasing temperature. Over a period of 22 days, cumulative biogas production at constant temperatures of 35°C and 45°C amounted to 1546cm^3 and 2249cm3, respectively.

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BIOGAS PRODUCTION ENHANCEMENT USING AUTOCLAVE PRE-TREATMENT

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ABSTRACT

The increasing demand for energy and the global energy crises have led to a search for alternative, cost-effective, sustainable, and renewable energy sources. This study explores the potential of utilizing animal and agricultural waste for energy production. Anaerobic digestion was employed on a laboratory scale using a mixture of corn cobs and poultry droppings as substrates. Fresh rumen content from slaughtered cattle was used as inoculants to initiate the fermentation processes in the biogas digesters. The biomass underwent autoclaving at different temperatures (80°C and 120°C) to assess the impact of pre-treatment on biogas production. Anaerobic digestion was conducted within a pH range of 4.2 to 8.0 and temperatures between 27°C and 35°C over a period of 16 days. The results indicate that autoclaving the substrate at 80°C produced a cumulative biogas volume of 1176 cm^3 (with a daily average of 73.5 cm^3/day), while autoclaving at 120°C yielded a cumulative volume of 1589 cm^3 (with a daily average of 99.3 cm^3/day).

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PRELIMINARY PHYTOCHEMICAL SCREENING AND ANTIOXIDANT CONTENT OF SOME EXTRACTS OF TUMERIC (*Curcuma longa)*

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ABSTRACT

Turmeric (*Curcuma longa*) is a strong antioxidant, anti-inflammatory, antibacterial, and antiviral agent. Curcumin has been used extensively in traditional medicine for centuries, more recently curcumin has been found to possess anti-cancer activities. The ethanol, Aqueous, N-hexane, and Chloroform extracts of Turmeric were investigated for their phytochemical and antioxidant capacities. The results showed high levels of phytochemicals such as Alkaloids, Flavonoids, Steroids, Glycosides as well as Anthraquinones compounds in all four extracts. Additionally, the ethanol extract showed the highest phytochemicals, followed by the chloroform, Aqueous and N-hexane extracts, respectively. The free radical scavenging activity of turmeric extract results showed that the ethanol extract had the highest free radical scavenging activity, With a mean of 44.90 ± 0.028 at 20mg/ml, 46.93 ± 0.003 at 40mg/ml, and 50.30 ± 0.007 at 60mg/ml. Meanwhile, the aqueous extract had a mean of 76.67 ± 0.009 at 60mg/ml, showing the second-highest free radical scavenging activity. The chloroform and n-hexane extracts had lower mean values at all three concentrations, with the highest value of 49.50 ± 0.010 at 20mg/ml for chloroform and 47.03 ± 0.009 at 20mg/ml for n-hexane. These results suggest that the ethanol and aqueous extracts of Turmeric have the highest free radicing activity, potentially making them beneficial for medicinal purposes.

Keywords: Phytochemicals, Antioxidant, *curcuma longa*

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MOLECULAR DETECTION OF HEPATITIS B VIRUS AMONGST PREGNANT WOMEN ATTENDING ANTENATAL CARE AT GENERAL HOSPITAL JEGA AND ALIERO, KEBBI STATE, NIGERIA.

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ABSTRACT
Hepatitis is an aggravation of the liver, the condition can be self-restricted (intense) and can advance to liver cirrhosis (persistent). Infections with hepatitis B virus (HBV) is open wellbeing issues, which is profoundly endemic within the sub-Saharan Africa nations where Nigeria is found. This research ascertained the prevalence of hepatitis B virus infection among pregnant women attending antenatal care at general hospitals Jega and Aliero, Kebbi State Nigeria. In this study, a total of one hundred and thirteen (113) samples were collected from the studied participants. Out of 113 samples collected, 15 (13.3%) were found to be seropositive for hepatitis B virus by promed HBsAg rapid strip with General Hospital Jega having the highest prevalence 9(7.9%) while General hospital Aliero had the least 6(5.4%). Using conventional quick response hepatitis B combo test kit, the presence of serological markers revealed that eleven (11) were at low level of infectivity (HBsAg), while two (2) were infective/replication form and 2 were low level/acute infection respectively. Furthermore, eight out of fifteen (8/15) samples were further identified using Polymerase chain reaction (PCR) out of which 5 (62.5%) were found to be positives. Therefore, the study's sensitization lectures ought to focus on raising awareness of the hepatitis B virus and its mechanism of transmission, vaccine, and other preventative measures.

Keywords: *Hepatitis B Virus,* Pregnant Women, General Hospital Jega and Aliero

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ISOLATION AND IDENTIFICATION OF BACTERIA ASSOCIATED WITH MOBILE PHONES OF SELECTED UMARU MUSA YARADUA UNIVERSITY UNDERGRADUATE STUDENTS

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ABSTRACT
Mobile phones are portable electronic devices that become essential for professional and personal telecommunication for social daily life but are potential reservoirs for pathogens and sources of healthcare associated infections. Students are more exposed to bacterial contamination because their mobile phones are rarely clean and often operated without proper hand washing. Therefore, this study was conducted to identify, enumerate, showcase the percentage prevalence and

determine the antibiotic susceptibility profile of bacterial species isolated from mobile cell phones among selected students of Umaru Musa Yaradua University. A total of 20 swab samples were randomly collected from Male and Female students' mobile phones. The samples were cultured and processed by using standard microbiological procedure. Antibiotic susceptible profile was carried out using Kirby-Bauer disc diffusion method. The data of the bacterial load revealed that high count was detected from male students' touchscreen (3.89×10^{6}) while low count was detected from female student's keypad (1.94×10^{5}). All mobile phone samples were contaminated with various species of bacteria, the species identified from the present study were Staphylococcus aureus, *Klebsiella pneumonia*, *Escherichia coli Pseudomonas aeruginosa*. Among the isolated organisms *Staphylococcus* aureus, has the highest percentage prevalence with (42.9%), and *Klebsiella pneumonia* with (10.0%) as the lowest. The sensitivity test revealed that the antibiotics were effective against all the isolates. It was confirmed in this study that mobile cell phones harbor bacteria liable for causing health threat to handlers. Therefore, awareness programs concerning hand hygiene and discouraging their use in toilets to avoid causing severe health consequences is recommended.

Keywords: Swabs, Mobile cell phones, *Staphylococcus aureus*, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa*.

2nd UMYU Conf/2024/203

A REVIEW ON THERAPEUTIC POTENTIALS OF HONEYBEE PRODUCTS.

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ABSTRACT

Honeybee products, including honey, propolis, royal jelly, and bee venom, have long been revered for their medicinal properties across various cultures. This review explores the therapeutic potentials of these natural substances and their applications in modern medicine. Honey, often referred to as nature's liquid gold, is examined for its complex composition and diverse medicinal properties, including wound healing, antimicrobial activity, and anti-inflammatory effects. Propolis, known as nature's antibiotic, showcases its antimicrobial and immunomodulatory effects, particularly in wound healing and oral health. Royal jelly, hailed as the elixir of life, is captured for its anti-aging, immune-modulating, and nutritional properties. Bee venom, nature's pain reliever, is explored for its potential in pain management, autoimmune disorders, and cancer therapy, along with considerations for clinical trials and safety. Challenges such as sustainability and conservation of honeybee populations are addressed, alongside research gaps and future directions for leveraging the synergistic benefits of honeybee products in conjunction with conventional medicine. By delving into the therapeutic potential of honeybee products, this review aims to inspire further research and collaboration in harnessing their natural healing powers for human health and well-being.

Keywords: Honeybee, Propolis, Therapeutic, Bee venom.

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FILARIASIS: CAUSES, TRANSMISSION, DIAGNOSIS, PREVENTION, AND TREATMENT

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ABSTRACT
Filariasis is a parasitic disease caused by an infection with roundworms of the Filarioidea type, residing in the tissue and blood of humans. It belongs to the group of diseases called Helminthiases. It is spread by blood-feeding insects such as black flies and mosquitoes. The parasitic worms include *Wuchereria bancrofti, Onchocerca volvulus, Loa loa, Brugia timori, Brugia malayi, Mansonella ozzardi, Mansonella streptocerca, Mansonella perstans, Dracunculus medinensis* and are divided into categories depending on the site of infection. Transmition is by the bites of infected black flies or mosquitoes. Generally, repeated and prolonged exposure to infected larvae is required for establishment of infection in human. In the case of acute infection, patients suffer from symptoms such as inguinal lymph nodes, enlarged axillary, fever, lymphedema and skin exfoliation while chronic lymphatic filariasis is characterized by chronic lymphedema and swelling of the limbs, breasts and scrotum. The definitive parasitologic diagnosis is the demonstration of microfilariae in blood and skin samples of the host. Recommended treatment for filarial infections are Diethylcarbamazine, ivermectin and albendazole. Currently there are no vaccines available for filariasis, so preventing mosquitoes and black flies' bites will be the best form of defense.

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TUBERCULOSIS IN PREGNANCY: AN OVERVIEW OF ITS NATURE, HAZARDS AND THERAPEUTIC APPROACHES

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ABSTRACT
Tuberculosis (TB) is one of the common causes of morbidity and mortality worldwide, affecting over 1 million children and 3 million women of child-bearing age. Despite being preventable and curable, it may adversely affect pregnancy. Furthermore, early diagnosis and treatment of pulmonary TB and extrapulmonary TB in pregnancy can determine maternal and feotal outcome. However, severe forms of TB could adversely affect the outcome of maternal and perinatal outcome. We aimed to review the association between TB and pregnancy, the dangers of such association, and insights into therapeutic approaches by consulting relevant World Health

Organization TB reports and peer-reviewed online journal articles from different search engines and specific scientific repositories. TB in pregnancy results in immunological changes, leading to the suppression of antibodies that protect the fetus. Low birth weight, vaginal bleeding, maternal, feotal, perinatal death, acute feotal distress, and prematurity are among the adverse effects of TB in pregnancy. Pregnancy alters maternal immune system, leading to variations in TB responses. This increases susceptibility to TB infection or reactivated disease. Which is worsened by hormonal and physiological changes. The first-line anti-TB therapy (ATT) is still the mainstay. However, there is limited data on second-line ATT in pregnancy. TB in pregnancy is a significant threat to both the mother and feotus. Therefore, more studies on the safety of the use of second-line agents for the treatment of TB in pregnancy are necessary. In addition, adequate antenatal care and good nutrition in addition to anti-Tb medications are necessary for optimum maternal and perinatal outcome.

Keywords: Antimycobacterial, immunosuppression, maternal-health, outcomes and pregnancy.

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PREVALENCE OF PAEDIATRIC TUBERCULOSIS IN SOME HOSPITALS WITHIN KATSINA METROPOLIS, KATSINA STATE, NIGERIA

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ABSTRACT
In 2019, the paediatric age group was the second highest-risk group for tuberculosis (TB), with Katsina state having the highest prevalence of 23% and the third state experiencing the most significant increase at 42%. This study aimed to determine the prevalence of paediatric TB in some hospitals within Katsina Metropolis, Katsina state, Nigeria. One hundred and twenty-eight children were randomly selected in the selected hospitals and enrolled. They were screened for TB and rifampicin-resistant TB (RR-TB) using the Xpert MTB/RIF Ultra, and their HIV status were determined using the Determine™ Kit. Data obtained was analyzed using Stata. Six subjects tested positive for TB giving a prevalence of 4.7%, with none having RR-TB. The prevalence was highest in the age group of 5–14 years (66.7%). Males were equally affected as females. Despite existing efforts to combat TB, this study showed that the disease still exists in the paediatric population in the study area. This calls for more strengthened efforts in health education, active case search and improved access to treatment, all towards eradicating the disease in the area.

Keywords: Childhood-TB, mycobacterium, paediatrics, tuberculosis and Xpert (MTB/RIF)

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INCIDENCE OF TUBERCULOSIS AMONG FEMALE SYMPTOMATIC PATIENTS AT MARTHA BAMAIYI GENERAL HOSPITAL, ZURU, KEBBI STATE, NIGERIA

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ABSTRACT
Above HIV/AIDS, tuberculosis (TB) is one of the leading causes of death worldwide. Consequently, the African region accounts for over 25% of TB mortality rate. In 2017, 36% of women and girls accounted for global TB incidence. This study aimed to assess the incidence of TB among symptomatic female patients screened using Gene Xpert (MTB/RIF) at Martha Bamaiyi General Hospital (MBGH), Zuru, Kebbi State. This was a prospective cross-sectional study that involved 97 female TB symptomatic patients at MBGH, Zuru between April-June, 2018. The results showed the overall incidence of TB and HIV to be 13.4% and 31.9% respectively. Additionally, the prevalence of HIV-TB co-infection was 4.1%. Furthermore, age groups of 25-34 years (46.2%) and 35-44 years (23%) were mostly affected by TB, while, 15-24 and >65 years were least affected, 7.7% respectively. Based on the results obtained, this study suggests the findings to be public health alarming. Special care should be rendered to the infected patients.
Keywords: Tuberculosis, HIV, incidence, prevalence and women

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THE PLACE OF XENOBIOTICS IN WATER QUALITY ASSESSMEN: A REVIEW

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ABSTRACT
This overview includes information on the xenobiotics which are compounds or chemicals to which an organism is exposed usually in large concentrations that are extrinsic to the normal metabolism of that organism. Some drugs, including antibiotics, have the potential to be dangerous for both humans and animals. And also discussed on regulation, classification, and effects of xenobiotics on humans, animals, and the environment. It also provides a general overview of the process of removing and detecting xenobiotics. Additionally covered is the potential environmental destiny of xenobiotics. A list of xenobiotic categories is provided, and they include industrial products, insecticides, pharmaceuticals, personal care items, and radioactive waste. Microplastics, heavy metals, and pesticides are examples of xenobiotic chemicals found in freshwater bodies that were also discussed. Technological progress that resulted in the creation of substances such as personal care products, medicinal chemicals, and insecticides, which in excess, can become xenobiotics is explained. And detail explanation of contamination from pesticides of common environmental compartments such as soils, streambed sediment, groundwater, and surface water is given, since surface runoff accounts for more than 10% of pesticide residue in surface rivers, which is the main mechanism of transmission. Very sensitive and selective techniques like FTIR, HPLC, UPLC, GC/MS, AAS, and multidimensional chromatographic techniques are also included in the investigation of xenobiotics. These techniques are often paired with state-of-the-art detection techniques like high resolution mass spectrometry, or HRMS.
Keywords: Xenobiotics, Drinking water, Environment, Contamination, Insecticides

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EVALUATION OF ANTIBACTERIAL ACTIVITY OF CRUDE N-HEXANE EXTRACT OF *Cochlospermum Tinctorium* ROOT ON MULTI-DRUG RESISTANT ENTERIC BACTERIAL ISOLATES

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ABSTRACT
This Research aimed to Evaluate the Antibacterial activity of crude n-hexane root extract of *Cochlospermum tinctorium* on Multi - drug resistant enteric bacterial isolates. Extraction was made using soxhlet extractor. Agar well diffusion test was employed to test the activity of *C. tinctorium* root extract. Broth dilution test was applied to determine the Minimum inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) of the root extract. Gas chromatography- mass spectrometry was also used to identify the bioactive compounds present in the plant. The data was analysed using Graphpad prism version 5.0 (p<0.05). Extraction yieled 13.0g, n-hexane extract showed the highest mean activity (zone of inhibion) of 36, 42 and 44mm against *P. aeruginosa* at concentration 8, 40, 200mg/ml, respectively. For MIC, five out of the eight isolates were inhibited at concentration of 200µg/ml while for MBC five of the isolates were also killed at concentration of 2000µg/ml. Fraction number three (3) of n-hexane showed the highest mean zone of inhibition of 34mm against *E. aerogenes*. The major bioactive compounds detected include 3-Tetradecanone, cyclododecane, Nephthalene, 1,2,3,4-tetrahydro-6-methyl etc. This study showed that *C. tinctorium* root extract might be useful in the treatment of MDR enteric bacteria and in pharmaceutical formulations.

Key word: *Cochlospermum tinctorium*, Multi-drug resistant (MDR), Minimum inhibitory concentration (MIC), Minimum bactericidal concentration (MCB), Bioactive compounds

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ISOLATION AND CHARACTERIZATION OF MULTI-DRUG RESISTANT (MDR) ENTERIC BACTERIA FROM SAMPLES OF ROASTED MEAT (TSIRE) SOLD IN SOKOTO METROPOLIS

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ABSTRACT
Antibiotic resistance has increased rapidly in both geographic range and intensity leading to the emergence of Multi -drug resistant (MDR) organisms. This research was aimed to isolate and characterized MDR Enteric bacteria from samples of tsire. A total of twenty samples of tsire were analysed. The bacteria were isolated using spread plate methods. Biochemical tests and moleculer techniques were used to identify the enteric organisms. Kirby-bauer disk diffusion method was used to determine the sensitivity of the enteric isolates. Fourteen (14) enteric bacterial species were isolated which includes *E. coli, K. pneumoniae, P. aeruginosa, P. mirabilis, E. aerogenes, P. vulgaris, S. dysenteriae, C. freundii,* and *Salmonella* spp with *E. coli* having the highest rate of occurrence. Eight (8) out of the isolates were found to be MDR to the antibiotics tested which includes ampicillin, augmentin, ceftazidime and cefuroxime. This research revealed the present of MDR Enteric bacteria from samples of tsire. Key word Multi-drug Resistannt, Enteric bacteria, Roasted meat (Tsire).

Keywords: Antibiotic, Resistance, Meat, Enteric-Bacteria, *Escherichia coli*

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FUNGAL DEGRADATION OF HYDROCARBON CONTAMINATED SOIL

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ABSTRACT
Hydrocarbons found in petroleum can be released into the environment through spills or improper disposal. Hydrocarbon contamination is a serious environmental problem with a variety of harmful effects on human health and ecosystems. The purpose of this study was to identify fungi that could thrive in hydrocarbon-contaminated environments and that could potentially be used in bioremediation strategies to clean up these environments. Soil samples were collected from three contaminated sites and fungal isolates were identified based on macroscopic and microscopic (morphological and taxonomical) characteristics using standard procedures. Mineral salt medium was used to monitor the degradation potential of the fungal isolates with aid of absorbance reading of spectrophotometry machine. The result of microscopic and macroscopic identification revealed the presence of *Aspergillus niger, Candida albicans* and *Rhizopus* species. *Aspergillus niger* was the most effective fungus at hydrocarbon degradation, followed by *Candida albicans* and *Rhizopus* species. This study provides valuable insights into the potential of fungal bioremediation as a sustainable and cost-effective solution for the clean-up of hydrocarbon-contaminated environments.

Keywords: Soil, Degradation, Hydrocarbon, Fungi, *Aspergillus niger*

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EVALUATION OF PHYTOCHEMICAL CONSTITUENTS AND ANTIMICROBIAL ACTIVITY OF *Calotropis procera* ROOT EXTRACT AGAINST SOME PATHOGENIC MICROORGANISMS

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ABSTRACT
Calotropis procera has been used for generations as source of medicine in the treatment of variety of human illnesses. In Nigeria, different parts of this plant are used by traditional healers without any scientific justification for their therapeutic values. Thus, this study aimed at evaluating the phytochemical constituents and antimicrobial activity of root extracts of *C. procera* against some pathogenic microorganisms. *C. procera* root was extracted using aqueous, chloroform and n-hexane as solvents and qualitative analysis of the phytochemical constituents of the extract was done following standard procedure. The antimicrobial activity of the extracts was tested against *Staphylococcus aureus*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Candida albicans* and *Aspergillus flavus* using agar well diffusion method. Phytochemical screening

revealed the presence of tannin, saponin, alkaloids, phenolics, flavonoids and reducing sugars in all the extracts, while terpenoid was found only in aqueous extract and cardiac glycoside was absent in all the extracts. The extracts exhibited potent antimicrobial activity against all the tested pathogens. The chloroform extract showed the highest zone of inhibition (23.50±0.38 mm) against *S. aureus* while the lowest inhibition zone (6.38±0.52 mm) was found in n-hexane against *A. flavus*. The minimum inhibitory concentration (MIC) values obtained were 25 mg/ml for chloroform extract against *S. aureus* and *S. typhi* and 50 mg/ml for both aqueous and n-Hexane extracts against *K. pneumoniae* and *C. albicans* while minimum bactericidal concentration (MBC) was 100 mg/ml for *S. aureus, S. typhi* and all the extracts. The root extracts of *C. procera* have shown good antimicrobial effect *S. aureus* and *S. typhi*. The plant has proven to be a good source of bioactive compounds and can be considered as alternative to antibiotics in the treatment of infectious diseases.

Keywords: Antimicrobial, *Calotropis procera*, Microorganisms, Phytochemical compounds, Root extracts

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ANTIBACTERIAL ACTIVITY OF ENDOPHYTIC FUNGI ISOLATED FROM *Psidium guajava* (Guava) LEAF AGAINST *ESCHERICHIA COLI* AND *Klebsiella pneumoniae*

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ABSTRACT
Antibacterial resistance has been a major public health issue and remains a threat to the global health care system. Endophytic fungi, particularly those isolated from medicinal plants are potential source of new antibiotics. The aim of the study was to determine the antibacterial activity of endophytic fungi isolated from *Psidium gaujava* leaf against *Escherichia coli* and *Klebsiella pneumoniae*. Surface sterilized leaves of *P. guajava* were inoculated on Potato Dextrose Agar and incubated at room temperature. Endophytic fungal isolates that emerged were identified based on their macroscopic and microscopic characteristics. The isolates were screen for antibacterial activity against *E. coli* and *K. pneumoniae* isolates. Antibacterial activity of ethyl acetate extracts of endophytic fungi with antibacterial activity was also evaluated against *E. coli* and *K. pneumoniae* isolates by Agar well diffusion method. Minimum Inhibitory Concentrations and Minimum Bactericidal Concentrations of the ethyl acetate extracts were also determined. Eight endophytic fungi were isolated from the leaves of *P. guajava* and four had antibacterial activity namely: *Gonatobotrys* sp. P21, *Rhizoctonia* sp. P11, *Fusarium* sp. P22 and *Rhizoctonia* sp. P25. The extracts exhibited antibacterial activity with zones of inhibition ranging from 11.5 ± 0.5mm to 18.5 ± 1.5mm for *E. coli* and 12.5 ± 0.5mm to 21.0 ±1.0mm for *K. pneumoniae*. The MIC was found to be 500mg/mL and 250mg/mL for *E. coli* and *K. pneumoniae* respectively. Endophytic fungi isolated from *P. gaujava* leaf are potential source of novel antibacterial drug since they possess antibacterial activity against *E. coli* and *K. pneumoniae*.

