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SECTION ONE:

FOOD AND INDUSTRIAL MICROBIOLOGY ABSTRACTS (FIM)

FIM 110

APPLICATION OF ALUMINUM OXIDE NANOPARTICLES IN THE CULTIVATION OF SELECTED ASPERGILLUS SPECIES AND THE PRODUCTION OF PROTEASE ENZYME.

Yetunde Noimot Tijani*, Solomon Bankole Oyeleke, Evans Egwin, Aliyu Jagaba Department of Microbiology Federal University of Technology Minna, Nigeria Correspondence author's Email address: adebukolayetty@gmail.com Tel: +234-8062062052

ABSTRACT

Cymbopogan citratus (lemon grass) was collected from the school clinic environment of Federal University of Technology, Minna, Niger State. 25g of fresh lemon grass was boiled with 200ml of distilled water. The filtrate was used to produce aluminum oxide nanoparticles. *Aspergillus niger*, *Aspergillus terreus* and *Aspergillus flavus* were isolated from the soil sample collected from the biological garden of the Federal University of Technology, Minna, Niger State. The pure isolates were cultivated using potato dextrose agar enhanced with the aluminum oxide nanoparticles and incubated at room temperature for the period of 5days. The spores of the enhanced *aspergillus specie* were harvested and cultured on agar-plates containing sugarcane molasses (45 g/L), peptone (18 g/L), NaCl (5 g/L), KCl (0.5 g/L), $FeSO_4 \cdot 7H_2O$ (15mg/L), KH_2PO_4(60mg/L), $MgSO_4$(50mg/L), $CuSO_4 \cdot 5H_2O$ (15mg/L), $MnSO_4$(15mg/L), and agar (20 g/L). The plates were incubated at 28°C until sporulation and the conidia were harvested for protease enzyme production using wheat

bran as substrate. Different pH, ranging from 4.5, 5.0, 5.5, 6.0, 6.5, 7.0 and 7.5 and different temperatures, ranging from 20º, 30º, 40º, 50º and 60º were used for the optimization of the protease enzyme. *Aspergillus niger* has the highest yield of protease at pH 6.0 and at 30ºC. *Aspergillus niger* is recommended as a pilot scheme for utilization in the production of protease.

Keywords: Protease, *Aspergillus niger*, Enzyme optimization, Nanoparticles.

FIM 111

SCREENING AND OPTIMIZATION OF FUNGAL ISOLATES FOR EXTRACELLULAR PROTEASE PRODUCTION

[1*]Idakwoji, John A., [2]Adegoke, Samuel A. and [2]Obi, S. K. C.

[1]Department of Science Laboratory Technology, Federal Polytechnic Idah, P.M.B. 1037, Idah, Kogi State-Nigeria.

[2]Department of Microbiology, Kogi State University, Anyigba, Kogi State-Nigeria.

[*]**Corresponding author**: idakwojijohn93@gmail.com

Tel: 08070937493 / 07035481230.

ABSTRACT

An attempt has been made to screen fungal isolates for extracellular protease production and optimize nutritional and process parameters using available agro-based substrates. A total of forty seven filamentous fungi were isolated and made pure from selected sources. *A. niger* BM -1 (isolated from '*suya'* meat) produced the highest zone of