Keywords: Endophytes, fungi, antibacterial, *Escherichia coli*, *Klebsiella pneumoniae*

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HEAVY METAL CONCENTRATIONS OF SOME VEGETABLES CULTIVATED NEAR A METAL ARTISANAL SITE IN KOFAR MARUSA, KATSINA METROPOLIS

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ABSTRACT
This study was aimed at quantifying the concentration of some selected heavy metals in some commonly consumed vegetables cultivated in an irrigation area located near a metal artisanal site in Kofar Marusa, Metropolitan area of Katsina city, Katsina State. Twenty designated cultivation areas of Cabbage, Lettuce, Tomatoes, Spinach, and Cress, were sampled, heavy metal concentrations in the samples were determined using an Atomic Absorption Spectrometer, with the results reported in mg/kg. The findings have revealed that the heavy metal Pb mean concentrations were above the permissible limit for Pb in vegetables (0.05mg/kg). Spinach exhibited the highest concentrations of several of the metals, including copper (Cu) at 0.123 mg/kg, manganese (Mn) at 0.431 mg/kg, and nickel (Ni) at 0.539 mg/kg. Cress also displayed the highest mean levels of manganese and cobalt (Co) at 0.374 mg/kg and 1.474 mg/kg, respectively. Conversely, lettuce showed lower concentrations of most of the heavy metals compared to spinach and cress but had the highest iron (Fe) content at 6.028 mg/kg. Cabbage demonstrated particularly highest levels of lead (Pb) at 11.68 mg/kg and chromium (Cr) at 2.276 mg/kg. Tomato had comparatively lower concentrations of most heavy metals but contained notable amounts of nickel and lead at 0.526 mg/kg and 4.24 mg/kg, respectively. The study revealed significant variations in heavy metal uptake among the vegetable samples. The above permissible concentrations of Pb in the samples is a portrayance of the potential health risks associated with their consumption, which will also lead to the suggestion that consumption of vegetables cultivated in the area may contribute to the bioaccumulation of heavy metals burden among the population.

Key words: Heavy metals, Vegetables, Katsina, Irrigation, Metal artisanal site

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INVESTIGATING THE ASSOCIATION BETWEEN SYNANTROPHIC FLIES AND BACTERIA BASED ON INCOME CATEGORIES (LOW, MEDIUM AND HIGH) IN KADUNA METROPOLIS

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ABSTRACT
Flies associated with human habitat pose a significant challenge, particularly in regions with inadequate environmental sanitation. The objective of the study was to identify the species diversity of synanthropic flies and to relate the prevalence of bacteria species associated with different synanthropic flies isolated from the flies in the study areas. The significance is to check bacteria species that are commonly found with synanthrophic flies in Kaduna metropolis. The research was conducted in Kaduna state one of the largest cities in northern Nigeria located at latitude of 10.6 (10° 35' 60 N) and a longitude of 7.45 (7° 27' 0 E). Two locations from each of the three income class were selected for sampling of flies. A total of 848 flies were captured

using a locally made fly trap. *Chrysomyia albiceps*, *Chrysomyia chloropyga*, *Musca domestica* and *Musca sorbens* were caught in all the income class. Body wash from the flies were used to isolate and culture bacteria species. Bacteria species identified include; *Bacillus subtilis*, *kleibsiella* sp, *Eschericia coli*, *Stretococcous* sp, *Enterobacter* sp, *Staphylococcus aureus*, *Pseudomonas aeriginosa*, *Salmonella* sp and *Shigella* sp. Low income class had all the species encountered with 51.4%, middle income class had 27.7% while high income class had the least with 20.8%. Analysis of variance indicated significant difference in the prevalence of bacteria in flies according to income classes ($p < 0.05$). This information is valuable for understanding the potential associations between income levels and bacterial presence.

Keywords: Synanthropic, income class

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MOLECULAR DETECTION OF MACROLIDE-INDUCED CLINDAMYCIN RESISTANCE AMONG CLINICAL ISOLATES OF *Staphylococcus aureus* IN KATSINA METROPOLIS

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ABSTRACT

The emergence of inducible clindamycin resistance presents a significant challenge in the treatment of *Staphylococcus aureus* infections. This phenotype, evading routine susceptibility testing, compromises treatment efficacy and prolongs patient illness. Despite its clinical importance, limited data exist on its prevalence and mechanisms in Katsina Metropolis, Nigeria. This study aims to assess its prevalence and characterize its phenotypic and genotypic aspects among clinical isolates from local healthcare facilities. *Staphylococcus aureus* isolates from diverse clinical specimens were obtained from three hospitals and identified using routine standard bacteriological methods. Antibiogram profiles were determined following CLSI guidelines, revealing varying efficacy among commonly prescribed antibiotics. Notably, chloramphenicol (87.8%), clindamycin (79.6%), tetracycline (69.4%), and azithromycin (67.3%) demonstrated high efficacy rates, while cefoxitin exhibited the highest resistance level (44.9%). Prevalence of MLS_B phenotypes was assessed using the D-test, unveiling specific resistance phenotypes among the isolates. The $iMLS_B$ phenotype accounted for 25% of isolates, followed by the MS phenotype at 18.4% and the $cMLS_B$ phenotype at 6.1%. Polymerase chain reaction detected the ermC gene as predominant among D-test-positive isolates, with all expressing the $iMLS_B$ phenotype. These findings shed light on the prevalence and mechanisms of inducible clindamycin resistance in *S. aureus* clinical isolates in Katsina Metropolis, emphasizing the importance of tailored treatment strategies and ongoing surveillance in combating antimicrobial resistance effectively.

Keywords: *Staphylococcus* aureus, *erm* Genes, Antibiotic resistance, and Inducible Clindamycin Resistance

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Phenotipic Characterization and Determination of Extended Spectrum Beta-Lactamase Producing *Pseudomonas Aeruginosa* from Clinical Sample of Patients in General Hospital Aliero and Jega

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ABSTRACT
Extended spectrum beta-lactamases (ESBLs) producing strains of *Pseudomonas aeruginosa* have become a significant public health concern, complicated treatment plans and raising morbidity and mortality rates worldwide. This research was design to phenotypically characterized and determine extended spectrum beta-lactamase producing *P. aeruginosa* from clinical sample of patients in general hospital Aliero and Jega, Kebbi State, Nigeria. One hundred and eighty-six (186) urine and sputum samples were evaluated using the culture characteristics in Macconkey agar and biochemical method. While the double-disk synergy test (DDST) was used to produce extended spectrum beta-lactamase production (ESBLs), the modified Kirby-Bauer disk diffusion method was used for antibiotic resistance pattern testing (ART). The current study demonstrated a prevalence rate of (5.91%) 11/186, with the lowest prevalence (2.15%) 4/11 from a urine sample and the highest prevalence (3.76%) 7/11 from sputum. According to the analysis of antibiotic resistance patterns, the antibiotics with the highest resistance were found to be Tetracycline (100%), Cefoxitin (81.80%), Cefepime (72.70%), Cefotaxime (72.70%), Ceftazidime (63.60%), Ciprofloxacin (54.50%), Augmentin (36.40%), Imepenem (27.30%), and Meropenem (9.10 However ESBLs production phenomena was only observed in (71.43%) 5/7, from sputum and (28.57%) 2/7 from urine, in confirmatory tests, out of the total (100%) 7/7 suspected ESBLs producing isolates during screening test respectively. The research study has demonstrated extended spectrum beta-lactamases (ESBLs) producing *P. aeruginosa* in the facilities. For this reason, attempts ought to be undertaken to identify them. Additionally, physicians must to take into account the potential for ESBL formation in cases where beta-lactam antibiotic treatment fails.
Keywords: *P. aeruginosa*, Sputum, Urine, Antibiotic resistance pattern, and ESBLs production.

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ANTIBACTERIAL SUSCEPTIBILITY PATTERN OF PATHOGENS ISOLATED FROM READY-TO-EAT LETTUCE AND GURASA SOLD WITHIN KADUNA STATE UNIVERSITY (MAIN CAMPUS), KADUNA STATE.

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ABSTRACT
The consumption of ready to eat *lettuce and gurasa has gained acceptance* due to its appealing taste and nutritive value. However, these foods can serve as a vehicle for transmission of pathogens. This study was carried out to assess the antibacterial susceptibility pattern of pathogens isolated from lettuce and gurasa sold in Kaduna State University. Samples were collected from five vendors of gurasa and lettuce. Standard microbiological methods were carried out using pour plate and modified Kirby-Bauer disc diffusion method. The isolates obtained were examined for morphological and biochemical characteristics. *Escherichia coli*, *Bacillus spp*,

Salmonella spp, Staphylococcus aureus and *Klebsiella spp.* were isolated and identified. *Staphylococcus aureus* was the most prevalent bacterium in this study having 27.7% in lettuce and 38.4% in gurasa, followed by *Escherichia coli* having 16.6% in lettuce and 30.7% in gurasa. There was no significance difference *(P > 0.05)* in the total colony counts of bacteria among the samples. Lettuce had the least bacteria count (1.48 x 10^6CFU/g) while gvurasa had the highest count (1.55 x 10^6CFU/g). Antimicrobial sensitivity test results showed that out of 10 *S. aureus* isolates (Rocephin was 100% resistant), out of 7 *E. coli* isolates (Septrin, Amoxicillin and Augmentin were 100% resistant), out of 6 *Klebsiella spp* isolates (Amoxicillin and Augmentin were 100% resistant), out of 5 *Salmonella spp* isolates (Septrin, Amoxicillin and Augmentin were 100% resistant) and out of 3 *Bacillus spp* isolates only (Rocephin was 100% resistant). The high bacteria resistance to antibiotics is of great concern as infections with these organisms could be lethal.

Keywords: Ready-to-Eat Lettuce and Gurasa, Bacterial counts, Antibiotic susceptibility pattern.

2nd UMYU Conf/2024/219

ASSESSMENT OF THE ANTIMICROBIAL EFFECTS OF *Ziziphus mauritiana* LEAVES AGAINST *Escherichia coli* AND *Salmonella.*

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ABSTRACT

Ziziphus mauritiana is an important species of the *Ziziphus* genera which is distributed all over the world and is used for medicinal purposes. Different parts of the plant has been studied by by various scientists and was reported to possess many bioactive phytochemicals with antimicrobial potential. The Study aimed at assessing the antimicrobial potential of *Zizipus mauritiana* leaves extracts against *E. coli* and *Salmonella spp*. Ethanolic and aqueous extract of the leaves where screeaned for the presence of bioactive phytochemicals *which include alkaloids, terpenoids, steroids, tannins, saponins, anthocyanins, organic acids and carotenoid.* The antimicrobial potential of the extracts as well as the Minimum Inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) were assessed using disc diffusion and dilution method respectively. The results of the phytochemical screening confirmed the presence of alkaloids, flavonoids, tannis, steroids, terpenes as well as saponins in both extracts. The assay was conducted in duplicate using varied concentration of 500mg/ml, 250mg/ml, 125mg/ml and 62.5mglml, the result showed that the aqueous leaves extract has inhibition zones that ranged between 10.00 to 19.00mm and between 12±4.24 to 32.25±3.89mm against Escherichia coli and salmonella spp respectively, the ethanolic leaves extract have inhibition zones that ranged between 11.00 to 28.75±1.77mm against both *E. coli* and *Salmonella spp*. The MIC of the aqueous extract was 125mg/ml and 250mg/ml against *E. coli* and *Salmonella spp* respectively, the MIC of the ethanolic extract was 62.5mg/ml against both organisms, the MBC of the aqueous extract was 125mg/ml and 250mg/ml against *E. coli* and *Salmonella spp* respectively, while the MBC of ethanolic extract was 125mg/ml and 62.5mg/ml against *E. coli* and *Salmonella spp* respectively. In conclusion, *Ziziphus mauritiana* leaves extracts contains bioactive phytochemicals which might be responsible for its antibacterial activity. All the extracts tested had inhibitory effect as well as cidal effect on the test organisms. The toxicity profile of the analyte should be studied in order to rule it safe for consumption.

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ISOLATION AND IDENTIFICATION OF ENTOMOPATHOGENIC FUNGI

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ABSTRACT

This study was aimed at isolating and characterizing of Entomopathogenic fungi isolated from insect's cadavers in Umaru Musa Yar'adua University, Katsina. Thirty (30) insects which include: grasshoppers, cockroaches, spiders, housefly, scorpion, mosquitoes and sugar ants were collected from four (4) different locations (PG Hostel, FNAS, Student's centre and Senate building) and transferred directly to Microbiology laboratory for analysis. The insects were washed thoroughly with 70% ethanol, rinsed with water and allowed to dry; they were inoculated into a fresh potato dextrose agar (PDA) and incubated for 5 days. Fungal growth was monitored and sub-cultured into a fresh potato dextrose agar (PDA) and identified using a standard protocol. Result shared the occurrence of four (4) different species of fungal isolates that includes: Beuveria bassiana, Metarrhizium annosiplae, Acantomyces spp and Aspergillus niger. Prevalence of the fungal isolates showed that B. bassiana 18(34 %), M. annosiplae 14(26%), *A. niger* 13(24.5%) and A. spp 08(15%) recorved. Prevalence based on the host site showed that battles showed more of the fungal species with beetle hosted 8(34.6%), spider 06 (11.5%), grasshopper 05 (9.6%), housefly 03 (11.5%), mosquito 08(15.4%), sugar ant 03(5.8%) and scorpion 01(1.9%). Presence of these fungal isolates showed that they secrete an active compound which leads to the extinction of host insects. It is recommended that further researches should be conducted to ASCERTAIN molecular mechanisms of their relationship.

Key words: Entomopathogenic fungi, potato dextrose agar (PDA), *Beuveria bassiana*, M*etarrhizium annosiplae*, *Acantomyces* spp, *Aspergillus niger*.

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PHYTOCHEMICAL SCREENING, ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF *Acacia gourmaensis*

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ABSTRACT

Acacia gourmaensis, locally known as "*kama mu raba*", is widely used in traditional medicine for the treatment and/or management of body well being, skin rashes, yellow fever, diarrhea, paralysis, ear ache, malaria, hypertension, dysentery, pile, cough, aphrodisiac and wound healing in Katsina State, Nigeria. In this study, an attempt was made to validate the folkloric use of *A. gourmaensis* by evaluating its phytochemical constituents, antioxidant and antibacterial properties using aqueous leaves extract. The phytochemical screening revealed the presence of saponins, flavonoids, phenolics and phytosterols secondary metabolites. Antioxidant properties were evaluated using Total Phenolic Content (TPC) and 1,1-Diphenyl-2-diphenyl picrylhydrazyl (DPPH) scavenging assays. The TPC observed was 82.75 ± 7.25 GAE/g while strong radical scavenging activity of 69.43% against ascorbic acid was observed. The extract also displayed strong antibacterial property against *Staphylococcus aureus*, *Salmonella spp*, *bacillus spp* and *Pseudomonas spp* at 250 mg/ml. Results obtained substantiate the folkloric use of *A. gourmaensis* in herbal medicine. However, further studies aimed at evaluating its toxicity and mechanisms of action are highly recommended.

Keywords: *Acacia gourmaensis*, biological properties and folkloric use.

2nd UMYU Conf/2024/222

ENVIRONMENTAL CONTAMINANTS INCREASE THE EXPRESSION HER1 AND HER4 IN NORMAL AND BREAST CANCER INDUCED EXPERIMENTAL RATS

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ABSTRACT
Cancer is a complex disorder characterized by abnormal growth and alterations in cells, reduced cell death and increased cellular energy metabolism. HER family receptors, such as HERI and HER4 are over-expressed in many cancers, including breast cancer probably due to mutation of the respective receptors. Over-expression of HER1 and HER4 play a critical role in breast cancer development. Exposure to pesticides, industry contaminants, and air pollutants, along with poor lifestyle choices are associated with the development of breast cancer. The aim of this study was to assess the effect of the possible reduced tumor suppression activity of *HER1 and HER4* and the environmental factors that may modulate individual susceptibility to breast cancer. This study evaluated environmental contaminants toward affecting the expression of HER1 and HER4 in normal and breast cancer induced experimental rats. It is found that a contaminants move towards increase in expression of HER1 and HER4 in normal rats and made the existing expression of HER1 and HER4 in breast cancer induced rats even more worst than before the exposure to contaminants. Taken together, this study indicated the likelihood of environmental contaminants to cause breast cancer in individuals living in a heavily polluted environment.

Keywords: Breast cancer; Contaminants; HER1 and HER4; Experimental rats

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REVIEW ON MICROBIAL LOOP: A FUNDAMENTAL CONCEPT IN AQUATIC ECOLOGY

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ABSTRACT
The microbial loop, a fundamental concept in aquatic ecology, elucidates the intricate network of interactions among microorganisms driving nutrient cycling within aquatic ecosystems. Comprising bacteria, protists, and viruses, the microbial loop plays a pivotal role in the decomposition of organic matter, recycling essential nutrients such as carbon, nitrogen, and phosphorus. Bacteria serve as primary decomposers, converting organic matter into dissolved organic matter (DOM), which forms the basis of microbial food webs. Protists, in turn, graze on bacteria, regulating their populations and influencing nutrient fluxes. Viruses contribute to the loop by infecting and lysing bacterial cells, releasing nutrients back into the environment. Understanding the microbial loop is crucial for comprehending ecosystem dynamics, primary productivity, and overall ecosystem health. This review explores the components, processes, significance, and factors influencing the microbial loop, drawing on case studies from diverse aquatic ecosystems. Additionally, it highlights the emerging research directions, technological advancements, and challenges in studying microbial communities. Ultimately, elucidating the microbial loop's complexities is vital for effective conservation and management strategies in the face of environmental change.

Keywords: Ecology, Decomposers, Ecosystem, Dissolved Organic Matter

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OPTIMIZATION OF SOLID STATE FERMENTATION OF *Pennisetum glaucum STALK* USING FILAMENTOUS FUNGI *Aspergillus niger*

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ABSTRACT
This study was carried out to determine the optimum pH and temperature from the proximate analyses result of fermented *Pennisetum glaucum stalk* with focus on varying the temperatures and pH. The study explored the effects of temperature ranging from 20℃ to 35℃ and pH levels of 5 to 8 on the efficiency of *Pennisetum Glaucum stalk* fermentation. Through this process the idle conditions for optimal fermentation of *Pennisetum Glaucum* yielding highest output was determined. The result shows that at pH 7 and temperature 35℃ has the highest values when proximate analyses was carried out on the samples, the proximate result at pH 7 were; Ash (5.80), protein (2.47), Moisture (37.10), Fat (2.10), Fibre (3.62) and Carbohydrate (48.91). the proximate result at tempreture 35℃ were; Ash (5.0), Protein (5.30), Moisture (38.64), Fat (2.80), Fibre (4.01), and Carbohydrate (48.77). The result obtains in both pH 7 and Temperature 35℃ indicated that they are the optimum pH and temperature for the solid-state fermentation of *Pennisetum Glaucum.*

Keywords; Pennisetum Glaucum, solid state fermentation, proximate analyses.

2nd UMYU Conf/2024/225

ANTHROPOGENIC INFLUENCE ON THE PHYSICOCHEMICAL PARAMETERS AND PHYTOPLANKTONS COMPOSITION IN KALGO RIVER, KEBBI STATE

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ABSTRACT
Anthropogenic influences can have significant and often detrimental effects on aquatic ecosystems, including water quality, biodiversity, and ecosystem services. The study aimed to assess the impact of anthropogenic activities on physiochemical parameters and the phytoplankton assemblage in the Kalgo River. Water samples were collected from three different stations (A, B, and C) using a plankton net and one-liter plastic bottles, and analyzed in the laboratory using standard methods. In August, higher concentrations of pH (7.90±0.23), EC (793.91±3.56 µs/cm), P (0.31±0.05 mg/l), NH4 (0.63±0.23 mg/l), and TDS (529.27±0.13) were observed, while the highest temperature (29.66±1.50°C) and maximum concentrations of DO (7.52±0.25 mg/l), BOD (22.4±10.29 mg/l), Ca2+ (164.0±13.21 mg/l), and Cl- (15.40±0.59 mg/l) were found in June. A total of 341 phytoplankton species distributed across 37 genera and belonging to seven classes were identified. Chlorophyceae (31.43%) was the dominant class, followed by Bacillariophyceae (25.72%) and Cyanophyceae (20.00%), with Rhodophyceae recording the lowest percentage (2.86%). Station B exhibited the highest species composition (41.35%), while station C had the lowest (26.96%). There was no significant difference (P>0.05) in phytoplankton composition variations between the stations. Crucigenia sp. had the highest occurrence (8.50%), followed by *Navicula digitoradiata* (7.33%), Volvox sp. (6.16%), and *Craticula sp*. (5.28%). *Asterionella sp*., *Vaucheria sp*., and *Melosira variants* each accounted for 0.88% of the composition. Despite the diverse phytoplankton assemblage in the Kalgo River, indicating some resilience to pollution from washing, agricultural, and domestic runoff, further studies are necessary to evaluate the specific impacts of anthropogenic activities on different phytoplankton species and their overall health in the river.
Keywords: Anthropogenic, Ecosystem, Kalgo, Phytoplankton, River.

2nd UMYU Conf/2024/226

SCREENING AND CHARACTERIZATION OF BIOSURFACTANTS PRODUCING-BACTERIA ISOLATED FROM INDUSTRIAL EFFLUENTS IN MAIDUGURI, BORNO STATE

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ABSTRACT
Microbial Ssrfactants are surface-active, naturally occurring molecules which are produced by yeast, bacteria, and, fungi and they can be classified by their molecular weight and chemical composition. The industrial effluent provides a suitable habitat for the growth of different types of microorganisms. The study is aimed to isolate and screen biosurfactant producing bacteria from industrial. The Cultural, morphological and biochemical characteristics of the isolates were analysed using standard procedures and bergey's manual were used as guide. Methods for screening the isolates for biosurfactant production include blood haemolysis, drop collapse, oil displacement and emulsification index tests were employed. The total bacterial count ranges from 2.1×10^7 to 2.8×10^6. Five bacterial isolates were isolated from enrichment culture (mineral salt medium supplemented with 0.1% Bonny light crude oil) and the identification was based on their biochemical characterization, the isolates found are *Bacillus species, Pseudomonas species, Staphylococcus species, and Rhodococcus species*. The Five isolates obtained all have been hemolytically active and have a strong emulsification capacity. Results obtained by the drop collapse shows that *Pseudomonas spp* (in 10 seconds) collapses faster than the others followed by *Staphylococcus spp* (in 30 seconds), then the *Bacillus spp* (in 40 seconds) and *Coryenebacterium spp* (in 1 minute). From the results obtained, it was shown that the isolate A1 *(Pseudomonas spp)* produces a significant amount of biosurfactants as compared to the other four isolates obtained and it's regarded as most potent isolate. It can be concluded that the production of biosurfactant using *Pseudomonas spp* yield higher biosurfactant than the other isolates.
Keywords: Biosurfactant, screening, characterization, industrial effluent.

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EFFECT OF HEAVY METALS ON THE BIODIVERSITY OF PROTOZOA

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ABSTRACT
Protozoa which are single-celled eukaryotic microorganisms are found in various ecosystems, thereby playing crucial roles by acting as predators and prey and also they perform wonderfully in nutrient cycling, food webs, and overall ecosystem health. Heavy metals such as lead, cadmium, mercury, and zinc, are toxic pollutants which are often released into the environment through industrial activities, mining, and agricultural practices. These heavy metals can be accumulated in soils, sediments, and water bodies, thereby posing a threat to the biodiversity and ecological functions of protozoa. Researches have proved that heavy metals can directly impact protozoan populations by causing mortality or inhibiting their reproduction. Many authors

revealed that continuous exposure to heavy metals can drive selection pressure on protozoan populations, leading to the development of metal-tolerant strains through genetic adaptation. Different species of protozoa have varying sensitivities to heavy metals. Some species may be more tolerant and thrive in metal-contaminated environments, leading to shifts in species composition and diversity. While sensitive species may disappear, because heavy metals can interfere with essential metabolic processes in Protozoa, including respiration, photosynthesis (in photosynthetic species), and ion transport across cell membranes. These disruptions can impair energy production and cellular homeostasis, thereby affecting nutrient cycling processes, such as carbon and nitrogen mineralization, decomposition of organic matter, and nutrient uptake by plants. Protozoa also contribute a significant role to the purification of water bodies by consuming bacteria and organic particles. Therefore, accumulation of heavy metal contamination can compromise this purification function by reducing protozoan abundance and diversity, potentially leading to the accumulation of pathogens and pollutants in water. Finally, heavy metal pollution poses a significant threat to the biodiversity and ecological functions of protozoa.

Keywords: Protozoa, Heavy metals, Biodiversity, Ecosystem, Pollution

2nd UMYU Conf/2024/228

ISOLATION AND IDENTIFICATION OF FUNGI IN CULTIVATED AND UNCULTIVATED SOIL

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ABSTRACT

Soil fungi are the most important part of the terrestrial ecosystem and it plays a major role in nutrient cycle as decomposers. The diversity of soil fungi indicates the good or defective condition of the soil health. The work was aimed to study the isolation and identification of fungi in cultivated and uncultivated soils in Northwestern Nigeria in terms of its morphological and microscopic characteristics, percentage frequency and its relationship with physicochemical properties. The soil samples were collected from 2 different locations of cultivated and uncultivated soils randomly from 0-15cm depth after removing the surface soil for the isolation of fungi. Soil dilution method and PDA media was used for isolation. A total of 8 different fungal species were isolated by using relevant literature. The identified species are *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus fumigatus*, Fusarium spp, Mucor spp, Penicillium spp, Rhizopus spp and Trachoderma spp. *Aspergillus niger* were the most dominant species with 26% relative frequency, followed by Fusarium spp and Rhizopus spp with relative frequency of 18% and 17% respectively. The least abundance of the fungi isolated was *Aspergillus fumigatus* with 2%. Alternatively, the highest (32%) were isolated from L1 cultivated soil which was closely followed by L2 uncultivated soil (31%) and the least was from L2 uncultivated soil (16%). Physicochemical analysis reveals that soils are rich in mycoflora due to basic pH of 7.12-9.15, rich in organic matter and optimum moisture content. The soil which has large amount of organic matter due to the accumulation of more organic litter, moist deciduous vegetation, neutral and alkaline soil pH holds a good amount of moisture content and harbor a good qualitative and quantitative mycoflora in the soil for the purpose of recycling dead organic matter thus, making them available for the next generation.

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CHARACTERIZATION OF TWO BACTERIAL SPECIES DEGRADING DRILLING FLUID FROM CONTAMINATED SOIL WITHIN VERITAS UNIVERSITY, ABUJA, NIGERIA.

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ABSTRACT
A circulating fluid that is utilized in rotary drilling to carry out any or all of the several tasks necessary for drilling operations is known as a drilling fluid. Environmental management and industrial operations like oil and gas drilling are becoming more and more integrated globally. In comparison to other remediation approaches, biodegradation by naturally occurring populations of microorganisms is the most cost-effective and environmentally safe method of removing petroleum and other hydrocarbon contaminants from the environment. The research study characterized bacterial species capable of degrading drilling fluids. Mineral salt medium was used for the isolation of the bacteria species following Standard procedures. Result from the plate count showed colony forming unit ranging from 1.40 $x10^{-3}$ to 1.75 $x10^{-3}$ CFU (1.60 $x10^{-3}$, 1.75 $x10^{-3}$, 1.40 $x10^{-3}$, and 1.70 $x10^{-3}$ respectively for each batch). The molecular characterization of the isolates was carried out by sanger sequencing and the result revealed the isolates to be bacterial species; *Klebsiella pneumoniae* and *Cronobacter sakazakii*. *Klebsiella pneumonia* has the highest occurrence rate (68%) of growth while *Cronobacter sakazakii* has an occurrence (32%) percent for all batches of contaminated soil samples examined. **Keywords**: Bacteria, drilling fluids, soil, biodegradation, Abuja.

2nd UMYU Conf/2024/230

ANTIBACTERIAL ACTIVITY OF AQUEOUS AND ETHANOLIC STEM EXTRACTS OF *Jatropha tanjorensis*

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ABSTRACT
Man has relied on plants for food, medicine, and animal feed for ages. Even with the advent of numerous synthetic medications and dietary supplements, plants are still thought to be important for maintaining both human and animal health and welfare. This work aimed at assessing the antibacterial activity of *Jatropha tanjorensis* aqueous and ethanolic stem extract against *staphylococcus aureus* and *Pseudomonas aeroginosa*, in order to highlight its therapeutic potentials with a view to integrate it into conventional medical use. Antibacterial tests were carried out on the aqueous and ethanol extracts using the agar well diffusion method, Mueller-Hinton agar medium was used to test the bacterial isolates after it was prepared according to manufacturer's instruction. The sterilized media were seeded with 0.1ml of the standardized inoculums of the test microbe; the inoculum was spread evenly over the surface of the medium using a sterile swab stick. Standard wells were made in each of the plates with a sterile 6.0 mm diameter cork-borer. Using a sterile dropper, 0.1 ml of each of 100 mg/ml concentration of the extracts were dispensed into each corresponding well, made in the plates. A well containing

ciprofloxacin (500mg) was made in each of the plates seeded with the bacteria, as a reference drug. The plates were allowed to stand for 1 h for the pre diffusion of the extract to occur. The plates were incubated at 37°C for 24 h. The plates were observed and the presence of zones of inhibition around the wells were measured and taken as an indication of antimicrobial activity. The present finding has thus provided a clue for the antibacterial activity possessed by *J. tanjorensis* stem extract. Based on the findings of this work, future study on the phytochemistry and chemical constituents in relation to certain other biological activities are required to fully understand the phytochemical and complex pharmacological effect of the plant species.

Keywords: *Jatropha tanjorensis, Antibacterial activity, Staphylococcus aureus, Pseudomonas aeroginosa.*

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ASSESSMENT OF HEAVY METALS CONCENTRATION IN COMMONLY CONSUMED VEGETABLES CULTIVATED NEAR MINING SITE IN TORO LOCAL GOVERNMENT AREA OF BAUCHI STATE

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ABSTRACT
This investigation was conducted in the Toro Local Government Area of Bauchi State, Nigeria, an area known for its diverse agricultural activities including the utilization of water from mining-induced holes for irrigation. The primary objective was to assess the concentrations of heavy metals in vegetables grown in this region, given the potential health risks associated with heavy metal accumulation in edible vegetables. The study focused on five types of vegetables: *Amaranthus*, Onion, Cabbage, Pepper, and Tomato, which were collected from different distinct sampling zones. Following comprehensive decontamination protocols for all laboratory equipment, the vegetables underwent preparation and analytical procedures to quantify the content of heavy metals (Cu, Cr, Co, Fe, Mn, Ni, Pb, and Cd). The method of acid digestion utilized a mixture of nitric acid (HNO_3) and perchloric acid ($HClO_4$), which is recognized for its efficacy in breaking down organic material to ensure the complete dissolution of target metals. The digested samples were then subjected to Atomic Absorption Spectroscopy (AAS) for the detection and quantification of the heavy metals. This technique is noted for its precision in measuring trace elements within samples. Results from the analysis indicated varying levels of heavy metals across the vegetable samples. Noteworthy findings include the elevated levels of chromium (Cr) in cabbage (4.316±0.0010 PPM) and lead (Pb) in pepper (4.900±0.0018 PPM). These results suggest potential health risks for the local populace consuming these vegetables. This study underscores the importance of regular monitoring of heavy metal concentrations in agricultural products and the implementation of safer irrigation practices, aiming to mitigate health risks associated with heavy metal exposure in the Toro region.

Keywords: Heavy metals, Vegetables, Katsina

2nd UMYU Conf/2024/232

UNVEILING NITROGEN CYCLING DYNAMICS THROUGH BIOGEOCHEMICAL AND MOLECULAR PERSPECTIVES (A REVIEW)

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ABSTRACT
This review examines nitrogen cycling dynamics in the ecosphere, particularly in environmental samples. Nitrogen pollution from agricultural runoff, industrial discharges, and wastewater effluents has significant implications for nitrogen transformation pathways and water quality, including eutrophication. Understanding the roles of microorganisms, biogeochemical characteristics, and environmental factors in nitrogen cycling is crucial for ecosystem management. The objective of this review is to highlight key nitrogen cycling processes, including nitrification, denitrification, DNRA, anammox, feammox, and sulfammox, and emphasize the influence of microorganisms on these processes. Additionally, the review explores the use of metagenomic techniques to analyze the genetic diversity and functional potential of microorganisms involved in nitrogen migration and transformations. Through an extensive literature review, it is evident that microorganisms, particularly through nitrification, play a central role in mediating nitrogen cycling processes. The composition and functional diversity of microbial communities significantly impact nitrogen transformation rates and efficiency. Metagenomics is a valuable tool for comprehensively studying microbial communities and understanding their role in nitrogen cycling. The results underscore the importance of integrating metagenomic approaches, conducting field studies and indoor experiments, and employing modeling techniques to assess the impacts of environmental changes on nitrogen dynamics. These approaches enhance our understanding of nitrogen cycling in environmental samples and its implications for ecosystem functioning.

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ANTIBACTERIAL POTENTIAL OF *Eucalyptus camaldulensis* AND MOLECULAR DOCKING ANALYSIS AGAINST MULTI-DRUG RESISTANT *Staphylococcus aureus*

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ABSTRACT
Antimicrobial resistance (AMR) is a huge threat against the public heath sphere and is a major cause of global mortality and morbidity. Antibiotics misuse and overuse have led to the development of many resistant bacterial strains. One particular bacteria of concern are multi-drug

resistant *staphylococcus aureus* which is the most common resistant bacteria in humans. Antibiotic development has been unable to keep up with the rapid evolution of antibiotic-resistant organism, and there is an urgent need to identify alternative agents to combat this problem. This study is aimed at testing the efficacy of antibacterial activity and molecular docking analysis of *Eucalyptus camaldulensis* extracts against multi-drug resistant *Staphylococcus aureus*. *Eucalyptus camaldulensis* extracts were tested against the test organism by using the agar diffusion technique. GC-MS analysis of *Eucalyptus camaldulensis* was conducted to determine bioactive compounds Agar plate wells was used for susceptibility testing. Molecular docking was carried out to estimate the effect of *Eucalyptus camaldulensis* against multi-drug resistant *Staphylococcus aureus* using HPPK protein. The results reveal in the inhibition zone of 6.00mm, 7.00mm, 8.00mm, 10.00mm, and 14.00mm respectively. This study highlights the impacts of *Eucalyptus* phytochemicals on *Staphylococcus aureus* HPPK. Eleven (11) *Eucalyptus* phytochemicals compound was retrieved and their inhibitory interactions was examined with HPPK. Results obtains from this study revealed four (4) compounds with desirable pharmacokinetic properties were selected and these compound are considered as suitable prospective inhibitors against HPPK.

Keywords: Multidrug resistant, Molecular docking, in-silico, drug discovery, bioactive compounds.

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ANTIBACTERIAL ACTIVITY OF METHANOL EXTRACT OF *Salvadora persica* (Linn) STEM AGAINST GRAM POSITIVE BACTERIA ISOLATED FROM ORAL INFECTIONS

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ABSTRACT

Salvadora persica L. also known as Miswak is a commonly use oral hygiene tool popularly referred to as chewing stick. The aim was to determine the antibacterial activity of *S. persic*a methanol crude extract against gram positive bacteria isolated from orally infected patients attending the University Health clinic of Ahmadu Bello University. 20 samples were collected from patients with oral infection. These were analyzed using standard microbiological and biochemical procedures. Antibiotic susceptibility test was performed using Kirby–Bauer disc diffusion method and results were interpreted using CLSI guidelines. ***Salvadora persica* L** was extracted using cold maceration with methanol. The crude extract was tested using agar well diffusion and Broth dilution methods. Phytochemical screenings were carried out using standard methods. From the results, ***Staphylococcus aureus*** was found to be the most prevalent with 60%, **then *Streptococcus sp*. 10%.** High resistance was observed against amoxicillin (100%), chloramphenicol (85%), ciprofloxacin (60%), ceftriaxone (50%), gentamycin (47.5%). Cold maceration extraction revealed 11.59% yield of crude extract. The phytochemical constituents were identified as saponin, tannin, alkaloid, flavonoid, phenol, cardiac glycoside, carbohydrate, steroid and terpenoid. A significant activity was observed with 18-22mm Zone of inhibition and 25mg/ml MIC. The methanolic extract of ***Salvadora persica* L.** had significant activity against **gram-positive bacteria isolated from orally infected patients** with 18-22mm Zone of inhibition and 25mg/ml MIC.

Keywords; Gram-Positive Bacteria**,** Oral infection, Antibacterial

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PHYTOPLANKTON DENSITY IN RELATION TO PHYSICO-CHEMICAL PARAMETERS OF MAIRUA RESERVOIR KATSINA STATE, NIGERIA

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ABSTRACT
The study on phytoplankton population in relation to physico-chemical parameters of Mairua reservoir, Katsina state was carried out from May 2013 to April 2014 to establish physical, chemical, and biological parameters of Mairua reservoir. Four sampling stations were chosen; the physico-chemical and biological parameters were determined using standard methods and procedures. The result revealed that; Water temperature (25.02 ± 0.17^{0}C), pH (7.54 ± 0.03), Alkalinity (3.69±0.09), Conductivity (129.43 ± 5.15µS/cm), Total Dissolved Solids (50.54 ± 0.57mg/L) Nitrate-nitrogen (0.21 ± 0.04mg/L), Water Hardness (134.44 ± 3.06mg/LCaCO3), Dissolved Oxygen (3.98 ± 0.10mg/L), Biochemical Oxygen Demand (2.53 ± 0.08mg/L), Phosphate-phosphorus (0.19 ± 0.02mg/L), Chloride (5.09 ± 0.15mg/L), Sulphur-sulphate (0.21± 0.01) and Calcium (2.97±0.06mg/L) varied with months and seasons. Analysis of variance indicated significant difference between seasons ($P < 0.05$); but no significant difference in phytoplankton distribution and abundance among the four stations ($P>0.05$). The result indicated phytoplankton percentage composition as; Chlorophyta (57.66%), Bacillariophyta (25.70%), Cyanophyta (14.73%), and Dinophyta (1.91%). Water quality of the reservoir is influenced by anthropogenic activities, the reservoir water is suitable for irrigational and domestic purposes from the results of most of the physico-chemical and biological parameters obtained. Hence, there is need for an effective anthropogenic inputs control programme in the reservoir.

Keywords: Physico-chemical parameters; Phytoplankton population; Gwaigwaye reservoir.

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NEURO-PROTECTIVE CONDITIONS IN ANTICIPATION TO PHYTOCHEMICALS PROPERTIES OF MEDICINAL HERBS AND DIETARY SOURCES

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ABSTRACT
Many neuropsychiatric and neurodegenerative disorders, such as anxiety, cerebrovascular impairment, depression, seizures, Alzheimer's disease, Parkinson's disease, etc. are predominantly appearing in the current era due to the stress full lifestyle. Treatment of these disorders with prolonged administration of synthetic drugs will lead to severe side effects. However, in the recent years, scientists have focused the attention of research towards phytochemicals in curing neurological disorders. Nootropic herb refers to the medicinal role of various plants/parts for their neuroprotective properties by the active phytochemicals including alkaloids, steroids, terpenoids, saponins, phenolics, flavonoids, etc. Phytocompounds from medicinal plants play a major part in maintaining the brain's chemical balance by acting upon the function of receptors for the major inhibitory neurotransmitters. Medicinal plants viz. *Panax ginseng*, *Valeriana officinalis*, *Ginkgo biloba* and *Nardostachys jatamansi* have been used widely in a variety of traditional systems of

therapy because of their adaptogenic, psychotropic and neuroprotective properties. This review highlights the importance of phytochemicals on neuroprotective function and other related disorders, in particular their mechanism of action and therapeutic potential.

Keywords: Synthetic drugs, Phytochemicals, Nootropics, Dietary sources Medicinal herbs.

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BIOACCUMULATION OF CADMIUM IN SOME FRESHWATER FISHES OF MAIRUA RESERVOIR FUNTUA, NORTH-WESTERN NIGERIA

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ABSTRACT
This study explores Cadmium (Cd) as one of the most toxic heavy metal found in certain aquatic organisms. Cadmium intake by fish has serious implications. Metal pollution from multifarious sources has adverse effects on aquatic ecosystems. In aquatic systems, Cd is most readily absorbed by organisms directly from the water in its free ionic form. In many contaminated situations with heavy metals, Cd has become an important element of concern because of its bioaccumulative nature in food webs. Therefore, fish living in polluted waters tend to accumulate heavy metals in their tissues. To assess the influence of Cd on freshwater fish, this review briefly addresses the Cd emission sources, uptake and impacts of Cd on freshwater fish and bioaccumulation nature of Cd by emphasizing the Cd accumulation affinity in freshwater fish tissues. However, metal accumulation primarily depends on waterborne and dietary pathways. It shows a relationship of Cd level in fish tissues with the age and size of fish. Some species of fish show the highest Cd accumulation in the liver while others in kidneys and gills. Accumulation of Cd by the body muscles is always reported as comparatively low. Cd in freshwater environments results biological and environmental implications by changing reproductive and physiological behaviors of freshwater fishes and abilities which ultimately affect environmental state and biodiversity of the ecosystem.
Keywords: Heavy metals, food web, accumulation, dietary pathways, muscles

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IN VITRO ANTI-TRYPANOSOMAL ACTIVITY ASSESSMENT OF ETHYL ACETATE EXTRACT OF ENDOPHYTIC FUNGI ISOLATED FROM *Psidium guajava* Leaf

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ABSTRACT
Endophytic fungi are found in the tissues of higher plants and they produce bioactive compounds used in many agricultural, pharmaceutical and food industries. This study was undertaken to asses the *in vitro* antitrypanosomal activitiy of endophytic fungi isolated from the leaves of *Psidium guajava.* Following surface sterilization, the plant parts were placed in potato dextrose agar (PDA) to initiate fungal growth. Hyphae and spores of distinct fungal growth were further sub-cultured in sabouraud dextrose broth. Pure fungal isolates were obtaind using standard

microbiological methods. Each fungal isolate was subsequently grown in a 500ml Erlenmeyer's flask containing 100ml of liquid broth (pH 5.6) for 7 days at 28°C at 220 rpm in an incubator shaker. The respective fungal growths were filtered from the broth, air dried, weighed and stored in well labelled airtight containers. Ethyl acetate was used for extraction. The extract was screened for its phytochemical constituents and evaluated for its *in vitro* anti-trypanosomal activitiy using standard methods. Three endophytic fungi were isolated namely *Penicillium sp., Aspergillus niger,* and *Mucor racemosus.* The phytochemical analyses revealed the presence of alkaloids, flavonoids, phenols, tannins, steroids, terpenoids, anthraquinone, cardiac glycoside, and phlobatannins. The *in vitro* result showed that the activity of ethyl acetate extract of the endophytic fungi was highly effective against *Trypanosoma brucei brucei* and the activity was concentration dependent ranging between 0.15 and 10.0 mg/ml with median lethal concentration (LC_{50}) of 0.303 mg/ml respectively.

Keywords: Endophytic Fungi, *Psidium guajava, Trypanosoma brucei brucei*

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IDENTIFICATION OF SOIL INHABITING BACTERIA IN BATURIYA WETLAND, HADEJIA, JIGAWA STATE

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ABSTRACT

A study was carried out to identify bacterial communities inhabiting the soil of Baturiya wetland, Hadejia, Jigawa state. Line transect was used to demarcate the study area randomly. The soil samples were collected using auger from four different sites to represent horizontal distribution and from a depth of 25 cm in each site to represent vertical distribution and transported to the laboratory for bacterial analyses using standard procedures. Serial dilution technique and streaking method were used to inoculate the samples on Nutrients Agar plates and incubated for 24 h at 32 ^{o}C. Colonies observed were identified using gross morphology, Gram staining reaction and biochemical tests were used for the identification and characterization of the microorganisms. Bacterial counts determined using colony counter. Data obtained for bacterial counts was analyzed using Analysis of Variance with Duncan's New Multiple Rage Test used to separate significant means at 5% level. The result obtained revealed significant difference ($P \leq 0.05$) in the bacterial loads present in the four study sites. The result showed high bacterial loads (1.64×10^6 cfu/g) in areas adjacent to the water bodies with high amount of debris. Five bacterial species were identified as follows: *Bacillus cereus, Bacillus thuringiensis, Escherichia coli, Klebsiella pseudomonas* and *Proteus vulgaris* The result implies that the conservation status of the area is at risk as most decomposers were found deep inside the soil as the distribution is related with variations in organic carbon, clay content, and soil water characteristics at the field scale.