proteolysis when screened qualitatively on skim milk agar and incubated at room temperature for 4 days. Optimization of medium nutritional factors revealed that the best agro-based carbon substrate was milled rice husk at an optimum concentration of 2.5 % (w/v) which gave a protease yield of 4.0×10^{-2} U/mL and growth, (0.53 g) at 28 ^{o}C under five days of solid state fermentation; while glucose was the best refined carbon substrate giving yields of (4.2×10^{-2} U/mL) for protease and (0.53g) for mycelial growth. Among the organic and inorganic nitrogen sources tested, NH_4Cl supported the highest growth (0.28g) and protease yield (0.078 U/mL), while yeast extract gave a mycelial weight of (0.27g) and enzyme yield of (0.081 U/mL). However, the best organic nitrogen source was groundnut cake, which gave a protease yield of (0.011U/mL) and growth yield of (0.11g) and it was optimum at 2.0 % (w/v). Protease enzyme production and growth took place over a wide range of pH ranging from 4.0 to 8.0, but growth yield (0.24g) and protease production (0.61 U/mL) were highest at 7.0 pH. *A. niger* BM -1 showed the best growth (0.25g) and enzyme yield (0.31 U/mL) at an incubation temperature of 35 ^{o}C and both declined between 40-50 ^{o}C under five days incubation. Under the optimized conditions (2.5 % w/v milled rice husk, 2.0 % w/v groundnut cake, pH of 7, temperature of 35 ^{o}C and 5 days incubation), mycelia weight of (0.55g) and enzyme level (0.078 U/mL) were recorded and the five sets of experiment indicated appreciable growth (0.51 to 0.56g) and protease yield (0.61 to 0.78 U.mL).

Key words: Protease, Optimization of enzyme production, Solid state fermentation, *Aspergillus niger*.

FIM 112

BACTERIOLOGICAL ANALYSIS OF FRESH PALM WINE SOLD IN PORT HARCOURT CITY, RIVERS STATE

*Brian Nanyi, Njoku S.O.C and Juliet Nanyi
Microbiology, Madonna University, Elele, Rivers State
Corresponding author: bnanyi@yahoo.com
Tel: 08039435716

ABSTRACT

The bacteriological study of fresh palm wine consume in Portharcourt was carried out on a total of 50 samples collected regularly after every two days for three months. Total aerobic plate count, coliform count and *Escherichia coli* count were determined using nutrient agar, MacConkey agar and Eosine Methylene Blue agar respectively. Samples collected from Elekahia had the highest TAPC of $5.78\pm0.13\log_{10}$Cfu/ml while Rumokoro had the least $5.70\pm0.16\log_{10}$Cfu/ml. Coliform counts were $5.69\pm0.7\log_{10}$Cfu/ml in samples from Elekahia while $5.66\pm0.06\log_{10}$Cfu/ml was from Rumokoro. *Escherichia coli* count was $5.65\pm0.08\log_{10}$Cfu/ml in samples from Elekahia but there was none in samples from Rumokoro. Percentage occurrence of bacteria were *Serratia* species and *Proteus* species 4(33.3%) each followed by *Staphylococcus* species 2(16.6%). *Escherichia coli* and *Pseudomonas* species had 2(16.6%) each while *Klebsiella* species had the least with 1(8.3%). The data were subjected to statistical analysis using sample T test. P value was >0.05 which shows that there was no significant difference in the mean

count of bacteria isolated from Elekahia and Rumokoro. These isolates were tested for antibiotics susceptibility using the agar diffusion method. In the antibiotic susceptibility amoxacillin had the highest resistance

FIM 113

ANTIBIOTICS SUSCEPTIBILITY PATTERN OF BACTERIA ISOLATED FROM NUNU SOLD IN OWERRI

*Brian Nanyi, Njoku S.O.C and Juliet Nanyi
Microbiology, Madonna University, Elele, Rivers State
Corresponding author: bnanyi@yahoo.com
Tel: 08039435716

ABSTRACT

This study was carried out to determine the occurrence of bacteria in nunu sold in Owerri, Imo state. A total of 50 samples were investigated 25samples from Amahausa market and 25 from Obinze market. Using 10 fold serial dilution the samples were inoculated into nutrient agar, MacConkey agar and eosine methylene blue agar for total aerobic plate count, coliform count and *Escherichia coli* count respectively. Standard bacteriological methods were used in the identification of the organisms. The total mean count of bacteria from Amahausa market was higher with $8.63\pm0.25\log_{10}$Cfu/ml, $7.45\pm0.10\log_{10}$Cfu/ml and $6.21\pm0.05\log_{10}$Cfu/l, while that of obinze market was $8.59\pm0.02\log_{10}$Cfu/ml, $7.39\pm0.06\log_{10}$Cfu/ml and $6.14\pm0.10\log_{10}$Cfu/ml for TAPC, CC and ECC respectively. The bacteria isolated include *Staphylococcus aureus*,

Escherichia coli, *Pseudomonas* species, *Bacillus* species and *Lactobacillus* species. There was no significant difference in the amount of bacteria found in nunu sold in Owerri. High resistance was observed with ampiclox, zinnacef, rocephin, streptomycin and septrim while high susceptibility was seen with ciprofloxacin, gentamycin, pefloxacin and tarivid.