Keywords: Bacteria, Baturiya wetland, Hadejia, Soil

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IDENTIFICATION OF FUNGAL COMMUNITY ASSOCIATED WITH ORANGE AND BANANA FRUITS SPOILAGE IN ABAJI MARKET, ABUJA, NIGERIA

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ABSTRACT

A research was carried out to isolate and characterize the fungal community responsible for the spoilage of orange (*Citrus sinensis*) and banana (*Musa paradisiaca*) fruits vended in Abaji market, Abuja, Nigeria. Samples were collected randomly aseptically in sterile polybags. The samples were surfaced sterile and the homogenates were cultured on Potato Dextrose Agar (PDA) and incubated at 28 ^{o}C for 5 days. The pure cultures obtained were identified morphologically using high and low resolution objectives of a microscope. Data obtained for fungal enumeration was analyzed using Analysis of Variance, with Least Significant Difference used to separate significant means at %% level. Prevalence was determined using frequency and percentages. The result obtained revealed the presence of six fugal species associated with the spoiled fruits: *Aspergillus niger*, *Aspergillus flavus*, *Rhizopus stolonifer*, *Mucor mucedo*, *Fusarium oxysporum* and *Saccharomyces cerevisiae* in orange while with the exception of *Fusarium oxysporum*, *Rhizopus oryzae* was found in banana. *Aspergillus niger* had the highest fungal count of $1.7x10^6$ CFU/g and $1.0x10^6$ CFU/g in orange and banana respectively. *Saccharomyces cerevisiae* had the least count of $4.8x10^5$ CFU/g in orange while *Rhizopus oryzae* had the least count of $3.1x10^5$ CFU/g in banana. The most predominant fungal species found in the fruits are *Aspergillus niger* and *Rhizopus stolonifer*. The pathogenicity test showed that *Rhizopus stolonifer* and *Aspergillus niger* induce the highest spoilage portions on banana.

Keywords: Abaji, Banana, Fungi, Orange.

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BACTERIOLOGICAL ASSESSMENT OF SLICED-PINEAPPLE, PAWPAW AND WATERMELON FRUITS VENDED IN SOME MARKETS WITHIN KANO METROPOLIS, KANO STATE

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ABSTRACT

Sliced street vending fruits are cheaper, affordable and consumed by a lot of people but the safety of such fruits are not ascertained. This study aims at assessing the presence and microbial counts of pathogenic bacterial flora present in such fruits (Pineapple, Pawpaw ad Watermelon). The samples were obtained from three different markets within Kano metropolis and transported aseptically to the laboratory in sterile poly bags for bacteriological analyses. Serial dilution technique was carried out for sample prepared in buffered peptone water and inoculated onto Nutrients agar and MacConkey agar plates and incubated for 24 h at 32^{o}C. Sub-cultures were made and colonies formed were counted and identified by their gross morphology, Gram staining

reactions and biochemical tests. Data obtained for bacterial counts was analyzed using Analysis of Variance with Duncan's New Multiple Rage Test used to separate significant means at 5% level. The result obtained revealed significant difference ($p \leq 0.05$) in the bacterial loads present in the fruits. Highest bacterial load of $1.3x10^6$ CFU/ml was found in sliced pawpaw. Eight different bacterial species were isolated and identified as: *Bacillus subtilis* (7.2%), *Escherichia coli* (21.6%), *Salmonella typhi* (15.8%), *Staphylococcus aureus* (31.2%), *Streptococcus spp*. (3.4%), *Proteus mirabilis* (2.6%), *Pseudomonas aeruginosa* (16,5%), and *Vibrio cholerae* (1.7%). The result inferred that people consuming such fruits are at risk of several clinical symptoms as almost all the bacterial species identified were pathogenic. Attention of the authorities is urgently needed to address the issue via proper monitoring and evaluation of the hygienic practices in the process of handling such fruits.

Keywords: Bacteria, Fruits, Markets, Pawpaw, Watermelon

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Extraction and Application of Dye Obtained from Turmeric (*Curcuma longa*) as Alternative Counter Stain in Gram Reactions

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ABSTRACT
A study was carried out to investigate the efficacy of dye obtained from turmeric (*Curcuma longa*) as alternative stain in gram staining reactions. Ethanolic and aqueous extracts were formulated from the dye extracted from the turmeric rhizome into different staining solutions of different concentrations (2 mg/ml, 4 mg/ml. 6 mg/l and 8 mg/ml) with neutral red, safranine and dilute carbol fuchsin as positive controls. These staining solutions were used to stain known Gram positive and Gram negative bacterial isolates using Gram staining technique. The result obtained revealed that all the extracts exhibit staining ability as counter stains in gram reactions with ethanolic fractions at 8 mg/ml showing the better staining reaction. **Keywords**: Dyes, Gram Reaction, Stains, Turmeric

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PREVALENCE OF GASTRO-INTESTINAL HELMINTHS IN SLAUGHTERED CATTLE FROM ZARIA, KADUNA STATE

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ABSTRACT
A research was conducted to determine the prevalence of gastro-intestinal helminths in slaughtered cattle at some abattoirs in Zaria, Kaduna state. The standard Sedimentation and floatation technique was used to examined the fecal samples collected from forty cattle of various age and gender for a period of six weeks. Six different gastro-intestinal helminth parasites were identified as follows: *Fasciola gigantica* (39.7%), *F. hepatica* (11.8%), *Oesophagastomum*

radiatum (26.4%), *Schistosoma bovis* (5.3%), *Monezia expansa* (9.4) and *Dicrocoelium hospes* (7.4%). *Fasciola gigantica* is the most predominant helminth parasite among the slaughtered cattle with 39.7% abundance. The result showed that the prevalence of the parasites increased with gender and age as the males are more vulnerable due to their ability to graze far and wide than the females. A prevalence rate of 36.33% was recorded among the male cattele and 24.76% among the females. It is recommended that, beep from cattles should be well cooked before consumption.

Keywords: Cattle, Gastro-intestinal, Helminths, Zaria.

2nd UMYU Conf/2024/244

SPECIES COMPOSITION AND RELATIVE ABUNDANCE OF ZOOPLANKTONS IN ZOBE RESERVOIR DUTSIN-MA KATSINA STATE, NIGERIA

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ABSTRACT
The present study on species composition and abundance of zooplankton in Zobe reservoir was carried out between May 2017and April 2018 for a period of twelve months. Zooplankton samples were collected from four different sampling stations in the morning between the hours of 6-10am. Standard procedures were used to determine monthly species composition and abundance of zooplankton. Zooplankton classes identified included Cladocera, Copepoda, Protozoa, and Rotifers. The Class Copepoda has the highest percentage composition 348 (39.42%) with six species identified, while Protozoa 110 (14.45%) has the least percentage composition. Species counts were more abundant in rainy season 685 (77.58%) than in dry season 197 (22.48%). Simpson's and Shannon diversity index revealed more zooplankton in wet season. The reservoir has high species of zoooplankton, which may be due to high levels of nutrients and other farming activities taking place around the reservoir. However, the presence of bloom producing species such as acanthometron sp. is an indication that the reservoir is undergoing gradual detoriation in water quality.

Keywords: Zooplankton, Reservoir, Copepoda, Zobe, Dutsinma, Nigeria

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OCCURRENCE OF PLANT GROWTH PROMOTING BACTERIA IN THE ENDOSPHERE OF *Vigna unguiculata* WALP.

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ABSTRACT
Food security has become a topical issue in Nigeria recently and also across the globe. Sustainable agriculture has been described as key in attaining food security worldwide. As a result, biofertilizer has been identified as a major driving-force for sustainable agriculture due to its efficacy, cost effectiveness and environment friendliness. In this study, the endosphere of *Vigna unguiculata* Walp., commonly known as cowpea, was explored with a view to isolating

endophytic bacteria with the potential to promote plant growth. Fifteen endophytic bacterial strains were isolated from the roots of *V. unguiculata* and identified and their their plant growth-promotion (PGP) traits characterized. Among the isolated strains, *Buttiauxilla agrestis* EB14 emerged as a prominent performer, expressing a comprehensive suite of PGP traits, including production of cellulase, pectinase, ammonium; and phosphate solubilization, along with high secretion of siderophores and indole-3-acetic acid (IAA). Notably, this strain demonstrated an solubilization efficiency index of 128.6 and an IAA index of 4.0, showcasing its potential as a potent biofertilizer candidate. Furthermore, *Enterococcus saccharolyticus* EB3, EB13, EB15, and *Cellulomonas endophytica* EB1 also displayed desirable PGP traits, contributing to the enhancement of plant growth. However, *Paenibacillus polymyxa* EB7 and *Lysinibacillus endophyticus* EB8 were found to lack PGP traits studied. These findings underscore the rich diversity of endophytic bacteria associated with *V. unguiculata* and highlight their potential applications in sustainable agriculture and biofertilizer development.

Keywords: *Vigna unguiculata*, Sustainable agriculture, Biofertilizer, Endophytic bacteria, Plant growth promotion

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ASSESSMENT OF BACTERIA ASSOCIATED WITH SOME SURGICAL INSTRUMENTS IN GENERAL HOSPITAL DUTSIN-MA, NORTHWESTERN NIGERIA

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ABSTRACT

Bacteria can be associated with surgical instruments through a variety of mechanisms, which could potentially pose risks to patients undergoing surgical procedures. The presence of such bacteria on surgical instruments could lead to surgical site infections (SSIs), a serious complication that may result in extended hospital stays, additional medical treatments, and increased healthcare costs. The aim of this study was to assess the prevalence of bacteria on surgical instruments at General Hospital Dutsin-Ma, Nigeria and to evaluate their antibiotic susceptibility profile. A total of twenty (20) samples of instruments were collected from surgical instruments at the Surgery Department of the Hospital Dutsin-Ma using sterile cotton swab sticks. The samples were then analyzed using standard bacteriological procedures. Results showed a total of five (5) bacteria isolates were obtained from the analyzed samples. Out of the 5 bacterial isolates, *Escherichia coli* and *Pseudomonas aeruginosa* had the highest prevalence (33%), followed by *Staphylococcus aureus* (29%), *Klebsiella pneumonia*e (17%), while *Bacillus* species had the least prevalence (13%). Of all the surgical instruments used in the study, scissors happened to have highest bacterial contamination (27%), followed by forceps, while clamps had the least prevalence (12.4%). The result of antibiotic susceptibility testing carried out using the modified Kirby Bauer disk diffusion method revealed that Vancomycin was the most effective antibiotic with the susceptibility rate of 78% followed by Gentamicin (67.7%). The ampicillin antibiotic was, however, found to most resisted drug in the study (84.2%), followed by amoxicillin (73%), and finally the nalidixic acid (68.6%). It was concluded that there is high prevalence of bacteria on surgical instruments at General Hospital Dutsin-Ma, Katsina, Nigeria, and that surgical instruments should be regarded as a possible source of nosocomial infections since bacteria from them could be carried from the hands of surgeons to the patient (s) undergoing surgery or through re-dispersed bacteria from surfaces during surgery. Therefore, surgical procedures to prevent cross contamination of instruments, such as proper handling and decontamination, are highly encouraged.

Keywords: Surgery, Instruments, Bacteria, Surgical Site Infections, Contamination.

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ANTIBACTERIAL ACTIVITY OF *Ziziphus jujube* LEAF EXTRACT AGAINST *Streptococcus pneumonia* AND *Salmonella Species*

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ABSTRACT
Ziziphus jujube is widely distributed in both tropical and subtropical countries. Different parts of the plant have been used traditionally for several biological purposes including fungal, antibacterial and antidiarrheal treatments. The antibacterial activity *of Ziziphus jujube* can be attributed to its bioactive compounds such as tannins, saponins, terpenoid and phenolic compounds. The aim of this study was to investigate the antibacterial activity of *Ziziphus jujube* leaf extract against *Streptococcus pneumonia* and *Salmonella species*. The result of phytochemical screening shows that tannins, phenols, saponins, quinines, terpenoids, steroid were present in ethanolic extract while alkaloid, glycoside and phytosteroid were absent in ethanolic extract. The results of phytochemical also indicated that Tannins, saponin, phenols, steroids, phytosteroid, terpenoid were present in aqueous extract while alkaloid, glycoside, Quinines were absent in aqueous extract respectively. The extract of the leaf of this plant at all concentration (500,250,125 and 62.5mg/ml) exhibited antibacterial activity against the test isolates. The response of *Streptococcus pneumonia* and *Salmonella species* shows that the leaf extract of *Ziziphus jujube* can be a very good source of antibacterial drug against the test isolates.

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ANALYSIS OF THE ANTIBACTERIAL STRENGTH OF MASQUERADE PLANT AGAINST *Staphylococcus aureus* AND *Escherichia coli*

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ABSTRACT
The masquerade plant, scientifically known as *Polyalthia longifolia*, is a tropical evergreen plant that holds cultural and medicinal importance in Nigeria. The study is aimed at analyzing the antibacterial strength of masquerade plant leaves against *Staphylococcus aureus* and *Escherichia coli* by disc diffusion method, to determine the phytochemical constituents of the aqueous and ethanolic extracts of the leaf using phytochemical analysis and also to compare the susceptibility of *S. aureus* and *E. coli* to the plant extract. Photochemical analyses of the leaf extract of as *Polyalthia longifolia* revealed that the leaves of this plant has alkaloids, anthraquinone, phenols acid and saponins while flavonoids and Steroids were absence. The results of the antibacterial screening for aqueous and ethanolic extract of the plant indicated that the plant exhibited antimicrobial activities for both ethanol and aqueous extract with Minimum inhibitory concentration and Minimum bactericidal concentrions of 100mg/ml. The study recommends that plant leaves of masquerade plant can be used in the preparation of medicinal drug for treatment of bacterial infections especially the ones caused by *Staphylococcus aureus* and *Escherichia coli*.

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ENHANCING PEARL MILLET GROWTH: SYNERGISTIC EFFECTS OF RHIZOSPHERE BACTERIA AND ARBUSCULAR MYCORRHIZAL FUNGI

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ABSTRACT
The escalating global population presents a pressing challenge for food security, necessitating increased agricultural productivity. However, conventional agricultural practices reliant on chemical fertilizers pose environmental and health risks. This study aimed to isolate and characterize rhizosphere bacteria and arbuscular mycorrhizal fungi (AMF), evaluating their synergistic effects on pearl millet (*Pennisetum glaucum* L.) growth. A pot experiment was conducted using soil from the University of Maiduguri farms, employing a randomized complete block design with four treatments and three replicates. Plant growth parameters including height, stem girth, leaf number, and leaf area were monitored and the data obtained were analyzed using one-way ANOVA. A total of ten soil samples from healthy *Arachis hypogaea* L. plants and their root nodules were collected from University of Maiduguri farms and processed using culture-dependent method. Sixteen rhizosphere bacteria belonging to five strains of *Rhizobium* spp., *Bradyrhizobia* spp., *Azotobacter* spp., *Bacillus* spp., and *Pseudomonas* spp. were isolated and identified. Among these, *Azotobacter* sp. SF5b exhibited the highest plant growth-promoting activities and was selected for further experimentation. Arbuscular mycorrhizal fungi were extracted from rhizosphere soil samples of *Fadherbia albida*, revealing the presence of *Glomus* and *Acaulospora* species. Spore counts ranged from 23 to 62 per 100g of soil, indicating widespread colonization. Significant differences were observed among treatments, with dual inoculation of AMF and Azotobacter showing superior growth promotion compared to other treatments ($P<0.05$). This underscores the potential of combined AMF and *Azotobacter* inoculation in enhancing pearl millet growth. The application of AMF in conjunction with *Azotobacter* represents a promising strategy for improving pearl millet productivity. This research highlights the importance of sustainable agricultural practices in meeting the challenges of food security amidst increasing global population pressures.

Keywords: Arbuscular mycorrhizal fungi, Biofertilizer, Pearl millet, Rhizosphere bacteria, Growth promotion.

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EFFECT OF DE-BITTERING METHODS ON THE PHYTOCHEMICAL AND ANTINUTRITIONAL CONTENTS OF BITTER LEAF (*Vernonia Amygdalina* Del.)

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ABSTRACT
The study investigated the effect of de-bittering methods on the phytochemical and antinutritional contents of bitter leaf (*Vernonia amygdalina* Del.). The processing methods used were washing and squeezing (Method 1), washing and boiling (Method 2), washing and addition of salt (Method 3), washing and addition of potash (Method 4), and washing and addition of palm oil (Method 5). Qualitative phytochemical screening revealed the presence of flavonoids, alkaloids, and cardiac glycosides across all processing methods, while tannins, saponins, and cardia

glycosides varied in abundance. The results further showed that Method 2 was high in flavonoid and alkaloid, Method 3 was high in cardiac glycoside, Method 4 was high in flavonoid and cardiac glycoside, Method 5 showed a medium presence of flavonoid and cardiac glycoside while in Method 1 absence of tannins and saponin were observed but flavonoid, alkaloid and cardia glycosides were present. The choice of processing method significantly influenced the content and activity of these natural compounds. However, the results obtained for the antinutrient shows that there is significant difference ($p \leq 0.01$) for Nitrate, tannin, cyanide and oxalate percentages. Nitrate, tannin and cyanide percentage (6.3±0.6), (0.6±0.2 and 0.73±0.1) were recorded respectively while phytate and oxalate were recorded as (0.01±0.02 and 0.001±0.0002) respectively. Therefore, it was recommended that further research and investigation should be conducted to evaluate the specific implications of these findings in the context of the studied substances and their potential effects on human health.

Keywords: De-Bittering, Phytochemicals, Anti Nutritional and Bitter Leaf

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BACTERIOLOGICAL PROFILE, ANTIBIOGRAM AND RISK FOR CROSS INFECTION ASSOCIATED WITH FOMITES: A STUDY OF PUBLIC TOILETS WITHIN KATSINA METROPOLIS

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ABSTRACT
Public toilets serve as potential reservoirs for various pathogenic bacteria, contributing to the risk of cross-infection among users. A total of 4 swab samples each from 24 public toilets in major markets of Katsina metropolis were sampled. The samples were processed using standard microbiological protocols to determine bacterial load, identify isolates, and multiple antibiotic resistant patterns. The bacterial contamination level were consistent across all 24 sampling points ranging from 4.5×10^4 to 6.8×10^5. Door handles and faucet handles exhibited highest level of contamination. Among the six different bacterial groups identified *E. coli* and Salmonella sp. were the most prevalent with 31.5% and 26.7% respectively. The test isolates exhibited a varied levels of antibiotic resistance with the highest resistance observed against Ampicillin (76.2%) and least against cefuroxime (42.7%). Among the test isolates twenty antibiogram patterns were identified. A majority of bacteria (59.8%) were linked to MAR index values exceeding 0.8. This study revealed potential risk for cross infection in public toilets with drug resistant pathogenic bacteria of high MAR indices characteristics.

Keywords: Public toilet, Cross infection, Fomite, Katsina

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ARBUSCULAR MYCORRHIZAL FUNGI AS SUSTAINABLE ALTERNATIVES TO CHEMICAL FERTILIZERS IN MAIZE CULTIVATION

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ABSTRACT
Arbuscular mycorrhizal fungi (AMF) are ubiquitous commonly found in symbiosis with over 90% of plant species. AMF play a pivotal role in facilitating nutrient uptake, including phosphorus, nitrogen, sulfur, and micronutrients, from the soil, thus contributing to plant growth

and development. To explore the impact of different fertilizers on maize growth, nutrient absorption, and moisture content in shoots, field experiments were conducted during the 2019/2020 rainy season at the agricultural teaching and research farmland of the University of Maiduguri. The experimental setup followed a complete randomized block design, with treatments replicated four times each. Soil pH ranged from 7.05 to 7.07, indicating a neutral environment. Results revealed significant enhancements ($P<0.05$) in growth parameters with the application of AMF, NPK, and cow dung. Mean shoot heights ranged from 113.51 to 183.19 cm, mean stem diameter from 6.12 to 7.69 cm, leaf area from 762.19 to 2749.58 m2, and mean root length from 25.88 to 35.00 cm across maize crop field experiments. Notably, NPK fertilizer, cow dung manure, and AMF demonstrated superior efficacy in promoting overall productivity compared to the untreated control, with significant differences observed ($P<0.05$). These findings suggest the potential of AMF as a viable alternative to both organic and chemical fertilizers, given their comparable effectiveness to inorganic fertilizers, which may be economically burdensome for smallholder farmers. Further research into bio-fertilizers is recommended to characterize active spores for crop development.

Keywords: Arbuscular mycorrhizal fungi, Maize, Fertilizers, Growth promotion, Nutrient uptake

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ANTIMICROBIAL SENSITIVITY AND PRESCRIPTION PATTERN IN A NIGERIAN PRIMARY HEALTHCARE FACILITY

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ABSTRACT
Infectious diseases are considered the most common cause of morbidity and mortality in developing countries. It is also believed that almost one in six deaths worldwide is attributed to infectious diseases. The emergence of antimicrobial resistance is considered a major public health problem that significantly impacts patient treatment and outcomes. Therefore, this study was aimed at assessing antibiotic sensitivity and prescription patterns in Ahmadu Bello University Medical Centre. A retrospective cross-sectional study on a stratified sample of 153 patients' records seen between January 2014 and August 2014 was reviewed. Pertinent data were collected on a predesigned data collection form and the results were presented descriptively. The results showed that the majority of the patients were female and the age group of 20 – 29 years was the most common age group treated with antibiotics. The most common isolated organisms were *Staphylococcus aureus* (45.8%) followed by *Klebsiella pneumoniae* (23.5%) and then *Streptococcus pneumoniae* (20.3 %). Urinary tract infection (UTI) (56.9%) and respiratory tract infection (RTI) (36.6%) were the most common infections in the facility. Levofloxacin (96.6%), pefloxacin (94.8%), ceftriaxone (93.8%), streptomycin (90.8%), ciprofloxacin (87.6%), and gentamycin (81.7%), were the most sensitive antibiotics for the isolates. Organisms isolated were found to be resistant to ampicillin (93.5%) and amoxicillin (86.3%). Ciprofloxacin was the most prescribed antibiotic. In conclusion, the study established that *Staphylococcus aureus*, *Klebsiella* species and *Streptococcus pneumoniae* were the predominant causes of infections. Isolated organisms were shown to be resistant to penicillins. Quinolones and aminoglycosides were the most common antibiotics for the treatment of infections. Urinary and respiratory tract infections were the most frequent infections treated with antibiotics in the facility.

Keywords: antibiotics, infection, sensitivity, prescription and resistance

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PRODUCTION OF BIOETHANOL FROM *Citrus limon* (CITRUS) PEEL USING *Aspergillus niger* AND *Saccharomyces cerevisiae*

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ABSTRACT
Bioethanol production could be the route for the effective utilization of Lignocellulosic agricultural wastes such as rice straw, wheat straw, fruits peels etc. Lignocellulosic biomass as feedstocks have been considered the most promising way for bioethanol production, which is a fuel of the future generations. The study aims to determine the optimal conditions for the production of bioethanol from lemon and pineapple peel wastes using *Aspergillus niger* and *Saccharomyces cerevisiae.* Isolation and Identification of *Aspergillus niger* and *Saccharomyces cerevisiae* were carried out using streak plate method, microscopy and molecular techniques. Cellulose, hemicellulose and lignin contents of the substrates was determined, then the substrates were pretreated with 5% sulfuric acid and were subjected to enzymatic hydrolysis using *Aspergillus niger*. Reducing sugar contents of the hydrolysate was determined followed by fermentation using *Saccharomyces cerevisiae*. The percentage bioethanol produced as well as the fermentation efficiency (%) were calculated. Analysis of Variance was employed to determine statistical difference among parameters determined. cellulose, hemicellulose and lignin contents of *Citrus limon* were 32.00%, 4.99% and 9.80%. Pretreatment increased cellulose content of *Citrus limon* 23.00% to 32.00%. The highest reducing sugar content was recorded at 96hours of hydrolysis with values 6.63g/l *Citrus limon* peel respectively. Fermentation using *Saccharomyces cerevisiae* yielded 19.20% for *Citrus limon* with fermentation efficiency of 38.42% respectively. Optimum conditions recorded were time of 96hrs, pH of 3.5, temperature of 30^{o}C and amount of substrate 15g with bioethanol ethanol yield from *Citrus limon* peel (22.90%) with fermentation efficiency of 44.44% respectively. The research has revealed the potential of *Citrus limon* peel waste as substrates for bioethanol production.

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YAM PEELS SUBSTRATE FOR PRODUCTION OF SINGLE CELL PROTEIN (SCP) BY *Aspergillus niger*

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ABSTRACT
Agro-industrial waste is a source of nutrients and compounds that can be used to support microbial growth in fermentation processes for production of bio-products such as enzymes, antibiotics, or single-cell proteins. The microbial biomass is a source rich in proteins and other compounds with several advantages over traditional protein sources. This study was aimed at producing Single cell protein (SCP) from *Aspergillus niger*, using yam peels as substrate. *Aspergillus niger* was isolated from garden soil of the Department of Biological Science, Ahmadu Bello University (ABU) Zaria, using Sabouraud dextrose agar (SDA). Yam peel was collected from a restaurant in Social Center, ABU Zaria, processed to dryness and analyzed for proximate composition. The isolate was subjected to submerged fermentation using commercially prepared yeast extract peptone dextrose (YEPD), and the yam peel substrate for a period of 7days on a rotary shaker. Results show that *Aspergillus niger* isolates had dark to brown colonies with

black conidial heads and pale yellow colour on reverse of the SDA plate. Microscopically, conidiophore extended from its hyphae carrying black globular conidia. Proximate composition of the yam peels substrate was found to contain carbohydrates (81.73%), lipids (4.17%), proteins (3.5%), moisture (5.19%), ash (5.4%), and fiber (1.85%). Support for higher fungal biomass was observed on yam peel substrate which attained 0.4 OD (optical density), while the maximum growth on the commercially prepared media (YEPD) was 0.23 OD. It was concluded that the yam peels substrate supported the cell biomass increase of A. *niger* (Single Cell Protein) better than the commercially prepared YEPD. It is recommended that agro-industrial wastes such as yam peels and others be used to enhance production of SCP which reduces pollution caused by improper disposal of agro-industrial wastes.

Keywords: *Aspergillus niger*; single cell protein, yam peels; submerged fermentation

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PROXIMATE COMPOSITION AND MINERAL ANALYSIS OF PEARL MILLET BALL (FURAR MAIWA) CONSUMED IN KATSINA STATE

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ABSTRACT
Pearl millet (*Pennisetum glaucum*) balls, locally known as "Furar Maiwa," are a cherished traditional food in Katsina State, Nigeria, with significant cultural and nutritional importance. The study aimed to analyze the nutritional and mineral content of these traditional food products, which are widely consumed in Katsina state. Proximate analysis revealed that Furar Maiwa contained 10.03% carbohydrate, 54.00% moisture, 5.57% fat, 3.85% ash, 2.167% crude fiber, and 15.08% crude protein. Mineral analysis further identified essential elements present in Furar Maiwa, including iron (Fe) 0.85 mg/g, copper (Cu) 0.09 mg/g, manganese (Mn) 0.09 mg/g, magnesium (Mg) 0.27 mg/g, zinc (Zn) 0.04 mg/g, calcium (Ca) 0.94 mg/g, sodium (Na) 1.42 mg/g, and potassium (K) 2.35 mg/g. These findings provide valuable insights into the nutritional composition of Furar Maiwa, highlighting its richness in carbohydrates, protein, and essential minerals. Understanding the nutritional value of this traditional food can inform dietary practices and promote its consumption for improved nutrition and health outcomes in Katsina State.
Keywords: proximate composition, pearl millet balls, minerals analysis, Katsina

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DETERMINATION OF THE LEVEL OF AFLATOXINS CONTAMINATION ACROSS THREE ZONES OF KATSINA STATE

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ABSTRACT
Aflatoxin B1 (AFB1) Contamination in feeds and food is an important health challenge to people worldwide, particularly among children, in whom it leads to delayed development, stunted growth, liver damage and liver cancer. The study is aimed to determine the level of aflatoxin contamination in groundnut and maize produced and stored in the three zones of Katsina State. A total of six (6) grain samples (one groundnut and one maize from each of the three geopolitical zones of Katsina State) were collected for the study and analyzed using Enzyme-linked Immunosorbent Assay (ELISA). Groundnut and Maize stored in Katsina zone was most

contaminated with a mean concentration of 95.20µg/kg and 94.90µg/kg respectively, this is compared with the Groundnut and Maize stored in Funtua zone which has a mean concentration of 89.20µg/kg and 87.30c respectively. All the samples (100%) analyzed contains aflatoxinB1 level above the permissible limit of Nigeria which is 20µg/kg and also above the permissible limit of World Health Organization (WHO) and European Union (EU) of 4µg/kg. There was no significant difference in the mycological analysis of the grains in all the three zones of the State, this could be due to physical factors that includes; pH level, light, moisture, temperature, water, relative humidity, and atmospheric gases as factors responsible for aflatoxin contamination.

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PREVALENCE OF GASTROINTESTINAL PARASITE OF HORSES REARED IN KATSINA METROPOLIS.

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ABSTRACT

This study focused on assessing the prevalence of gastrointestinal parasite infections in horses within Katsina metropolis. Over one month, faecal samples were collected from 50 horses, consisting of 33 males and 17 females, and analysed using the simple flotation technique with saturated salt NaCl solution. The overall prevalence of gastrointestinal parasites was found to be 58%. Identified parasites included *Strongylus spp, Anoplocephala spp, Parascaris equorum, Oxyuris equi, and Eimeria spp.* Noteworthy variations in prevalence were observed: females exhibited a higher prevalence compared to males, and the Hausa breed showed a higher prevalence compared to other breeds such as Thoroughbred, Argentine, and Thai. Additionally, the prevalence was higher in horses with poor body condition scores (77.77%), followed by moderate (70.37%), and ideal (21.42%). The study suggested that factors such as poor nutrition, management practices, disease status, and physiological factors may compromise the immune status of horses, rendering them more susceptible to gastrointestinal parasitic infections.

The findings underscored the importance of implementing appropriate, economical, and efficient control measures to mitigate parasitism across all age groups, sexes, and body conditions throughout the year. This comprehensive approach aims to enhance the overall health of horses in Katsina, Nigeria. Recommendations for improved nutrition, management practices, and disease prevention were emphasized as essential components of a holistic strategy to minimize the impact of gastrointestinal parasites on horses in the region.

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THE ROLE OF HOUSE FLIES IN THE TRANSMISSION OF PARASITIC HELMINTHES IN KATSINA METROPOLIS.

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ABSTRACT

This study investigated the role of house flies in the mechanical transmission of medically significant parasites. Using an experimental research design, 500 samples of houseflies were collected from various household locations over a one-week period. The specimens were examined in the Biology Laboratory at Umaru Musa Yar'adua University, Katsina, Katsina State. Microscopic analysis revealed the presence of helminth ova and larvae, with Remel Lugols Iodine stain aiding in the identification of protozoan cysts. The findings indicated a substantial involvement of flies in transmitting medically important parasites. The study revealed a high prevalence of parasitic helminths, particularly *A. lumbricoides*, with an 88% prevalence in areas

frequented by humans daily, including kitchens, toilets, dustbins, gutters, and surroundings. Additionally, *O. volvulus* showed an 80% prevalence, while *E. vermicularis* had the least prevalence at 32%. Despite variations in prevalence among species, the study concluded that there was no significant difference in their impact on human health across different sample locations. Based on the study's outcomes, recommendations were proposed. These included improving and enforcing environmental sanitation by government agencies at national, state, and local levels to reduce the impact of flies in transmitting parasites. Encouraging the use of insecticides in household spaces and adopting closed dustbins were suggested measures to mitigate fly abundance. Motivating individuals to clear drainage along houses and implementing control and eradication measures for houseflies were also recommended. The study was positioned as an epidemiological tool for monitoring the sanitary situation and intestinal parasite prevalence in the study area, emphasizing the need for proactive measures to safeguard public health.

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In vitro ANTITRYPANOSOMAL ACTIVITIES OF ETHANOLIC AND N-HEXANE EXTRACTS OF *Hymenocardia acida* STEM BARK AGAINST *Trypanosoma brucei brucei* AND *Trypanosoma congolense*

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ABSTRACT
The development of resistance by trypanosomes to existing trypanocidal drugs has necessitated the need to search for safe and effective alternative drugs with broad spectrum of activity. Hence this study was carried out to evaluate the *in vitro* antitrypanosomal activities of ethanolic and n-hexane extracts of *Hymenocardia acida* stem bark against *Trypanosoma brucei brucei* and *Trypanosoma congolense*. Stem bark of *H. acida* were collected, dried and ground to fine powder. The powdered *H. acida* stem bark of was extracted successively using n-hexane and ethanol as solvent to obtain n-hexane and ethanolic extracts respectively. The extracts were screened for the presence of phytochemical constituents using standard procedure. *In vitro* antitrypanosomal activities of different concentrations of the extracts (2.5 mg/mL to 40.0 mg/mL) were determined using diminazene aceturate (100 µg/mL) and phosphate buffered saline as positive and negative controls respetively. Results of the phytochemical screening revealed the presence of flavonoids, alkaloids, tannins and saponins in the ethanolic and n-hexane extracts of *H. acida* stem bark. *In vitro* antitrypanosomal activities of ethanolic and n-hexane extracts were observed against *T. brucei brucei* and *T. congolense*. Cessation of trypanosome motility was observed after 30 and 50 minutes of exposure to 2.5 mg/mL of ethanolic extract and n-hexane extract respectively for both *T. brucei brucei* and *T. congolense*. In conclusion, ethanolic and n-hexane extracts of *H. acida* stem bark exhibited activity against *Trypanosoma brucei brucei* and *Trypanosoma congolense*. Hence, the plant could serve as a source of trypanocidal drug.

Keywords: Antitrypanosomal activities, Extracts, *H. acida*, *T. brucei brucei*, *T. congolense*

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DEVELOPED DIGITIZED SMART SURVEILLANCE AND MICROMANAGEMENT SYSTEM USING INFORMATION TECHNOLOGY FOR MALARIA CONTROL (SMART-MSS) IN SOME SELECTED HEALTH FACILITIES OF DUTSIN-MA TOWN, KATSINA STATE, NIGERIA.

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ABSTRACT
The widely used surveillance strategy adopted in Nigeria involves traditional (paper-based) methods most often appeared cumbersome hence marked by under-reporting. However, Nigeria had the highest number (27%) out of (96%) global malaria cases; a vector borne disease caused by Plasmodium parasite with falciparum as the predominant specie in Katsina State. There have been deliberate attempts in transiting to use IT integrated with GIS in web or mobile-based apps that can enable Smart Surveillance**,** which this research was aimed at; to micromanage malaria trends in some selected health facilities of Dutsin-ma town, Katsina State. The logics and design were achieved through utilization of Python, Django-Visual Studio Framework and SQlite. Smart surveillance was initiated from March to May 2023 as digitization year. Data was collected from Out Patient Department and Laboratory register who visited the selected health and diagnostic facilities respectively. The developed Smart Malaria Surveillance System (Smart-MSS App) "https://nuraddeen.mhinnov8.com.ng" was successfully deployed and able to capture, generate and store data, report real-time malarial cases, spatial distributions of; health facilities, mosquito breeding sites and campaigns. Nearly all new cases were reported within 24hours. The Malaria indices (positive cases, age, gender) are displayed in a modified dashboard and the overall data can also be retrieve from back-end for micromanagement as well other analytics for informed decisions. Conclusively; the promising capabilities exhibited by the developed App would be a critical focal point for providing an improved data accuracy, timeliness, and accessibility; allowing for more effective monitoring, and targeted interventions complimenting ongoing global malarial elimination effort.

Keywords: Smart-MSS, Surveillance, Malaria, Information Technology, Geographic Information System, Micromanagement, Real-time.

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HEALTH RISK ASSOCIATED WITH HEAVY METALS IN FREQUENTLY USED OIL PERFUMES SOLD AT KARU MARKET, FCT, NIGERIA

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ABSTRACT
The preponderant use of oil perfumes to enhance self-appearance has increased in recent years in Nigeria. The presence of toxic heavy metals in personal care products can constitute irreversible health problems for end users. Hence, this study aimed to determine the presence of lead (Pb),

chromium (Cr), cadmium (Cd), and arsenic (As) in oil perfumes sold in Karu Market. A total of 10 popular high-in-demand oil perfumes were assayed for heavy metals using an Atomic Absorption Spectrophotometer (AAS, ICE 3000 AA02134104 V1.30). Data analysis was carried out using the R statistical program version 4.3.0. A significant ($p < 0.05$) difference was observed in the concentration of all the metals across the 10 samples. The range in the concentrations of the heavy metals are 0.16±0.00 - 0.27±0.00 mg L^{-1}, 0.11±0.00 – 0.91±0.00 mg L^{-1}, 0.05±0.0 – 0.10±0.00 mg L^{-1}, 0.37±0.00 - 0.75±0.00 mg L^{-1} for Pb, Cr, Cd and As respectively. The mean hazard quotient (HQ) was estimated to be 5.5 x 10^{-3} – 9.5 x10^{-3}, 3.4 x 10^{-7} – 2.7 x 10^{-6}, 4.7 x 10^{-5} – 9.4 x 10^{-5}, 5.9 x 10^{-3} – 1.1 x 10^{-2} for Pb, Cr, Cd and As respectively. The hazard index (HI) ranged from 0.01 – 0.02. Carcinogenic risk for all metals in this study was within 1 x 10^{-6} – 1 x 10^{-4}. The principal component analysis (PCA) shows a higher association of Cd with Sample_J, Sample_H, and Sample_A, while Cr was highly associated with Sample_I and Sample_C. The results show that consumers of the studied oil perfumes are not likely to develop undesirable carcinogenic and non-carcinogenic risks. However, continuous bioaccumulation of these heavy metals can pose deleterious health problems over time.

Keywords: Risk, Assessment, Heavy metals, Oil perfumes, Carcinogenic risk

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EFFECT OF ADMINISTRATION OF AQUEOUS LEAVE EXTRACT OF *Pistia Stratiotes* (WATER LETTUCE) ON BLOOD GLUCOSE AND LIVER FUNCTION PARAMETERS IN ALLOXAN-INDUCED DIABETIC RATS

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ABSTRACT

This study was design to investigate the effect of aqueous leave extract of *Pistia stratiotes* on blood glucose and liver function parameters in Alloxan-induced diabetic rats. Thirsty wistar rats (30) of both sexes of average body weight of 110g were used for the experiment. The rats were grouped into 5: the normal and the diabetic groups were not given any treatment, the drug control group (metformin), the test groups were treated with extract (200mg/kg) and (400mg/kg). Blood glucose concentration and Liver function parameters were investigated. The result showed that the Extract treated groups have low serum glucose level and improved markers of liver function compared to the normal and diabetic control group rats in a dose dependent manner. In conclusion, Aqueous leave extract of *Pistia stratiotes* have been found to have hypoglycemic activity at dose of 200mg/kg and an increase activity at dose of 400mg/kg due to its phytochemicals and antioxidant properties. The plant was also shown to have the ability in reducing serum leaked contents as a result of damage done to the liver due to diabetes mellitus. Therefore, the finding suggests that *Pistia stratiotes* could be a valuable natural treatment option for diabetes mellitus and its associated complications.

Keywords: Diabetes mellitus, *Pistia stratiotes*, liver function parameters, Alloxan

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ASSESSMENT OF THE UTILIZATION OF COMPOST TEAS FOR SUSTAINABLE ORGANIC FARMING PRACTICES AND SOIL HEALTH AMONG SMALL HOLDERS FARMERS IN KANO STATE METROPOLIS

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ABSTRACT

Microbial compost plays a crucial role in improving soil health, soil fertility, and crop yield and plant biomass. The study was aimed to assess the application of Compost Tea among small holder farmers in Kano State Metropolis. Two research questions were formulated to guide the study. Related literatures were reviewed after the conceptual framework based on the major variables outlined in the study. Descriptive Cross Sectional Survey research design was employed. The population of the study comprised of Small Holders Farmers in Kano State Metropolis. Self-developed questionnaire was used for the study. The questionnaire was validated by expert from Agriculture and Test and Measurement department and a content validity index of 0.87 was obtained. Pearson product moment correlation coefficient was used to determine internal consistency of the questionnaire and reliability coefficient of 0.84 was calculated. Descriptive statistics were used to answer research questions. The findings revealed that the some of the farmers are applying the use of compost tea during farming while others are not due to some challenges like lack of awareness, resistance to change, lack of technical knowhow etc. The study recommends that government and all stake holders should ensure small holders' farmers in Kano State Metropolis acquired all the knowledge and the skills that would enable them to be utilizing compost tea during farming for effective and efficient farming practice.
Keywords: Assessment, Compost Tea, Organic Farming, Small Holders Farmers, Soil Health

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ANTIBACTERIAL ACTIVITY OF CRUDE EXTRACT OF *Ficus Platyphylla* AGAINST SOME EXTENDED SPECTRUM BETA-LACTAMASE (ESBL) PRODUCING ENTEROBACTERIACEAE OBTAINED FROM HOSPITALS WITHIN KADUNA METROPOLIS

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ABSTRACT

The use of natural products for health maintenance has been a longstanding practice throughout human history. This study focuses on the assessment of antibacterial properties of *Ficus platyphylla* leaf extract against ESBL-producing organisms (*Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Enterobacter aerogenes* and *Salmonella enterica*). A total of 409 clinical isolates were obtained from hospitals within Kaduna metropolis and subsequently confirmed in the laboratory. Microbiological methods were used for screening and confirmation of organisms and the antibacterial activity of *Ficus platyphylla* aqueous, methanolic,and ethyl acetate extracts were evaluated using the Kirby bauer disc diffusion method. The observed sensitivity of the tested organisms to the plant extracts were manifested through zones of inhibition, demonstrating various degrees of effectiveness across concentrations ranging from 6.25mg/mL to 100mg/mL for the extracts. The most significant zones of inhibition were achieved with 100mg/mL concentration of *Ficus platyphylla* leaf extract. The extracts displayed

high zones of inhibition against all tested organisms, with values ranging from 4.0mm to 17.46mm. Specifically, *E. coli* demonstrated a zone of inhibition of 16.33mm, *P. aeruginosa* exhibited 17.46mm, *K. pneumoniae* showed 14.6mm and *Enterobacter aerogenes* manifested 15.7mm against the extracts. The minimum inhibitory concentration (MIC) were observed to fall within the range of 12.5-50mg/ml while minimum bactericidal concentration (MBC) with *E. coli* exhibiting a higher MBC of 100mg/mL.In comparison, clavulanic acid exhibited a superior antibacterial effect against the ESBL-tested organisms, yielding zones of inhibition ranging from 19mm to 21mm in contrast to the plant extract. In summary, the antibacterial properties of *Ficus platyphylla* extracts were observed to be effective against the test organism. **Keywords:** Enterobacteriaceae, ESBLs, Ficus platyphilla, Antibiotic resistance

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A REVIEW ON MECHANISMS OF MULTI-DRUG RESISTANCE IN FUNGI

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ABSTRACT
Fungal infections have become increasingly difficult to manage due to the emergence of multi-drug resistance (MDR) in fungal pathogens. Understanding the mechanisms driving this resistance is crucial for developing effective treatment strategies. This review focuses on elucidating the various mechanisms by which fungi develop resistance to multiple drugs. Efflux pumps, which actively pump drugs out of fungal cells, and target alterations, such as mutations in drug targets, are among the primary mechanisms discussed. Additionally, the formation of biofilms and activation of cellular stress responses contribute significantly to MDR. The role of genetic determinants, including horizontal gene transfer and genetic diversity, in shaping MDR evolution is also examined. Clinically, diagnosing and managing MDR fungal infections pose significant challenges, necessitating a multidisciplinary approach. By unraveling the complexities of MDR mechanisms, this review aims to pave the way for the development of innovative therapeutic interventions to combat fungal infections effectively. **Keywords:** Fungi, Efflux pump, multi-drug resistance, Mechanisms

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ENHANCING SOY-DADDAWA FERMENTATION: SYNERGISTIC EFFECTS OF SENNA TORA LEAVES ASH AND TABLE SALT WITH BACILLUS SUBTILIS STARTER CULTURE

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ABSTRACT
This study delves into the processing of soybean seeds for the production of African seasoning Soy-daddawa, traditionally enriched with various substances, including plant wood ash, known for enhancing organoleptic attributes. *Bacillus subtilis*, validated as a monoculture starter, is employed in the production of daddawa. The focus of this research is to examine the impact of a

supplementary substrate consisting of *Senna tora* leaves ash and table salt on the biochemical transformations during soybean fermentation, using *Bacillus subtilis* as the starter culture. A blend of table salt and *Senna tora* leaves ash, with a ratio of 1:3, was formulated as a microbial fermentation substrate. This supplementary substrate, ranging from 0% to 5% (w/w), was incorporated into hydrothermally processed soybean seeds. Aerobic fermentation, without stirring, occurred at 37°C in a controlled incubator for 72 hours in customized clean plastic containers. Following the anticipated fermentation changes, the fermented products underwent comprehensive assessments for microbial and chemical alterations, as well as sensory and nutritional properties. The results revealed statistically significant ($P < 0.05$) chemical and nutritional shifts, along with important organoleptic effects, associated with varied concentrations of the *Senna tora* leaves ash and table salt mixture during soybean fermentation. The study advocates for the utilization of 1% to 5% (w/w) of *Senna tora* leaves ash and table salt mixture in the fermentation process of soybean seeds when *Bacillus subtilis* serves as the starter culture. This research contributes valuable insights into optimizing Soy-daddawa production, emphasizing the synergistic impact of *Senna tora* leaves ash and table salt in conjunction with a specific microbial starter culture.