FIM 114

ANTIBIOTIC SUSCEPTIBILITY PATTERN OF BACTERIA ISOLATED FROM GARRI SOLD IN YENAGOA, BAYELSA STATE

*Brian Nanyi, Njoku S.O.C and Juliet Nanyi
Microbiology, Madonna University, Elele, Rivers State
Corresponding author: bnanyi@yahoo.com
Tel: 08039435716

ABSTRACT

This work was carried out to determine the antibiotic susceptibility pattern of bacteria isolated from garri. A total of 100 samples were collected 50 from Swali market and 50 from Tombia market. Total aerobic plate count (TAPC), coliform count (CC) and *Escherichia coli* count (ECC) were determined using nutrient agar, MacConkey Agar and eosine methylene blue agar respectively. TAPC of garri sold in Tombia market had the highest count of $8.4\pm0.2\log_{10}$Cfu/g higher than Swali market with TAPC of $7.70\pm0.36\log_{10}$Cfu/g. No significant difference was observed in CC $1.83\pm0.28\log_{10}$Cfu/g for Tombia market and $1.59\pm0.25\log_{10}$Cfu/g for Swali market. EEC $4.63\pm1.37\log_{10}$Cfu/g and $5.7\pm1.8\log_{10}$Cfu/g for Swali and

Tombia market respectively showed no significant difference. The organisms isolated were *Staphylococcus* species, *Enterobacter* species and *Escherichia coli*. With *Enterobacter* species and *Staphylococcus* species being the most frequent isolated bacteria. Sensitivity test on the isolates showed ciprofloxacin, gentamicin and pefloxacin had the highest percentage of susceptibility pattern (100%). It was concluded that the low bacterial counts recorded for the evaluated fermented food product is tolerable and thus still safe for human consumption.

FIM 115

PRELIMINARY AFLATOXIN EVALUATION AND ISOLATION OF MOLDS FROM POPCORN RETAILED IN BAYERO UNIVERSITY (OLD CAMPUS) KANO

Kabir, A,*
Department of Microbiology, Bayero University Kano, Nigeria.
***Corresponding author**: akabir.mcb@buk.edu.ng

ABSTRACT

Popcorn is a tasty snack enjoyed by many, it is produced from maize. However maize is liable to spoilage and infestation by mycotoxin producing molds. Aflatoxin is a carcinogenic mycotoxin of public health significance. The research aims to isolate molds and detect the presence of aflatoxin in locally retailed popcorn within old campus of Bayero University Kano. Ten samples of popcorn were collected and analyzed to isolate molds, extract and detect

presence aflatoxin by Thin Layer Chromatography (TLC). Samples had mean fungal count of 4.13×10^4, molds isolated include; *Aspergillus flavus* (28.13%), *A. fumigatus* (25%), *A.niger* (18.75%), *A. terreus* (15.63%) and *Penicillium* spp (12.50%).None of the samples was found to contain aflatoxin This study revealed the presence of aflatoxigenic fungi in popcorn even though no aflatoxin was detected, there is the need to educate the farmers on good agricultural practices to reduce fungal contamination.

Keywords; Kano, Maize, Molds, Mycotoxins, Aflatoxin,

FIM 116

CHANGES IN THE MICROBIAL COMMUNITY OF SALTED GOAT MEAT

Ahmed El-Imam, A. M.[1]*, Akintunde, J. and Nihi, O.O.

Microbiology Department, Faculty of Life Sciences,
University of Ilorin, Kwara State.