Keywords: Soy-daddawa; Fermentation; *Senna tora leaves ash*; *Bacillus subtilis*; Table salt; Microbial starter culture.

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Optimizing Soy-daddawa Production: Unveiling the Impact of Table Salt on Microbial Fermentation with Bacillus subtilis as a Starter Culture

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ABSTRACT
This study explores the impact of table salt on the biochemical transformations occurring during the fermentation of soybeans into Soy-daddawa, utilizing *Bacillus subtilis* as the starter culture. Soy-daddawa, a seasoning product, involves the processing of soybean seeds, with the addition of various substances, including table salt. The hypothesized role of table salt, attributed to its osmotic properties, is to regulate and enhance microbial fermentation in legume seeds. To investigate this hypothesis, soybean seeds were hydrothermally processed and prepared, and various concentrations of table salt (0, 0.25, 0.5, 1, 2, and 3% w/w) were incorporated. The prepared soybeans were aerobically fermented at 37°C for 72 hours in customized clean plastic containers without stirring. *Bacillus subtilis* served as the monoculture starter culture. Following the completion of fermentation, the products were analyzed for microbial and chemical changes, as well as sensory and nutritional properties. The findings revealed statistically significant ($P < 0.05$) chemical and nutritional alterations, along with organoleptically noteworthy effects associated with different table salt concentrations during soybean fermentation. Based on the results, the study recommends the use of 0.25% and 0.5% (w/w) table salt in the fermentation process when employing *Bacillus subtilis* as the starter culture for soybean seed fermentation. This research contributes valuable insights into optimizing the production process of Soy-daddawa, a popular seasoning product, by leveraging the influence of table salt in conjunction with a specific microbial starter culture.

Keywords: Soy-daddawa, Fermentation, Table salt, Bacillus subtilis, Microbial starter culture, Optimization

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EFFECT OF HEAVY METALS ON THE BIODIVERSITY OF PROTOZOA

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ABSTRACT
Protozoa which are single-celled eukaryotic microorganisms are found in various ecosystems, thereby playing crucial roles by acting as predators and prey and also, they perform wonderfully in nutrient cycling, food webs, and overall ecosystem health. Heavy metals such as lead, cadmium, mercury, and zinc, are toxic pollutants which are often released into the environment through industrial activities, mining, and agricultural practices. These heavy metals can be accumulated in soils, sediments, and water bodies, thereby posing a threat to the biodiversity and ecological functions of protozoa. Researches have proved that heavy metals can directly impact protozoan populations by causing mortality or inhibiting their reproduction. Many authors revealed that continuous exposure to heavy metals can drive selection pressure on protozoan populations, leading to the development of metal-tolerant strains through genetic adaptation. Different species of protozoa have varying sensitivities to heavy metals. Some species may be more tolerant and thrive in metal-contaminated environments, leading to shifts in species composition and diversity. While sensitive species may disappear, because heavy metals can interfere with essential metabolic processes in Protozoa, including respiration, photosynthesis (in photosynthetic species), and ion transport across cell membranes. These disruptions can impair energy production and cellular homeostasis, thereby affecting nutrient cycling processes, such as carbon and nitrogen mineralization, decomposition of organic matter, and nutrient uptake by plants. Protozoa also contribute a significant role to the purification of water bodies by consuming bacteria and organic particles. Therefore, accumulation of heavy metal contamination can compromise this purification function by reducing protozoan abundance and diversity, potentially leading to the accumulation of pathogens and pollutants in water. Finally, heavy metal pollution poses a significant threat to the biodiversity and ecological functions of protozoa.

Keywords: Protozoa, Heavy metals, Biodiversity, Ecosystem, Pollution

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BACTERIAL BIOSORPTION; AN APPROACH TOWARDS BIOREMEDIATION OF CHROMIUM CONTAMINATED SOIL

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ABSTRACT
Bacterial biosorption is a promising approach which involves the use of bacteria to remove heavy metals such as chromium, lead, nickel, cadmium, arsenic etc from contaminated soil. Chromium possesses detrimental effects on both plants and animals' health. Conventional methods of removing heavy metal contaminated soils such as excavation and chemical treatment are expensive and disruptive making them less desirable. Bacterial biosorption on the other hand is a bioremediation strategy process that has great advantages which involves less expensive approach and can be applied *in-situ*. Some bacterial genera involved in biosorption process may include *Alcaligens, Achromobacter, Acinetobacter, Alteromonas, Arthrobacter, Burkholderia, Bacillus,*

Enterobacter, Flavobacterium, and *Pseudomonas.* They can either biodegrade or biotransform heavy metals into less toxic forms. Some factors which influence biosorption efficiency involves pH, temperature, concentration, bacteria surface, metal ion characteristics and soil composition. Challenges associated with using bacteria for biosorption as outlined by some authors revealed that the process can be slow and it may not be suitable for large-scale applications while many authors proved it as a process that can be applied in a large scale. Also, quality needed from the bacteria is that it must be able to tolerate the heavy metals that they were found to be wonderfully doing well as reported by many authors. A very interesting ability of some bacterial species is their potential ability to reduce toxic hexavalent chromium VI to less toxic trivalent chromium III. The bacterial species doing these wonders are now been involve in selection of the most potent by different researchers in order to select or engineer a bacterium that is more tolerant and efficient to bioremediate the heavy metals. Another is to optimize the environmental conditions, such as temperature, pH, and nutrient availability in order to achieve large scale efficiency. Bacterial biosorption has great potential for chromium-contaminated soil remediation, and more research is needed to fully realize it's potential. Finally, advances in biotechnology may eventually make the process more accessible.

Keywords: Bacteria, Contaminated-soil, Heavy metals, Chromium, Biosorption

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ISOLATION AND IDENTIFICATION OF ENTOMOPATHOGENIC FUNGI FROM INFECTED DEAD INSECT CADAVER

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ABSTRACT
Myco-insecticidal relationship brings about the positives outcome that led to the abolition of the dangerous insects living around our niche. This fungus tends to secrete their enzyme which also alters the existence of such insects. This study was aimed at isolating and characterizing entomopathogenic fungi residing at homes. Seven (7) different genera of insects (spider, cockroach, mosquitoes, grasshopper, beetles, ants and scorpion) were collected from homes and taken directly to the microbiology laboratory Umaru Musa Yar'adua University Katsina. These insects were washed aseptically using 70% ethanol to remove all the carcasses and allowed to air dried and dispensed in the prepared potato dextrose agar (PDA) and incubated at 25^0c for 7 days. Fungal growth was identify morphologically and microscopically using atlas of fungi for proper identification. Results showed the emergence of 62 fungal isolates from four (4) differences species of fungi which includes *Beaveria bassiana, Metarhizium anisopliae, Isaria fumosorosea* and *Lecanicillium lacanii*. Prevalence of fungal isolates based on body surface of each insects showed that spider harbors 22 (35.4%), cockroaches' 13 (21.0%), grasshopper 12 (19.4%), scorpion 9 (14.5%),ants 3 (4.8%),beetle 2(3.2%),mosquito 1(1.6%).Also prevalence of the fungus based on species showed that *Beaveria bassiana* occurred most with the *37(59.6%), Metarhizium anisopliae* 19 (30.6%), *Metarhizium anisopliae* 4*(6.4%*) *and the least Lecanicillium lacanii* 2(3.2%).Presence of these fungi species harboring different insects cadavers founds around the homes proved that insects some species of fungi contributes more towards the warding off of insects into our homes by secreting their toxins which led to the killing of the insects. It is also recommended that these insects could be used to ward off the dangerous insects around home, also further research could be conducted to ascertain the molecular mechanisms of action of toxins used by the insects.

Keywords: *Metarhizium anisopliae, Beaveria bassiana, Lecanicillium lacanii*

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APPLICATION OF URINALYSIS IN SCREENING FOR URINARY SCHISTOSOMIASIS

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ABSTRACT

Urinary schistosomiasis is a persistent disease among children in Nigeria and other African countries. Persistence of schistosomiasis among people in rural communities is due to abundance of unsafe water bodies in which both children and adult carry out activities like irrigation, bathing, fishing, washing or fetching of water for domestic use. Continued spread of the disease is aided by lack of community-based screening and treatment of infected cases. Urinalysis can be applied as a quick means of screening for urinary schistosomiasis in remote locations in order to commence quick treatment. A total of 600 consented school adolescents were enrolled for the study across six Local Government Areas of Kaduna State, Nigeria. Fresh urine sample of 10mL was collected from each of the subjects. Eleven analytes of each urine sample were determined immediately on submission using urine reagent test strips (SG11100-Uric 11V, Guilin Zhonghui Technology Co., Ltd, China). The urine was centrifuged at 3000 r.p.m for 5 minutes and sediment was examined for *Schistosoma haematobium* eggs by microscopy. Data were subjected to statistical analysis at 95% confidence interval. The overall prevalence of urinary schistosomiasis among the adolescents across the six LGAs of Kaduna State was 6.8%. There were significant associations between the urinary schistosomiasis and presence of leukocytes (18.5%, χ^2=47.596, df=1, P=0.000, OR=8.822), proteinuria (23.1%, χ^2=17.287, df=1, P=0.000, OR=4.959) and micro-haematuria (49.3%, χ^2=213.184, df=1, P=0.000, OR=63.695). This study indicated that urinalysis can be applied in screening for urinary schistosomiasis in remote communities in order to commence rapid treatment. Early detection and treatment are sure ways to prevent of chronicity and community spread of the disease.

Keywords: Urinalysis, urinary schistosomiasis, adolescents, water, screening, community.

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PHENOTYPIC AND MOLECULAR DETECTION OF *Trichomonas VAGINALIS* AMONG WOMEN LIVING WITH HIV/AIDS ATTENDING INFECTIOUS DISEASES HOSPITAL (IDH), KANO

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ABSTRACT

Trichomonas vaginalis is increasingly the most common non-viral sexually transmitted infection globally, infecting all age groups especially the immuno-compromised individuals. However, data on this subject matter are scarce in the study area. The study was design to determine the prevalence of *T. vaginalis* among women living with HIV/AIDs attending infectious Diseases Hospital Kano, using phenotypic and molecular procedures. It was also aimed to investigate the socio-demographic and risk factors influencing the prevalence of *T. vaginalis* among women living with HIV/AIDs. A total of 248 HIV/AIDs women, aged 18-58 years (mean age 40 ± 20) were recruited for the study. High vaginal swabs (HVS) were collected from each participant and

screened for *T. vaginalis* using Microscopy. The conventional PCR technique was used to confirm the presence of *T. vaginalis*. Out of 248 HIV/AIDs patients screened by microscopy, 17.3% (43/248) were positive for *T. vaginalis*. However, out of these positive 43 (17.3%), 48.8% (21/43) were positive for *T. vaginalis* using Conventional PCR (molecular analysis). Statistical analysis shows that there was no significant relationship between *T. vaginalis* and socio-demographic characteristics or risk factors of the study population. This study suggests a high prevalence of *T. vaginalis* among women living with HIV/AIDs attending IDH in Kano metropolis. Therefore, there is need to create awareness among the HIV/AIDS patients and general populace about *T. vaginalis* infection and associated complications for adequate preventive measures.

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IMPACT OF HEMOGLOBIN GENOTYPE ON HEPATITIS B VACCINE RESPONSE

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ABSTRACT

Hepatitis B virus (HBV) infection is considered as one of the viral diseases of public health concern globally. It has affected an estimate of 2 billion persons, about 400 million persons are chronically infected, and the infection accounts for approximately 1 million deaths annually from hepatocellular carcinoma (HCC), liver failure, and cirrhosis worldwide. Hepatitis B Vaccine is regarded as the primary means of preventing Hepatitis B infection, and it has since been incorporated into the routine infant immunization schedule of all the 47 countries in the WHO African Region including Nigeria's National Expanded Program on Immunization as recommendation by World health Organization. However, the vaccine failure which often results in sub-optimal response and non-responsiveness is becoming a global challenge. This study was meant to assess the impact of Human hemoglobin genotype (HbG) on the vaccine response in Bauchi, north-eastern Nigeria. A cross-sectional of 196 vaccinated subjects of both sexes within the ages of 1 year and 60 years were recruited. Five milliliters of venous blood were collected in an anti-coagulated container. The plasma was separated and used for antibody detection by Enzyme linked immunosobent assay (ELISA). The red cell was used for determining Hemoglobin Genotype (HbG). The result indicated that genotype AA had the highest prevalence rate of 141(71.9%), with 44% having optimal vaccine response. Genotype AS prevalence was 49(25.0%) with 61.2% optimal response, and Genotype SS had prevalence of 4(2.0%) with 75.0% having optimal vaccine response, while genotype AC had 2(2'0%) prevalence with 50.0% optimal vaccine response. Genotypes AS and AA had the highest rate of vaccine optimal responders of 62(44.0%) and 30(61.2%) respectively. Genotypes SS and AC had the least rate of optimal hepatitis B vaccine response. There was no significant relationship between various hemoglobin genotypes and Hepatitis B vaccine response. However, it is evident that some genotypes have affinity to hepatitis B vaccine optimal response than others. There is a need for certain individuals to be revaccinated while others should go for a vaccine booster dose.

Key words: Hemoglobin Genotype, Hepatitis B, Immunogenicity, vaccine

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PREVALENCE OF HYPERTENSION AMONG HIV PATIENTS ATTENDING KATSINA GENERAL HOSPITAL, KATSINA STATE NIGERIA.

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ABSTRACT

People living with Human immunodeficiency virus (HIV) are facing an increased burden of non-communicable diseases (NCDs) comorbidity. There is however, paucity of information on the magnitude of HIV-hypertension comorbidity, its associated factors, and how the health system responds to the double burden in Nigeria. This study aimed to determine the magnitude of comorbidity between HIV and hypertension and associated factors among HIV positive adults receiving antiretroviral therapy (ART) in Katsina General Hospital, Katsina. Two hundred (200) HIV infected adults (aged > 18) who had been on antiretroviral therapy for at least six months and attended the HIV clinic within Katsina general Hospital Katsina were recruited. Participant's demographics, HIV characteristics, the presence of non-communicable diseases via self-report, from clinic folders and from measurement of their blood pressure on the day of interview and serum lipid profile, were evaluated. The magnitude of comorbidity was 28.5%. Being older, higher BMI higher viral load, alcohol, and duration on antiretroviral therapy were found to increase the odd of having hypertension among HIV positive adults. The prevalence of hypertension measured on the day of interview was greater than that found on self-report or reported in clinic folder. Regular screening for the incidences of hypertension, addressing modifiable risk factors and providing integrated care in the center would help improve the quality of life of comorbid patients.

Keywords: Antiretroviral drugs, HIV, hypertension, comorbidity, Katsina.

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PREVALENCE OF DIABETES AMONG HIV PATIENTS ATTENDING KATSINA GENERAL HOSPITAL, KATSINA STATE NIGERIA.

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ABSTRACT

This study was conducted to identify the prevalence of diabetes among HIV patients attending the antiretroviral (ART) center of Katsina General Hospital. The objectives were mainly to identify the factors associated with the diabetes in the study subjects, compare the prevalence of diabetes based on self-report/clinic folder to those identified during the study interview/screening, and to find out how the health system responds to the double burden of the disease in the study center.

Two hundred (200) HIV infected adults (aged > 18) who had been on antiretroviral therapy for at least six months and attended the HIV clinic within Katsina general Hospital Katsina were recruited. Participants' demographics, HIV characteristics, the presence of diabetes via self-report, from clinic folders and from measurement of their plasma fasting glucose and insulin levels on the day of interview were evaluated. The magnitude of comorbidity was 3% only. Being older, higher BMI, higher viral load, alcohol, and duration on antiretroviral therapy were found to increase the odd of having diabetes among HIV positive adults. A lower prevalence of diabetes on clinic folders was found. It was also found that there was impairment in fasting plasma glucose of some patient assessed. Screening for the incidence of diabetes, addressing the modifiable risk factors, and providing integrated care in the center would help improve quality of life of comorbid patients.

Key words: Antiretroviral drugs, HIV, diabetes, comorbidity, Katsina.

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IDENTIFICATION OF *ESCHERICHIA COLI* 026 BY MOLECULAR PROCESS IN *NONO* MILK IN KANO, NORTH - WESTERN, NIGERIA

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ABSTRACT

Escherichia coli 026, the most commonly isolated non-0157 serotype from patients with hemolytic uremic syndrome (HUS), is a food-borne pathogen that produces the Shiga Toxin (STEC). There may be a greater chance of consuming toxic substances due to the introduction of new foodborne pathogens like Shiga toxin producing *Escherichia coli* in *nono* milk. But not every STEC strain can infect people and cause illness. Hemorrhagic colitis, hemolytic uremic syndrome, and diarrhea are linked to *E. coli* 026 infection in humans. This study was conducted to ascertain the detection of *Escherichia coli* 026 in *nono* milk sold in Kano, North. -Western Nigeria using standard procedures. The microbiological evaluations were based on the Coliform count and detection of *Escherichia coli* using the method of Food and Agricultural Organization. Molecular analysis was carried out using Polymerase chain reaction (PCR). The mean coliform count ranged between 2.67 x 10^2 – 1.07 x 10^3 cfu/ml, *E. coli* had 11.5% occurrence, *E. coli* 0157 (1%), *E. coli* 0157:H7 (3%) and presence of E. *coli* 026 was established. Fermented or raw milk is a well-known good medium that encourages the growth of various microbes, leading to product spoilage or consumer infections/intoxications. The presence of these pathogens particularly, Shiga toxin producing *Escherichia coli* (STEC) in *nono* milk that is highly consumed by both rural and urban populace calls for public health concern despite the low incidence. It is recommended that further research on *E. coli* 026 in *nono* milk be carried out in the study area.

Keywords: *Escherichia coli*, Kano, Polymerase Chain Reaction, Shiga Toxin

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MICROBIAL QUALITY ASSESSMENT OF FRESH TOMATO (*Solanum lycopersicum*) AND TOMATO PASTE SOLD WITHIN KATSINA METROPOLIS

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ABSTRACT

Tomatoes constitute an important part of the diet, and their microbiome (include contaminants of uncertain origin) may lead to spoilage and economic losses; and has impact on consumers' health. Studies comparing the microbiological profile of fresh and packaged tomatoes within Katsina Metropolis and those identifying tomato-associated bacteria using molecular techniques are scarce, as most researches focus on culture-based detection. This study assessed the microbial quality of fresh tomato and tomato paste within Katsina. Microbial counts were obtained using standard methods, and isolates were biochemically identified using VITEK/16S ribosomal DNA technique. One-way ANOVA was used for statistical analysis. The microbial load of analyzed fresh tomatoes and tomato paste was within the limit. Fresh tomatoes have bacterial counts ranging from 6.10×10^7 to 1.60×10^7; while tomato paste has counts ranging from 4.80×10^7 to 1.80×10^7 CFU/g respectively. Fungal counts ranged from 6.45×10^1 to 1.50×10^0 CFU/g. statistical analysis between colony counts of fresh and paste shows no difference in bacterial counts ($P>0.05$), whereas fungal counts differed significantly ($P<0.05$). Some selected isolates identified using VITEK include *Providencia rettgeri, Ochrobactrum anthropi, Bacillus subtilus* and *Serrati* spp. (bacteria) as well as *Rhizopus* spp., *Mucor* spp., *Aspergilus flavus* and *A. niger* (fungi) were identified from fresh tomatoes. *Alcaligenes faecalis* and *Bacillus subtilus* (bacteria) and *Aspergilus flavus, A. niger* and *Mucor* spp. (fungi) were the tomato paste isolates. Molecular identification confirmed the presence of *Serratia marcescens*. All counts of fresh tomato and tomato paste are within permissible limits, making the foods fit for human consumption. Improvement in the microbial quality of fresh tomatoes and tomato paste is very important, furthermore, adequate steps must be taken to prevent contamination and spoilage by microorganisms.

Keywords: 16S rDNA, Bacteria, Fungi, Microbial Quality Assessment, Tomato, Tomato paste.

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ETHNOBOTANICAL SURVEY OF PLANT SPECIES WITH INSECT REPELLENTS ACTIVITY IN KATSINA METROPOLIS

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ABSTRACT

Despite the abundant plant species in Katsina state, there is paucity of information on plants used to repel or kill insects. Plant-based repellents have been used for generations in traditional practice as a personal protection measure against different species of insects. The study was conducted to document and evaluate plants species that have the ability to repel insects. A semi-structured questionnaire was used to obtain data of plants with insects' repellents properties. A total of 50 respondents were interviewed among which the majority 28 (56%) were males, and 22 (44%) were females. The result reported a total of 20 plants species with insect repellent activity, the plants species belong to 15 families with Lamiaceae being the dominant. The leaves of the

plants are the most plant part used, followed by the roots. The mode of preparation of the plants materials varies, with burning to generate smoke being the most adopted mode of preparation. The 20 plants species were found to repel 12 different insects which are distributed in 7 orders, Dipterans being repelled by almost all the plants species, with mosquito being repelled most by the plant species in the order. It was observed from the study that plants species from different families have the ability to repel a particular insect. These findings will also provide validation to the ethno-botanical knowledge of the targeted communities. The results achieved could serve as baseline for further scientific investigation to strengthen the concept of plant-based insects' repellents. There is a need for further investigation on these plant species as they may constitute potential sources of insecticidal and repellent compounds against a wide range of insect pests.

Keywords: Activity; Ethno botanical; Insects; Katsina; Plants; Repellents; Species; Survey

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BACTERIOLOGICAL ANALYSIS OF SOME SELECTED SACHET WATER SOLD WITHIN KATSINA METROPOLIS

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ABSTRACT
Access to good quality drinking water is a challenge in most towns and cities in Nigeria and households have for years depended on other sources of water to supplement their activities. The introduction of sachet and bottled water to consumers was to provide safe, hygienic and affordable instant drinking water to the public. The aim of this study is to determine the Bacteriological qualities in some selected sachet water sold within Katsina metropolis. Using a simple random procedure five brands (A1, A2, A3, A4, and A5) of sachet water were bought from vendors at different locations and transferred to the laboratory. Nutrient agar was used to determine the total viable bacterial count, Eosin Methylene Blue agar (EMB) for enumeration, and Lactose broth for MPN. After serial dilutions the samples were analyzed using multiple tubes methods aerobic plate count, Gram's reaction, Microscopy and Biochemical assays. The Result showed that A1, A2, A3, A4, and A5 have $7.9x10^5$ cfu/ml, $4.5 x10^5$ cfu/ml, $8.2 x 10^5$ cfu/ml, $5.5 x 10^5$ cfu/ml and $3.2 x 10^5$ cfu/ml respectively. Zero (0%) of the samples was Excellent, zero (0%) was Satisfactory, three (3) (60%) were Suspicious and two (2) (40%) were Unsatisfactory using the MPN values recorded on the World Health Organization (WHO) classification system for drinking water. All The samples were contaminated with faecal coliform (*Escherichia coli*) and some samples (A2, A4,A5) with *Staphylococcus aureus* which could be due to inadequate treatment of water samples by the producers improper use of filters or cost production contamination. Hence there's need for strict concern and routine monitoring by regulatory agencies to ensure appropriate and standard water treatment is applied in the manufacturing safe sachet drinking water.

Keywords: Sachet water, Coliform, MPN, Durham tube

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UNLOCKING THE PROBIOTIC POTENTIAL OF LOCAL BEVERAGES (KUNU): PREBIOTICS AS POWER BOOSTERS

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ABSTRACT
Ranges of probiotic species and prebiotic substrates emerge to address newly elucidated data-driven microbial niches and host targets. New variants of microbiome-modulating interventions development include synbiotics, postbiotics, microbial consortia, live biotherapeutic products, and genetically modified organisms, with renewed interest in polyphenols, fibres, and fermented foods. Kunu is a fermented non-alcoholic beverage consumed all over Nigeria. The drink is served due to its perceived extreme nourishing and therapeutic properties. Varieties of this beverage are determined mostly by the type of grain, the supplements, sensory additives used, and the process employed during its production. Dietary quality is paramount in nutritional well-being and a key factor in human overall health development. The nutritional quality of grains utilized for Kunu production makes the drink more appealing to a large growing population when compared to some other drinks. Some use Kunu drink as an infant weaning drink, thus serving as a priming beverage for infants due to its rich probiotic and nutritional properties. However, this beverage's short shelf-life has limited its production scale. This project therefore elaborates succinctly on the diverse probiotic content of the Kunu beverage and the effect of prebiotics on the probiotic strains in kunu. Recent and ongoing developments in microbiome science are enabling new frontiers of research for probiotics and prebiotics. Novel types, mechanisms, and applications currently under the study have the potential to change scientific understanding as well as nutritional and healthcare applications of these interventions.

Keywords: probiotic, Postbiotics, Prebiotics, Fermented foods, Kunu.

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ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF ENDOPHYTIC BACTERIA FROM *Senna occidentalis* AGAINST SOME CLINICAL ISOLATES.

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ABSTRACT
Endophytic bacteria are endosymbiotic group of bacteria that are capable of colonizing the inter or intracellular regions of plants and provide them with protection by cross-communication and release of antibiotics through their biosynthetic gene clusters. Hypothesis for biosynthesis of novel antibiotics by endophytic bacteria include cross communication and co-culture with pathogens to activate biosynthetic gene clusters. In this study, different endophytic bacteria were isolated from the leaf, stem and root of the plant *Senna occidentalis* (coffee senna) and were identified by colonial morphology, microscopy and biochemical tests. Co-culturing methods through spread and patch technique and agar well diffusion method was employed. Here, endophytes were cultured alongside pathogens (*Staphylococcus aureus*, *Salmonella* Typhi and *Pseudomonas aeruginosa*). This co-culture method was observed for the zone of inhibition against the pathogens. The result showed that the probable endophytic bacteria were *Bacillus* sp. and *Pseudomonas* sp. Various zones of inhibition were produced against the pathogens indicating the effectiveness of the endophytic bacteria. The lowest zone of inhibition obtained was

12.00±0.00 mm by endophytic isolates S5 and R9 against *S. aureus* while the highest zone obtained was 30.00±0.00 mm by S6 against *P. aeruginosa.* The results of the sensitivity test are comparable to those obtained using Ciprofloxacin (positive control) which is 29.50±0.71 mm. The findings of this study indicate that endophytic bacteria of *S. occidentalis* can be used as a promising source of novel antimicrobial compounds with wide therapeutic importance.

Keywords: Endophytic bacteria, *Senna occudentalis,* co-culturing, antibacterial.

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ISOLATION AND CHARACTERIZATION OF MICROORGANISMS ASSOCIATED WITH BIODEGRADATION OF AFRICAN WALNUT SHELL USING CHICKEN DROPPINGS AS INOCULUM

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ABSTRACT
African Walnut (*Tetracarpidium conophorum*) is an important crop that is cultivated throughout the world's temperate regions for its edible nuts. Walnut shells are wastes generated after consumption of the nuts there by causing agro waste pollution. Chicken droppings is a waste by-product of poultry production and is comprised of feces, feeds and loads of microbes The aim of this study is to assess the effectiveness of some bacteria and fungi from chicken droppings in the degradation of African walnut shell and their potential application in Agro waste management. Methods involved washing the nuts under running water to remove flesh residues and contaminant, putting up each biodegradation set ups, weighing 5g of the samples at different interval of five days for microbial analysis and characterization which includes several biochemical tests such as Sugar Fermentation, Catalase, Citrate, Indole, 3% Potassium Hydroxide, M.R and V.P tests were performed to identify key bacteria isolates and assess their metabolic capabilities. The Fungal isolates were identified microscopically with *Aspergillus glaucus* as the predominant fungal isolates with 17.9% frequency of occurrence. The predominant Bacterial isolates were *Corynebacterium glutamicum*, *Enterococcus faecalis*, *Pseudomonas aeruginosa* and *E. coli*. The temperature readings ranged from 24ºC - 35ºC and pH readings ranged from 6.66 -10.30 readings favored the growth of these microorganisms as the inoculated shells exhibited signs of biodegradation, including softening and color changes and the results revealed a diverse microbial community in both biodegradations set ups. This study's findings provide insights into the potential use of chicken droppings as a source of microorganisms for biodegradation processes as it contributes to our understanding of microbial involvement in organic waste decomposition and holds implications for sustainable agro-waste management practices.

Keywords: Consortia, *tetracarpidium conophorum*, *Aspergillus glaucus*, inoculum, metabolic

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CHROMIUM REDUCTION BY BACTERIA ISOLATED FROM HYDROCARBON-CONTAMINATED SOIL

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ABSTRACT
Chromium is a cancerous and toxic element in the environment and it exists in two stable oxidation state of chromium (III) and chromium (VI). Chromium (VI) is the hazardous form of chromium and its reduction by some microbes to chromium (III) is an excellent job that is ecofriendly. This research work was aimed to screen bacteria isolated from hydrocarbon-contaminated soil for their potential in chromium reduction. Soil samples were collected from three different hydrocarbon contaminated of Sokoto metropolis and a sample was collected from non-hydrocarbon contaminated soil as control. Bacterial isolates were isolated using standard procedures. Potassium monochromate (K_2CrO_4) was used in the preparation of different chromium concentrations in mg/L incorporated into a nutrient broth medium. Chromium tolerance potential was screened from the bacteria isolated from hydrocarbon contaminated soil and two most potent were molecularly characterized using 16S rRNA sequencing. Chromium reduction was also assayed. The result of mean colony counts ranged from 10 to 13 × 10^5 CFU/g and the control soil were recorded to have 23.01× 10^5. Fourteen (14) bacterial isolates were isolated with a given isolate codes as MN1, MN2, MN3, MN4, MN5, WK1, WK2, WK3, WK4, KD1, KD2, KD3, KD4 and KD5. Isolate WK1 and KD1 were found to be the most potent in their ability to tolerate chromium and were molecularly confirmed to be *Brucella intermedia* and *Bacillus* sp. respectively based on high percentage hit similarity from basic local alignment search tool (BLAST) result of NCBI website. The phylogenic tree was produced using neighbour joining method based on the close members from GenBank of NCBI. Chromium concentration from 350 mg/L was reduced by *Brucella intermedia* to 301, 249 and 198 mg/L within 24, 48 and 72 hours respectively while Bacillus spp was able to reduced 350 mg/L of chromium 299, 248 and 196 mg/L within 24, 48 and 72 hours respectively. *Bacillus* sp. had the highest potential than *Brucella intermedia* based on four different concentrations (350, 250, 150 and 50 mg/L) used. The potential of *Brucella intermedia* and *Bacillus* spp, in the reduction of chromium from chromium metal solutions was proved more effective and these two organisms can be used as a good candidate in bioremediation of chromium contaminated soils or water bodies.

Keywords: Bacteria, Soil, Hydrocarbon, Chromium, Reduction

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DIABETES MELLITUS; THE *THEN* AND *NOW*

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ABSTRACT
Diabetes mellitus is a group of metabolic diseases involving carbohydrate, lipid, and protein metabolism. It is characterized by persistent hyperglycemia which results from defects in insulin secretion, or action or both. Diabetes mellitus has been known since antiquity and

despite therapeutic advances it still remains an incurable chronic disease. In our historical article, we attempt to provide the most important steps in the history of diabetes mellitus from antiquity till nowadays. This will provide an insight to the main events that occurred to the discovery of diabetes mellitus. This article covers events that took place from Ebers Papyrus, the nineteenth and the early twentieth century to the discovery of diabetes.

Keywords: Diabetes mellitus, hyperglycemia, metabolic diseases, insulin.

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INCIDENCE OF GINGER-ROT DISEASE IN SOUTHERN KADUNA, NIGERIA: A HIGH-THROUGHPUT SCREENING OF SOME MEDICINAL PLANTS AGAINST THE PATHOGENS

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ABSTRACT
Ginger (*Zingiber officinale* Rosc.) is a perennial, herbaceous rhizomic vegetable having great importance in medicine and spice. In 2023, a case of ginger-rot disease outbreak caused by some species of fungi was observed in many of the farms across the production region of ginger in Southern Kaduna, Nigeria which was seen to have affected hectres of numerous farmlands. This raised a concern and necessitates a prompt study to the underlying causes as well as to provide prospecting prophylaxis to curtail the spread of the disease. Total heterotrophic fungal counts were estimated using standard method. Isolation and identification of the fungal isolates were achieved using standard mycological technique of cultural, morphological as well as microscopic characteristics of the fungal isolates as compared to atlas. Inhibitory effects of the plant extracts against the fungi pathogens were done using standard method. It was shown that, the highest mean value for the total heterotrophic fungal count was $5.34x10^4 \pm 0.022$ while the lowest was $1.71x10^3 \pm 0.000$ respectively. The screened isolates were confirmed to be species of *Rhizopus*, *Fusarium*, *Aspergillus fumigatus* and *Aspergillus niger* respectively. Percentage occurrence of the fungi species shows that *Rhizopus* had the highest percentage occurrence (45.17%), followed by *Aspergillus fumigatus* (29.03%), *Fusarium* species (16.13%), and *A. niger* (9.67%). Inhibitory effects of the extracts were all active against isolates of *Rhizopus* and *A. niger* with maximum activity. Minimum activity was seen against isolates of *Fusarium* species, and moderate activity was recorded against *A. fumigatus*. It was however seen that the synergistic activity of the plant's extracts was highly effective against the fungal pathogens.

Keywords: Incidence, fungi, ginger-rot disease, Kaduna and Nigeria.

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DETECTION OF HUMAN PATHOGENIC *Escherichia coli* 0157:H7 IN LIVESTOCK AND POULTRY FROM ABATTOIRS AND SAMARU ULTRA-MODERN MARKET, ZARIA, NIGERIA

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ABSTRACT

Pathogenic *Escherichia coli* 0157:H7 poses significant risks to both human and animal health. This research aimed to detect its presence in various livestock and poultry samples collected from different markets and abattoirs in Zaria, Kaduna State, Nigeria. The samples were tested and confirmed using Eosin-Methylene Blue (EMB) agar, biochemical characterization, Cefixime-Tellurite Sorbitol MacConkey's (CT-SMAC) agar and serology. In slaughtered cattle from Zango Abattoir, Samaru, Zaria, 66% (33/50) of rectal swab samples tested positive for *E. coli*, with 75.8 % (25/33) of these samples identified as pathogenic *E. coli* 0157:H7. Similarly, in sheep and goat samples from Ganga Uku Abattoir Samaru, 58% (29/50) tested positive for *E. coli*, with 78.3% (18/23) of these being pathogenic *E. coli* 0157:H7. The study highlighted a higher risk of contamination in goats compared to sheep. For poultry, 54% (27/50) of samples from various sources in Samaru market and abattoir tested positive for *E. coli*, with 48.1% (13/27) identified as pathogenic *E. coli* 0157:H7. Notably, samples from chicken carcass cloacae showed the highest prevalence. These findings underscore the importance of implementing good practices and proper hygiene measures to mitigate the risk of *E. coli* contamination in livestock and poultry products. Additionally, further research using molecular tools such as PCR is recommended for more accurate detection and confirmation of pathogenic *E. coli* 0157:H7.

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DETECTION OF HUMAN PATHOGENIC *Escherichia coli* 0157:H7 IN FRUITS, VEGETABLES AND MILK SOLD IN SAMARU ULTRA-MODERN MARKET, ZARIA, NIGERIA

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ABSTRACT

Fresh fruits, vegetables, and milk are common sources of microbial food-borne diseases. This study aimed to assess the prevalence of pathogenic *E. coli* 0157:H7 in these food items sold in Samaru Ultra-Modern Market, Zaria, Nigeria. A total of 50 samples each of fruits, vegetables,

and milk were collected for analysis. For fruits, *E. coli* was isolated using Eosin-Methylene Blue agar (EMB), with a 68.0% (34/50) prevalence while biochemical characterization confirmed the 34 *E. coli* isolate. The prevalence of pathogenic *E. coli* 0157:H7 was 52.94% (18/34) using Cefixime-Tellurite Sorbitol MacConkey's agar (CT-SMAC) and serology tests. Ten different vegetables were used in this study. Overall, 66.0 % (33/50) of samples tested positive for *E. coli* using EMB, with cabbage showing the highest prevalence 100.0 % (5/5). Pathogenic *E. coli* 0157:H7 was detected in 45.5% (15/33) of samples and confirmed by serology testing. For milk, *E. coli* was found in 34% (17/50) of samples using EMB, with 82.35% (14/17) confirmed through biochemical tests. The prevalence of pathogenic *E. coli* 0157:H7 was 85.7% (12/14) confirmed by CT-SMAC and serology tests. These findings highlight the risk of microbial contamination in these food items, necessitating proper hygiene practices and, in the case of milk, pasteurization to mitigate health risks for consumers.

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A REVIEW ON MICROBIOLOGICALLY INFLUENCED CORROSION (MIC)

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ABSTRACT
Microbiologically influenced corrosion (MIC) often referred to as biocorrosion, is a pervasive phenomenon with significant implications across various industries. This review aims to provide a comprehensive overview of MIC, exploring its types, mechanisms, impacts, detection methods, prevention strategies, and future trends. By delving into the microbial species involved, corrosive agents produced, and environmental factors influencing MIC, the review will provide insights into the intricate interplay between microorganisms and materials. Through case studies and real-world examples, the review will highlight the detrimental effects of MIC on materials and structures, emphasizing the economic, safety, and environmental consequences. Moreover, it will address the importance of early detection and monitoring techniques, alongside preventive measures and engineering practices to mitigate its risks. Lastly, the review will shed light on emerging technologies, ongoing research, and potential innovations aimed at advancing MIC prevention and management strategies. Through greater awareness and understanding of this phenomenon, robust preventive measures will be developed and this will ensure the long-term integrity and sustainability of our infrastructures. **Keywords:** Corrosion, Materials, Microorganisms, Agents

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PHYTOCHEMICALS SCREENING AND ANTIOXIDANT ACTIVITY OF FRESH AND AGED GARLIC EXTRACTS

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ABSTRACT
The aging process profoundly influences the biochemical composition of garlic, a widely utilized ingredient known for its medicinal properties. This study meticulously examined both

Phytochemical analysis and antioxidant activity of fresh and aged garlic, employing various solvents—ethanol, chloroform, aqueous, and N-hexane—to extract phytochemicals. Phytochemical analysis revealed the presence of saponins, sterols, steroids, triterpenoids, and glycosides in fresh garlic, while aged garlic additionally showcased flavonoids, enriching its phytochemical profile. Furthermore, aged garlic demonstrated elevated levels of certain essential phytochemicals, notably sterols, steroids, triterpenoids, and alkaloids, particularly prominent in aqueous extractions. In terms of antioxidant activity, ethanol was found to be 78.13±0.001, whereas fresh garlic extracts exhibited a mean antioxidant activity of 76.00±0.002. N-hexane extracts from aged garlic showed a mean antioxidant activity of 55.67±0.001, slightly lower than that of fresh garlic at 53.40±0.003. Chloroform extracts from aged garlic exhibited a mean antioxidant activity of 51.47±0.004, compared to fresh garlic at 40.97±0.016. Aqueous extracts from aged garlic displayed a mean antioxidant activity of 51.73±0.006, while fresh garlic extracts showed a mean of 53.97±0.003. These findings underscore the nuanced differences between fresh and aged garlic, providing valuable insights into the potential health benefits associated with consuming aged garlic products. Exploring the intricate biochemical changes induced by aging in garlic illuminates its antioxidant properties and underscores its therapeutic potential.

Keywords: *Phytochemicals; Antioxidant activity; Fresh garlic; Aged garlic*

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EFFECT OF ORAL ALOE OIL, OLIVE OIL, AND VOGLIBOSE ADMINISTRATION ON SMALL INTESTINAL VILLI MORPHOLOGY AND BRUSH BORDER ENZYMES IN RATS

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ABSTRACT

Absorption process involves the transfer of nutrients and bioactive compounds from the epithelium to the bloodstream. *Aloe vera* and olive plants are known for their therapeutic properties, containing bioactive compounds used in treatment of diseases such as diabetes and oxidative stress. However, their consumption, whether prolonged or short-term, may influence small intestinal villi morphology, affecting absorption. This study aims to assess the effects of orally administered aloe and olive oil on small intestinal villi morphology and absorptive properties in albino rats. Twenty rats were procured and after 2 weeks of acclimatization were divided into four groups (n = 5): NC (normal control), AO (aloe oil), OO (olive oil), and VG (voglibose control). Over two weeks, each group received either normal saline (NC), Aloe oil (1 mL), olive oil (1 mL), or voglibose (200 mg/kgbw), with daily monitoring of feed and water intake. On day 14, maltose tolerance test was performed to assess the rate of glucose absorption after maltose administration (2 g/kg body weight). Rats were anesthetized and sacrificed, weights of organs and length of small intestine was recorded. Histopathological analysis was carried out on jejunal and duodenal samples. Results revealed that aloe and olive oil treatment increased water intake but did not significantly alter feeding patterns. Maltose absorption was delayed in the AO and OO group from 0-30 minutes compared to NC and VG, with peak plasma levels observed between 30-60 minutes post-administration. However, no significant differences in

small intestine weight or length were observed between AO/OO compared to the control group. Interestingly, AO and OO groups exhibited larger villi, statistically significant compared to the control and voglibose. Aloe oil treatment did not affect organ weights (liver, kidneys, and small intestine). Overall, aloe oil increased water intake and delayed maltose absorption compared to Olive oil, despite enlarging the villi. These findings further highlight the gut remodeling effects of aloe and olive oils.

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MICROBIAL ECOLOGY AND ITS ROLES IN WASTEWATER TREATMENT PROCESSES: A COMPREHENSIVE REVIEW

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ABSTRACT
Wastewater treatment is a crucial process to ensure the preservation of environmental health and sustainable management of water resources for human use. Microbial ecology plays a vital role in wastewater treatment processes contributing to the efficient removal of pollutants and the overall performance of treatment systems. This review paper aims to provide a comprehensive overview of microbial ecology in wastewater treatment discussing the various microbial communities involved, their interactions and the factors influencing their dynamics. Furthermore, the paper explores the application of emerging technologies, such as metagenomics and molecular techniques in understanding and manipulating microbial communities for improved wastewater treatment. The paper concludes by highlighting future research directions and potential for harnessing microbial ecology to address emerging challenges in wastewater treatment.

Keywords: Wastewater treatment, microbial ecology, environmental health

2nd UMYU Conf/2024/293

DETECTION OF TRYPANOSOME INFECTION IN ANIMALS SLAUGHTERED AT KATSINA ABATTOIR, KATSINA STATE

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ABSTRACT
One sentence on trypanosomiasis. In this study, a pioneering study was conducted at Katsina central abattoir to detect the presence of trypanosome infections in slaughtered animals brought

from all over Katsina. The study was conducted between September 2019 and January 2020. One hundred randomly selected camels and cattle (58 camels and 42 cattle) were examined using the wet mount and hematocrit centrifugation techniques. The overall infection rate was 1.7%, with camels exhibiting a higher prevalence (1.7%) than cattle (0.00%). Conversely, PCR analysis using nested ITS primers for *T. evansi* confirmed the presence of trypanosome infections in the tested animals. Furthermore, blood samples were collected from 100 small ruminants (66 goats and 34 sheep). Parasitological examination revealed trypanosome infection in both goats (1.58%) and sheep (2.70%). Further analysis indicated a significant difference in PCV levels between healthy and non-healthy animals, with non-healthy animals exhibiting signs of anaemia ($p<0.05$). Notably, animals originating from Mai'adua market displayed a higher prevalence of infection and lower PCV levels compared to animals originating from other areas, suggesting a localized prevalence. The findings underscore the continued presence of trypanosome infections in animals within Katsina state and highlight the economic significance of the research for both the local area and Nigeria as a whole. Effective management and control measures are warranted to mitigate the spread of this disease and safeguard animal health and economic interests. Further investigations are recommended to assess the distribution of the disease within the state and formulate targeted interventions.

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REVIEW OF PHYTOCHEMISTRY AND BIOLOGICAL ACTIVITIES OF MEDICINAL PLANTS WIDELY USED IN THE ETHNOPHARMACOLOGICAL TREATMENT OF TYPHOID FEVER

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ABSTRACT
This review comprehensively examines the phytochemical composition and biological activities of medicinal plants commonly utilized in ethnopharmacological practices for the treatment of typhoid fever. Typhoid fever, caused by Salmonella enterica serotype Typhi, remains a significant public health concern, particularly in regions with limited access to conventional medical interventions. Traditional medicinal plants have garnered attention for their potential therapeutic efficacy in managing typhoid fever symptoms and complications. Through systematic literature review, this study synthesizes the available scientific evidence regarding the phytochemical constituents and pharmacological properties of medicinal plants traditionally used for typhoid fever treatment. Key phytochemical classes, such as alkaloids, flavonoids, terpenoids, and phenolic compounds, are analyzed for their potential contributions to the observed biological activities, including antibacterial, anti-inflammatory, antipyretic, and immunomodulatory effects. Furthermore, this review critically evaluates the methodological approaches used in studies assessing the efficacy and safety of medicinal plants, highlighting areas for future research and clinical exploration. By elucidating the scientific basis underlying the ethnopharmacological utilization of medicinal plants in typhoid fever management, this review aims to inform evidence-based healthcare practices and facilitate the development of novel therapeutic interventions targeting this infectious disease.