ABSTRACT

Salting meat as a means of preservation was a common practice in Nigeria before electrification became widespread resulting in its replacement with refrigeration instead. Chronic, nationwide shortages in power supply has necessitated that this method be revisited. This study was carried out to determine the effect of varying salt concentrations on the population and diversity in the microbial community. Freshly processed goat meat was

purchased from Ipata abattoir in Ilorin, Kwara State and transported on ice for immediate analysis. The meat was treated with varying salt concentrations (5 %, 10 %, 15 % and 20 % respectively) with an unsalted portion serving as the control. Bacterial and fungal counts were obtained over five weeks, while recovered isolates were identified phenotypically. The 20 % salt concentration was the most effective for keeping the bacterial population low while the lowest salt concentration (5 %) yielded the highest bacterial counts. The average $\log_{10}$ bacterial count ranged from 4.93 – 5.34 while fungal count at 5 % salt concentration was found to be the least with log 2.52 showing that salt was most effective at that concentration. The final average mean log count for fungi between 15-20 % salt concentrations was found to be the highest (2.73-2.93) showing that 20 % salt concentration has the least effect on fungal growth in salted goat meat. The bacteria isolated from the samples were *Staphylococcus aureus, Listeria spp* and *Staphylococcus spp* while the fungi isolated from the samples were *Aspergillus niger, A. fumigatus, A. terreus, A. flavus, A. versicolor* and *Rhizopus stolonifer.*

Keywords: Salted meat; bacterial load; fungal load; preservation; Nigeria

FIM 117

CHARACTERIZATION OF UREASE FROM SOIL BACTERIAL ISOLATES FOR CONCRETE ENHANCEMENT

Hussaini Aisha, Oyewole Oluwafemi Adebayo, Omieza Haruna Ibrahim, Yakubu Giaus Japhet, Adebayo Anwo Ifeoluwa
Department Of Microbiology, Federal University Of Technology Minna, Niger State
Corresponding author: hussainaish@gmail.com

ABSTRACT

Ureases are a group of enzymes that hydrolyse urea producing carbon dioxide and ammonia, involving in increase in pH. The hydrolysis of urea by the enzymes urease is unique such that one of the few biologically occurring reactions that can generate carbonates. Bacteria are incredibly diverse and many species contribute to the precipitation of mineral carbonate in various natural environments. These microorganism have shown their importance in bio cementation in the construction industry such as the enhancement and durability of cementitious material, improvement in sand properties, restore of sandstone properties, covering of cracks in concrete, highly durable bricks production. These work examined the characterization of urease form soil bacteria isolates for concrete enhancement using bacteria isolated from the soil. Soil samples were collected from block industries within Minna metropolis, Niger state and transported to Federal university of Technology. A 10-fold serial dilution was carried out by the addition of one gram (1g) of the soil samples into nine millilitres (9 ml) of sterile distilled water,

0.1 millilitre (ml) of the10^{-5} and 10^{-6} dilution was inoculated in to the urease selective media. *Bacillus* sp gave the highest ability to produce urease was used for large scale production of urease. . Level of urease production was determined by spectrophotometry, optimum temperature, P^H , optimum incubation period were determined. It was centrifuged at 6000 rpm for 30 minutes. Crude ezyme was sterilised by filtration for large scale production. The cell free supernant containing crude enzyme was mixed with different ratio of cement for the production of bio concrete together with a control. Compressive strength test, spilt tensile test was carried in conformity with building specifications standards. The result obtained show that the enzyme produce by *Bacillus* sp was able to enhance the concrete; it can be use for bio cementation.