Keywords: Typhoid fever, *S typhi*, Ethanopharmacological, Medicinal plants, Traditional medicine

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ISOLATION AND SCREENING OF *BACILLUS* SPECIES WITH ANTIMICROBIAL ACTIVITY

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ABSTRACT

Fungal and bacterial infection are becoming increasingly common, few compounds currently been used as antimicrobial agent and are carcinogenic while the few bio fungicides are becoming resistance. Thus, the need for more active compounds. *Bacillus* species secretes extra metabolites which are detrimental to other microbial species if harnessed properly could substitute the synthetic chemotherapeutics that have adverse effects to the host cells. This study was aimed at isolating *Bacillus* species from agricultural soil and to screen their active compounds for potential as antimicrobial agents. A total of 5 soil samples were collected from different places in Umaru Musa Yar'adua University botanic garden. One gram (1g) of each of the sample was used to carried out serial dilution from 10^{-1} up to 10^{-12}, the last two were used to obtain total count. Twenty-five (25) different bacteria isolates were recovered from the samples and further screened for bioactive compound production, using drop collapse assay, oil spreading test and blood hemolysis. The isolates were tested for antimicrobial potentials against *E. coli*, *S. aureus* and *A. niger*. The result showed that out of 25 bacteria isolates nine (9) isolates satisfied as bioactive secretive bacteria by showing their antimicrobial activity on plant pathogenic fungi (*Aspergillus niger*) and plant bacterial pathogen (*E. coli* and *Staph. aureus*). Five (5) isolates showed antifungal activity with the zone of inhibition range of 10.0±0.0 mm -37.5±2.5 mm in (M2 and M12), and six isolates showed antibacterial activity with the ranges of 22.5±2.5 mm-32.5±3.0 mm in (71, S41and M12). Based on the finding it showed that the isolated bacteria have the potential of producing antibiotics. Also recommended for molecular characterization and further testing against pathogenic microbes.

Keywords: *Bacillus, E. coli* and *S.aureus*

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BIODEGRADATIVE POTENTIAL OF SOIL BACTERIA ON SOME COMMONLY USED PESTICIDES

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ABSTRACT

Pesticides are organic compounds manufactured and used for pest control. Excessive and continuous dispersion of pesticides in the environment results in environmental pollution that require remediation. This study investigated the potential of bacterial isolates to biodegrade Dichlorvos (2, 2-dichlorovinyldimethylphosphate) and Carbofuran (2, 3-dihydro-2, 2-dimethyl-7-benzofuranyl methylcarbamate) pesticides from soil samples from farmlands with a history of Dichlorvos and Carbofuran pesticide application. This research involved Sampling of three sites in Kano Metropolis, Kano State. Nigeria. Determination of Soil Physicochemical Parameters, Isolation and identification, Screening for the bacterial isolate (s) capable of utilizing the pesticide (Dichlorvos or Carbofuran) as a sole source of carbon were carried out. The following

parameters (Concentration of the pesticides, pH, Temperature, Agitation and Incubation time) were varied to determine the optimum conditions for maximum degradation. The potent bacterial isolates were further subjected to a molecular analysis for the detection of opd and mcd genes. Five pesticide degrading bacteria were isolated and identified as *Bacillus* sp 1, *Serratia* sp, *Bacillus* sp. 2, *Pseudomonas* sp. and *Bacillus* sp. 3. Their growth in MSM broth supplemented with 50 mg/L of Dichlorvos or Carbofuran pesticide was monitored at optical density of 600 nm. The results showed that *Serratia* sp recorded highest growth for degradation of Dichlorvos at 1 % (v/v), while *Pseudomonas* sp had maximum growth for degradation of Carbofuran at 1% (w/v). The results of the optimized conditions that yielded a maximum degradation indicated that concentration of 100 mg/L for *Serratia* sp and 300 mg/L for *Pseudomonas* sp, pH of 7.0 and agitation of 100 rpm for both organisms, temperature of 35^{o}C for *Serratia* sp and 30^{o}C for *Pseudomonas* sp, Incubation Time of 5 days for both organisms. opd and mcd genes were identified from *Serratia* sp and *Pseudomonas* sp respectively. The results suggest that the isolated bacterial isolates have the potential to degrade Dichlorvos and Carbofuran pesticide from contaminated soil.
Keywords: Biodegradation, Pesticide, Potential, Soil.

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BIOACTIVE COMPOUNDS AND ANTIBACTERIAL ACTIVITY OF MORINGA OLEIFERA: A MINI ASSAY

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ABSTRACT

Moringa oleifera Lam. (Family Moringaceae) is well – known for its various medicinal properties. It grows wild in the tropical and subtropical areas of Asia, Africa and the Middle East. In Nigeria, Moringa oleifera trees are planted at a large scale especially in the northern part of the country. Moringa oleifera Lam. (Family Moringaceae) on the other hand is well – known for its various medicinal properties. It grows wild in the tropical and subtropical areas of Asia, Africa and the Middle East. In Nigeria, Moringa oleifera trees are planted at a large scale especially in the northern part of the country. Moringa oleifera have been shown to have antibacterial effects against variety of bacterial species. It has been widely used in the treatment of certain diseases as a traditional medicinal herb. Many studies have suggested that different parts of Moringa oleifera show antibacterial activities against both Gram-negative and Gram-positive bacteria. Many studies have shown that nearly all types of Moringa oleifera tissues exhibit antibacterial activity. This review describes progress on research conducted to understand the antibacterial activity and bioactive compounds of Moringa oleifera and discusses the use of Moringa oleifera in the control of pathogenic bacteria. **Keywords:** Antibacterial activity; Moringa oleifera; Bioactive compounds

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UNDERSTANDING THE CRITICAL ROLE OF HIV PROTEASE IN PATHOGENESIS: MOLECULAR MECHANISMS AND THERAPEUTIC IMPLICATIONS

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ABSTRACT
Human Immunodeficiency Virus (HIV) continues to pose significant global health challenges, with an estimated 38 million people living with the virus worldwide. Understanding the molecular intricacies of HIV is crucial for elucidating viral pathogenesis and developing effective therapeutic strategies. This review provides an overview of HIV and the importance of understanding the viral pathogenesis in combating the epidemic. HIV protease is a key enzyme in the viral life cycle that play a pivotal role in cleaving viral polyproteins, thus facilitating viral maturation and enhancing infectivity. Additionally, HIV protease contributes to immune system evasion through its molecular mechanisms, including substrate specificity, interactions with other viral proteins, and host cell interactions. The current antiretroviral drugs targeting HIV protease have reportedly improved patient outcomes; however, drug resistance remains a challenge. Ongoing advancements in drug development and potential future therapeutic strategies hold promise for overcoming these challenges. Moreover, understanding the clinical implications of HIV protease, including drug resistance and its impact on patient outcomes, is vital for informing clinical research directions. In conclusion, screening more compounds that target HIV protease is essential for developing novel therapeutic approaches and addressing the evolving challenges posed by HIV/AIDS. This review highlights the critical role of HIV protease in viral pathogenesis and emphasizes the importance of continued efforts in this field.
Keywords: HIV, protease, pathogenesis, antiretroviral drugs, drug resistance, therapeutic strategies, clinical implications

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OPTIMIZATION OF SOLID-STATE FERMENTATION WITH *Aspergillus niger* IN SORGHUM STALK

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ABSTRACT
Fermentation of sorghum stalks has been traditionally practiced in various cultures, for use as an alternative animal feed. This study investigated the optimization of solid-state fermentation using filamentous fungi of the genera *Aspergillus niger* in the sorghum stalk sample using different temperatures of (20, 25, 30, 35, degrees ºC) to ensure optimum growth and the activity of the fungi while the Ph levels of (5, 6, 7, and 8) are used to create an ideal environment for the fungi to thrive. Also, a control groups are used to compare the effectiveness of the fermentation. We consider 70% moisture. 60g of substrate was put together with 140g of liquid medium which include 28g of peptone, $cacl_2$ of 1.4g, and 0.29g of NaH_2PO_4. Also, 1000ml of deionized water was added into the samples and kept at a varying temperature range. The result showed that the highest yield of Hetabolites was achieved at the optimum temperature of (35 degrees Celsius) and a (Ph level of 7.2), indicating the potential of the process to enhance the nutritional value of the sorghum stalk sample. This finding provides a valuable insight into the optimization of solid-state fermentation for production of metabolites and stalk as a substrate.

Keywords: *Aspergillus niger*, solid-state fermentation, temperature, PH, and sorghum stalk

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PREVALENCE AND MOLECULAR DETECTION OF SALIVARY GLAND HYPERTROPHY VIRUS (SGHV) IN WILD TSETSE FLIES FROM TAFA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA.

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ABSTRACT

Tsetse flies are biological vectors of Human African trypanosomiasis (HAT) and Animal African Trypanosomiasis (AAT) that account for severe economic losses in livestock in affected regions in Africa. Salivary Gland Hypertrophy Virus is an RNA Virus responsible for salivary gland hyperplasia, reproductive abnormalities and collapse of laboratory tsetse colonies in Sterile Insect Technique of tsetse control. A total of 480 wild tsetse flies were collected in Ija Gwari, in Tafa L.G.A of Niger State using biconical and NISTE traps. Speciation of the tsetse flies and sex differentiation were carried out using standard methods. Total DNA was extracted from whole flies using the Accuprep™ genomic DNA extraction kit. Molecular detection of tsetse flies was carried out using PCR and the open reading frame (ORFO5) gene of the SGHV was amplified using PCR under optimized conditions. Results showed that, two species of tsetse flies were identified, namely, G. *palpalis palpalis* (95.8%) and G. *tachnoides* (4.2%). Males accounted for 63.3% of the collected tsetse while 36.7% were females, Trypanosomes were detected in 79 of the 480 with a prevalence of 16.5%. Results further showed that five of the tsetse flies were infected with SGHV, ORO5 of the SGHV was detected with a band size of 320bp.The study indicated that tsetse flies in Tafa L.G.A harbored trypanosomes that is still endemic in the area. The wild tsetse flies examined were infected with SGHV, the prevalence of SGHV among these wild flies has serious negative implication for the use of wild tsetse flies from this locality as primary seed flies for tsetse programs, as wild flies infected with the virus will eventually result in collapse colonies and thus failure of the SIT.

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IMPACT OF ANTIOXIDANT SUPPLEMENTATIONS AS A THERAPEUTIC INTERVENTION FOR THE MANAGEMENT OF MALARIA

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ABSTRACT

Malaria is a disease that affects thousands of people around the world every year. Its pathogenesis is associated with the production of reactive oxygen and nitrogen species (RONS) and lower levels of micronutrients and antioxidants. Patients under drug treatment have high levels of oxidative stress biomarkers in the body tissues, which limit the use of these drugs. Therefore, several studies have suggested that RON/RNS inhibition may represent an adjuvant therapeutic strategy in the treatment of these patients by increasing the antioxidant capacity of the host. In this sense, supplementation with antioxidant compounds such as zinc, selenium, and vitamins A, C, and E has been suggested as part of the treatment. This review aimed to describe the main mechanisms inducing oxidative stress during malaria, highlighting the production of RONS as a defense mechanism against the infection, the metabolism of the parasite, and the metabolism of the Antioxidants providing information about its mechanism of action, and providing an evidence-based justification for its supplementation in malaria.

Keywords: Malaria, oxidative stress, antioxidants, supplementation, adjuvant treatment.

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CO (II) COMPLEX WITH SECOND GENERATION QUINOLONE DRUG OFLOXACIN: STRUCTURE AND ANTIMICROBIAL EVALUATION

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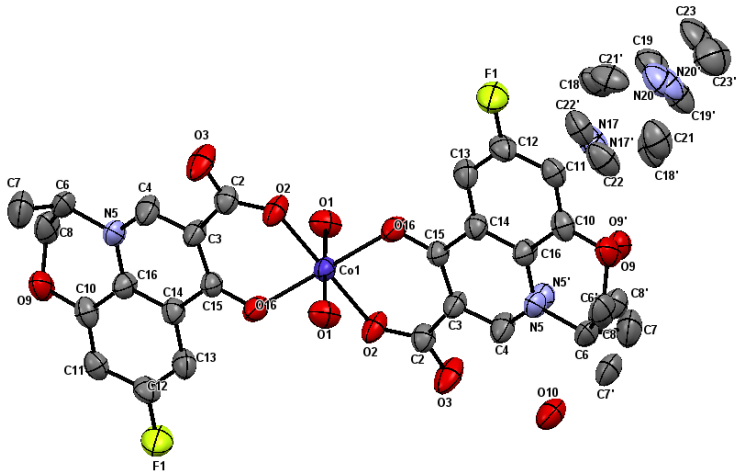
ABSTRACT
Co (II) complex of ofloxacin (ofx) has been synthesized and characterized using single crystal X-ray crystallography, elemental analysis, UV/Vis, FTIR, TG/DTA, and molar conductance. The mode of coordination of (ofx) was inferred by IR spectroscopy. Ofx acts as a bidentate ligand coordinated to Co (II) atom through the pyridone oxygen and carboxylato oxygen. The crystal structure of the complex $[Co(ofx)_2(H_2O)_2]$. H_2O has been determined by X-ray crystallography revealing a distorted octahedral geometry for the Co(II) atom. The *in-vitro* antimicrobial screening reveals the synthesized complex showing increased inhibitory action against some Gram (+) and Gram (-) bacteria in comparison to the parent ligand.



$[Co(ofx)_2(H_2O)_2].H_2O$

Keywords: Quinolones, complexes, ofloxacin, crystal structures.

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Synthesis, crystal structure, thermal analysis, and antimicrobial activity studies of 1-D Cd (II) coordination polymer containing pyrazinamide (PZA) and Dicyanamide (DCA) Co-ligand

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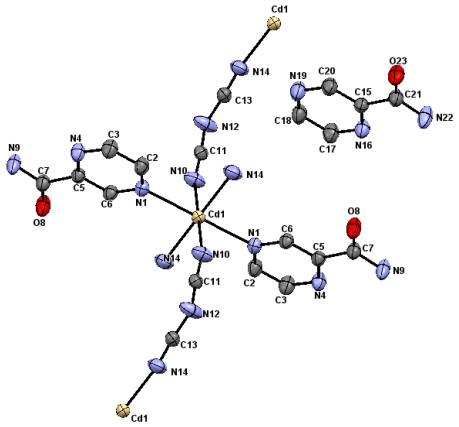
ABSTRACT
1D coordination polymer of $\{[Cd(\mu_{1,5}\text{-dca})_2(PZA)_2](PZA)_2\}n$ has been synthesized and characterized using single-crystal X-ray crystallography, elemental analysis, UV-Vis, FTIR, TG/DTA, and conductance measurement. The coordination modes of (PZA) and (DCA) were inferred utilizing IR spectroscopy. The single crystal X-ray structure of the complex revealed that

DCA coordinated through the nitrile nitrogen while PZA coordinated through the nitrogen of the pyrazine ring, forming an octahedral geometry. The antimicrobial activity results showed that metal complexes exhibited the same or a better antimicrobial compared to the parent ligand on some Gram (+) and Gram (-) strains.



Keywords: geometry, complexes, cadmium, crystal structures.

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SOCIO-DEMOGRAPHIC FACTORS AFFECTING THE PREVALENCE OF TYPHOID FEVER AMONG FEBRILE PATIENTS IN KEBBI STATE, NIGERIA.

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ABSTRACT

Typhoid fever is a life-threatening public health disease caused by the bacterium *Salmonella* Typhi. The disease is a significant health concern in underdeveloped and most developing countries, especially in Asia and Africa (including Nigeria). The study was aimed at determining the prevalence and sociodemographic factors associated with typhoid fever among febrile patients attending three selected hospitals in Kebbi State, Nigeria. A hospital based cross sectional study was carried out among 406 febrile patients suspected of typhoid fever aged 1-70 years (mean age 34 years) in three selected health facilities of Kebbi State, Nigeria from February2021 to October, 2021. Approximately 20 ml and 10 ml of venous blood was collected from adults and children respectively. Blood culture and biochemical tests were carried out. Patients were administered structured questionnaires to evaluate the level of knowledge and practice toward the disease. Data obtained from respondents was analysed by descriptive statistics. In this study, the culture identified *Salmonella* Typhi prevalence of typhoid fever among febrile study subjects in Kebbi State was 6.4%. A higher prevalence was recorded among males (7.5%) than in females (5.0%) participants. Patients within the age range of 11- 20 years had the highest prevalence (14.8%), those with informal education recorded 11.2%. It was observed that rural area dwellers had higher prevalence (9.4%). Out of 26 isolates, 25 were susceptible to cefotaxime, 11 isolates were resistant to cotrimoxazole and amoxicillin-clavulanate antibiotics. *Salmonella enterica* serovar Typhi is an important and common cause of febrile illness in our population. Lack of good quality drinking water in rural areas has a greater impact on the burden of typhoid fever among study participants. Cefotaxime and ciprofloxacin therapy are suitable treatments for typhoid fever. The identification of sociodemographic characteristics associated with the disease are of great importance in providing holistic preventive approach and control strategies of the disease.

Keywords: Typhoid fever, *Salmonella*, Prevalence, Febrile, Blood culture, Socio-demographic

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SEROPREVALENCE OF CYTOMEGALOVIRUS (CMV) INFECTION AMONG ANTENATAL CLIENT IN BAUCHI METROPOLIS, BAUCHI STATE, NIGERIA.

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ABSTRACT
Cytomegalovirus (CMV) remains a leading cause of congenital viral infection in humans. A cross-sectional study to determine the sero-epidemiology of CMV infection among pregnant women in Bauchi Metropolis was carried out. A structured questionnaire was administered to 184 consented patients whose blood sample was collected each. Samples were subjected to anti-CMV IgG and IgM assays using Enzyme-linked Immunosorbent Assay (ELISA) after which IgM-positive samples were further subjected to a CMV IgG avidity test. The study found a high seroprevalence of anti-CMV IgG (59.8%) among the study cohort while only 1.6% prevalence was recorded for anti- CMV IgM. This indicates that active CMV infection is not common among the study cohort but most of the participants might have had a previous exposure to CMV. Of the 3 (1.6%) IgM positive patients, 2 showed low avidity to anti-CMV IgM which indicates an ongoing primary CMV infection. Chi-square test showed a statistical association between sociodemographic characteristics of the study participants and prevalence CMV. Additionally, the study found that multiparous women had the highest anti-CMV IgG prevalence and that multigravida women had the highest anti-CMV IgM prevalence. A major route of CMV transmission is the sexual route, interestingly, this study found a strong association between history of sexually transmitted infection and both anti-IgM and IgG prevalence. The findings of this research suggests that interventions aimed at reducing CMV transmission may be beneficial in targeting specific stages of pregnancy.

Keywords: Cytomegalovirus, ELISA, Pregnancy, seroprevalence, IgM, IgG avidity, CMV.

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CURRENT PREVALENCE OF INTESTINAL PARASITIC INFECTIONS AMONG SCHOOLCHILDREN IN KATSINA METROPOLIS KATSINA STATE, NIGERIA

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ABSTRACT
Soil-transmitted helminthes and pathogenic intestinal protozoa are major causes of morbidity to humans especially children of school age. The present cross-sectional study was conducted between January 2022 and June 2022, to determine the current prevalence of intestinal parasitic infections among schoolchildren in Katsina metropolis. A total of Four Hundred and Twenty (420) schoolchildren from five randomly selected primary schools in Katsina metropolis were enrolled for the study. Structured Questionnaires were used to obtain the socio-demographic information of the children and their parents before the commencement of the survey. Stool samples were collected and analyzed using Kato-Katz and direct wet-mount techniques. The overall prevalence of intestinal parasitic infections was 33.6%. *Ascaris lumbricoides* was the most prevalent parasite (28.0%). Other parasites isolated are, *Giardia lamblia* (23.3%), Hookworm (22.8%), *Entamoeba coli* (19.5%) and *Trichuris trichiura* (6.6%). The result further showed that, males were more infected (37.1%) compared with the females (30.1%). Moreover, children aged 6-9 years old, were significantly ($P<0.05$) more infected (38.0%) compared to their

counterparts aged ≥10 years old (30.0%). Some of the major risk factors associated with the infection among the children were, family size, eating habit, lack of toilet facilities, source of drinking water and mothers' educational status. The prevalence of STHs and intestinal protozoa infections reported in this study indicated that STHs and intestinal protozoa infections are still prevalent and remained a matter of Public Health concern among schoolchildren in Katsina urban area. Efforts to improve the situation should include more public enlightenment, improved sanitary conditions in schools and implementation of school deworming programme.

Keywords: STHs, Protozoa, Parasite, School Children, Infection, Katsina Metropolis, Katsina State Nigeria

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THE EFFECTIVENESS OF OUTDOOR LABORATORY STRATEGY ON ACADEMIC PERFORMANCE AND RETENTION AMONG SENIOR SECONDARY SCHOOL BIOLOGY STUDENTS IN KATSINA STATE NIGERIA.

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ABSTRACT

This study investigated the effectiveness of outdoor laboratory strategy on students' academic performance and retention among biology senior secondary school in Rimi Zonal Education Quality Assurance Katsina state, Nigeria. The study has two research objectives, and tested two null hypotheses. The sample of 95 students which selected from the total population of 4531 were drawn from 16 core educational schools in Rimi Zonal Education Quality Assurance. The study was quasi experimental with pretest, posttest, post-posttest design. The validated instruments with reliability coefficient of 0.85, namely Ecology Performance Test (EPT) were used in data collection. The data were analyses using mean, standard deviation, t-test at 0.05 level of significance. Results revealed significant difference in the academic performance of students exposed to outdoor laboratory strategy and those taught using lecture. The study also revealed significant difference in the mean scores of student's retention ability when exposed to outdoor laboratory strategy. From the findings of the study, it was recommended among others, the use of outdoor laboratory Strategy in teaching biology in school should be encouraged by stake holders in the education sector such as Federal Ministry of Education, State Ministries of Education; NERDC among others. This can be done through periodic seminars and workshops to teachers on how to use outdoor laboratory strategy in teaching.

Keywords: Outdoor laboratory strategy, Academic performance, retention, Biology.