Keywords: Enzymes, *Bacillus,* Urease, Concrete, Building

FIM 118
OPTIMIZATION OF CARBONIC ANHYDRASE PRODUCED BY SOIL BACTERIAL ISOLATES FOR BIOCALCIFICATION OF CONCRETE

*Ibrahim, O.H., Oyewole, O.A., Hussaini, A., Jagaba, a., Yakubu, J.G., and Adebayo, A.I.
Department of Microbiology, School of Life Sciences, Federal University of Technology, Minna Nigeria.
*Correspondence author's email address:
ohionokuagidima@gmail.com
Telephone: +2348038451389

ABSTRACT

Biocalcification, otherwise referred to as microbially induced calcium carbonate precipitation (MICCP) is an

emerging area of research aimed at enhancing the strength properties of concrete. In this research study, two (2) bacterial isolates named GA(A) and GA(B) were isolated from concrete construction sites and screened for their carbonic anhydrase (CA) producing ability. Isolates GA(A) and GA(B) showed positive reaction to para-nitrophenylacetate (pNPA), producing yellow and peach/orange colour colonies respectively, and were used to produce the crude CA and the mean enzyme activity with standard error of mean for the CA from isolates GA(A) and GA(B) were 0.0321±0.0012 and 0.0351±0.0002 respectively. GA(B) was subsequently used for the large scale production of CA. Isolate GA(B) was identified as *Alcaligenes faecalis* subsp. *parafaecalis* Strain G, using cultural, biochemical and molecular characterizations. Optimum conditions for enzymatic activity were carried out to determine the optimum best conditions for CA activity. Optimum substrate concentration for the CA from isolate GA(A) was 5mM, with 50^{o}C optimum temperature and an optimum pH of 8.5. While CA from *A. faecalis* subsp. *parafaecalis* Strain G had an optimum conditions of 7mM, 50^{o}C, 9.5 respectively. The CA extract was used to reinforce concrete; the results showed an increase in crushing strength on days 7, 14 and 28 with mean crushing strength values of 11.54, 15.52 and 22.28 respectively. Scanning electron micrographs revealed distinctly visible precipitates of calcium carbonate crystals on the surfaces of the concrete treated with the CA. With the results obtained in the study, the CA could have huge potential applications in the biocalcification and healing of concrete.
Keywords: Concrete, Anhydrase, Bacteria, Soil, Optimization

SECTION TWO

MEDICAL AND PHARMACEUTICAL MICROBIOLOGY ABSTRACTS (MPM)

MPM 130

AIR QUALITY ASSESSMENT OF SURGICAL OPERATING THEATRE IN SIR YAHAYA MEMORIAL HOSPITAL BIRNIN KEBBI NORTHWEST NIGERIA

*Obi C[1], Jamila H.M[2]., Gulumbe B.H[3].,
Department of Microbiology, Faculty of Sciences,
Federal University Birnin Kebbi, Nigeria
Corresponding author: obichidiebere@gmail.com
Tel: +2348065942714

ABSTRACT

Air quality assessment of surgical operating theatre in Sir Yahaya Memorial Hospital Birnin Kebbi, Northwest Nigeria as a means of controlling pathogenic causing nocosomial infections was evaluated. Bacterial species were isolated by settling plate method, using Nutrient agar as the isolating medium. The isolates were fully characterized by standard methods. The isolated bacteria includes; *Staphylococcus aureus, Pseudomonas spp, Streptococcus spp, Escherichia coli. Proteus volgaris,* and *Enterobacter aerogens.* The in used hospital disinfectants (Povidone iodine, Jik and Purit solution) used in the surgical theatres was obtained and evaluated using Kirby-Bauer ditch dilution method. The agar was inoculated with standardized isolates and allowed to dry; holes were then bore on the agar using 8mm cork borer, and then graded concentration of each disinfectant (0.1 ml) was added into each hole, allowed to diffuse and then incubated at 37°C for 24hrs. After incubation, zones of inhibition developed were measured. Povidone iodine and Jik solution obtained from the surgical theatre showed no zones of inhibition in all the isolates

tested but Purit solution obtained from the operating theatre showed appreciable zones of inhibition. Povidone iodine and Jik solution purchased from a pharmacy store in town produced zones of inhibitions ranging from 4.00mm to 25.00mm while the range for Jik solution is 2.00mm to 20.00mm. Killing rate for the most resistant isolates showed that *S. aureus* and *E. coli* required 25 to 30 minutes of exposure time at a dilution of 6% povidone iodine to bring about the death of all resistant isolates. We conclude that disinfection remain one of the most effective ways of reducing nosocomial pathogens in the surgical theatre as demonstrated in the results of this work. However, from time to time potency of the disinfectant in use in the operating theatre must be evaluated in order to keep pace with degradation of the disinfectant which normally occurs with time.

MPM 131

SUSCEPTIBILITY PATTERN OF ISOLATED BACTERIA FROM OPERATING THEATRE IN SIR YAHAYA MEMORIAL HOSPITAL BIRNIN KEBBI TO SELECTED THIRD GENERATION CEPHALOSPORIN (CEFTAZIDIME)

*OBI C[1] and JELANI M.G[2]
Department of Microbiology, Faculty of Sciences,
Federal University Birnin Kebbi, Nigeria
Corresponding author: Email address:
obichidiebere@gmail.com Tel: +2348065942714

ABSTRACT

Susceptibility of bacterial species isolated from Sir Yahaya Memorial Hospital Operating Theatres to selected 3rd

generation cephalosporines was carried out. The selected cephalosporins is Ceftazidime. The bacteria used were isolated from operating theatres by settling plate methods using Nutrient agar. The isolates were fully characterized by standard method. Susceptibility test was carried out by using Kirby- Bauer diffusion method. Mueller Hintone agar was used for the susceptibility test. The agar was inoculated with standardized isolated bacteria and allowed to dry; holes were bore in the agar by using 8mm cork borer. Different concentrations of ceftazidime were prepared by two fold dilution; 0.1ml of each dilution was transferred into each hole and allowed to diffuse for 20 minutes than incubated for 24hrs. The result revealed the following bacteria in the theatres; *Staphylococcus aureus, Pseudomonas spp, Streptococcus spp, Escherichia coli. Proteus volgaris,* and *Enterobacter aerogens.* Among all isolated specie Pseudomonas was resisitant to the antibiotic tested, about 48% of the isolated Staphylococcus spp were susceptible to the antibiotic. It can be concluded that the isolated bacteria from the operating theatres of the hospital are capable of causing surgical wound nosocomial infections. The infection may be difficult to treat when it developed due to the fact that Staphylococcus aureus and Staphylococcus epidermidis which are important pathogens in surgical wound infections are resistant to Ceftazidime which are the most prescribed drugs in surgical wound nosocomial infection.

MPM 132

PREVALENCE OF CRYPTOSPORIDIOSIS AMONG STUDENTS OF FEDERAL UNIVERSITY BIRNIN KEBBI, KEBBI STATE NIGERIA

*OBI C[1] AND INUWA I[2]
Department of Microbiology, Faculty of Sciences,
Federal University Birnin Kebbi, Nigeria
Corresponding author: Email address:
obichidiebere@gmail.com Tel: +2348065942714

ABSTRACT

Cryptosporidium is ubiquitous enteric protozoan pathogen which affects humans, domestic and feral animals worldwide. An important aspect of cryptosporidiosis is its higher prevalence in young children with diarrhea. The infection causes high morbidity and sometimes high mortality rates especially among adults living with HIV/AIDS. This research was carried out to study the prevalence of *Cryptosporidium* among student of Federal University Birnin Kebbi. Fresh stool samples were collected from 120 students, using clean sterile dry screw top plastic containers. A thin smear was prepared by Ziehl Neelsen's staining technique to screen for *Cryptosporidium* parasites. Out of the 120 student examined, 59 were found positive representing 49.2%. Prevalence was significantly higher among females students than the male students (55% vs 43.3%, $P<0.05$ respectively). However, sex related distribution was similar ($P>0.05$). Hand washing with soap before eating was significantly protective ($P<0.026$). It was therefore inferred that effective control strategies should include educating students on the relevance of personal

hygiene and enforcement of health related laws in the community and at schools.

MPM 133

ANTIMICROBIAL PHYTOCHEMICAL AND CRUDE LIPID CONTENT OF SUNFLOWER (*Helianthus annuus*) AND COCONUT (*Cocos nucifera*) OILS

*Mohammed Shehu Busu[1], Ya'aba Yakubu[1], Halima Aliyu[2], Peters O. Oladosu[1], Ibrahim G. Ijele[1] Fatima Aliyu[1], Adam Raji Abdulmumin[1] Ibrahim Kolo[1] Peter O. Adigwe[3]
[1]Department of Microbiology and Biotechnology, National Institute for Pharmaceutical Research and Development, Abuja.
[2]Department of Medicinal Chemistry and Quality Control, National Institute for Pharmaceutical Research and Development, Abuja.
The Director General/CEO, National Institute for Pharmaceutical Research and Development, Abuja.
Corresponding author: mshehubusu@yahoo.com,
Phone No: +234 803 688 9317

ABSTRACT

Oil are heterogeneous collection of biochemical substances which have in common the property of being soluble in most organic polar solvents and insoluble in water. The beneficial uses of oil from plants have been known since time immemorial. Apart from their uses as food items, oils extracted from seeds are also used for different purposes ranging from medicinal to biofuels. This was aimed at comparing the antimicrobial as well as chemical

constituents of the two oils. The antimicrobial activities of the oils were assayed using Agar-well diffusion technique against *Salmonella typhi*, *Klebsiella pneumoniae*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Candida albicans*. Qualitative phytochemical screening was carried out and crude lipid contents were also determined. The result of the antimicrobial screening showed antimicrobial potency of sunflower oil against at highest concentration of 3.125% v/v to *S. aureus* with zone of inhibition of 26mm, *K. pneumonia* with zone of inhibition of 22mm, *S. typhi* with zone of inhibition of 20mm, *P. aeruginosa* with zone of inhibition of 18mm. The Minimum Inhibitory Concentrations (MIC) of the extract ranged from 1.5625%-3.125% whilst the Minimum Bactericidal Concentrations (MBC) also ranged from 3.125%-6.25%. Coconut oil showed activity against only *K. pneumonia* with zone of inhibition of 19mm at the highest concentration of 12.5% and *S. aureus* with zone of inhibition of 24mm. the MIC for the two organisms were 12.5% while the MBC for the *K. pneumonia* was 25% that of S. aureus 12.5%, The sunflower oil contains terpenes, sterols while the coconut contain carbohydrate in addition. The lipid content of sunflower was 70.6% while coconut oil has 68.85%. The result of this study showed that both oil has proved its use in folklore as an alternative antimicrobial agent and further research can lead to isolation of a new lead of medical importance.
Keywords: Oil, Antimicrobial, sunflower, coconut, lipid

MPM 134

DUAL INFECTION OF HIV-1 AND HIV-2 AMONG PATIENTS ON ANTI-RETROVIRAL THERAPY IN EKITI STATE NIGERIA

Dada, O.O., Oyinloye, M.A. and Okiki, P.A.
Department of Biological Sciences, Afe Babalola University, Ado-Ekiti, Nigeria
Correspondence E-mail: okikipa@abuad.edu.ng

ABSTRACT

Human Immunodeficiency Virus (HIV) is a virus that targets and alters the immune system, increasing the risk and impact of other infections and diseases. HIV-1 and HIV-2 are the two known human retroviruses belonging to the genus *Lentivirus*. The study was aimed at assessing the prevalence of HIV-1 and HIV-2 among patients on anti-retroviral therapy in Ekiti State, Nigeria. HIV patients (300) attending three HIV referral centres in Ekiti State, between October 2018 and March 2019, were considered for the study. Questionnaires were administered to generate socio-demographics of the patients and their blood collected for determination of viral loads, CD4 counts and differentiation of HIV into HIV-1 and HIV-2 variants. The patients were made up of 90 (30%) males and 210 (70%) females, aged 11- 80 (40.66 ± 0.91) years with median age range 41 - 60 years, and weighed 30 - 95 (66.86 ± 0.87) Kg. Two hundred and eighty-two patients (94%) had HIV-1 infection only, 2 (0.7%) had HIV-2 infection only, 15(5%) had dual infection of HIV-1 and HIV-2, while one tested negative. The health status of the patients based on the CD4 counts showed that 41.33% had CD4 counts ≥500 cells/μL, which is the normal

level for a healthy individual; while the rest were immunosuppressive with CD4 counts <500 cells/μL. Among the subjects, 224 (76.67%) had viral load <1000 copies/mL, a range considered normal suppression; 9.67% had 1000-10000 copies/mL, a poor suppression range; while 15.67% patients had above 10,000 copies/mL, which is considered as a critical value. For patients with HIV-1 only, the viral loads were between 20-2004945 (31907.71 ± 926.79) copies/mL. The two patients infected with HIV-2 only, both had 20 copies/mL of viral load. While for HIV-1/2 dual infection, the viral loads were between 20-1039452 (89040.33 ± 6959.04) copies/mL. Antiretroviral therapy (ART) with time improved CD4 counts significantly (P = 0.035), along with reduction in viral loads. This study established the prevalence of both HIV-1 and HIV-2 variants in Ekiti and the dual infection was found to be associated with high viral burden in the blood of the patients.

MPM 135

In Vitro ANTIBACTERIAL AND ANTITUBERCULAR ACTIVITIES OF LEAF EXTRACTS OF *Senna occidentalis*

Kazeem Toyosi Olatunji[1*], Yakubu Ya'aba[1], Shehu Busu Mohammed[1], Ifesinachi Josephine Akah[1], Oluwaseun Christaina Daniel[1] and Peters Olawale Oladosu[1]

[1]Department of Microbiology, Human Virology and Biotechnology, National Institute for Pharmaceutical Research and Development, Idu, P.M.B. 21 Garki, Abuja, Nigeria.

[*]**Corresponding author**: kto2k1@gmail.com Tel: +2348069231840

ABSTRACT

Tuberculosis remains a global infectious disease and with emergence of multi-drug resistance strains, there is need for research and development of new compounds that will serve as lead in drug development. This study aimed to evaluate the antibacterial and antitubercular activities of ethyl-acetate and ethanol leaf extracts of *Senna occidentalis*. Fresh leaves of *Senna occidentalis* collected from Suleja, Niger state were used for this study against some medically important micro-organisms viz; *Staphylococcus aureus*, *Escherichia coli*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Salmonella paratyphi*, *Klebsiella pneumoniae, Mycobacterium bovis and Mycobacterium smegmatis*. The leaves were extracted successively using ethyl-acetate and ethanol. The obtained extracts were tested *in vitro* for antibacterial activity by agar well diffusion method, while anti-tubercular screening was carried out by broth micro-dilution method. A fixed-dose

concentration of chloramphenicol (30 µg/mL) was used as a control drug against the bacterial isolates while isoniazid (25 µg/mL) was used as control drug against the mycobacterium isolates. The *in vitro* antibacterial screening showed that the crude extracts exhibited varying activity against the different microbes with highest zone of inhibition at 12 mm, and anti-tubercular activity with MICs ranging from 97.6-390.6 µg/mL. Among these extracts, ethyl-acetate extract showed significant antibacterial activity against most of the test micro-organisms. The most susceptible micro-organism was *P. aeruginosa* (12mm zone in ethyl-acetate at 80 mg/mL) followed by *B. subtilis* (10 mm zone in ethyl-acetate extract at 80 mg/mL) and *E. coli* (9 mm zone in ethyl-acetate extract at 80 mg/mL). The ethanol extract was the most effective in inhibiting the growth of *M. smegmatis and M. bovis* with MICs of 97.6 µg/mL and 195.3 µg/mL. The activities observed could be attributed to the presence of some active metabolites contained in the extracts which could be useful in drug development for therapeutic purposes.
Keywords: *Senna occidentalis*; anti-bacterial activity; anti-tubercular activity; micro-organisms.

MPM 136

DETECTION OF CYTOMEGALOVIRUS IgM ANTIBODIES AND HEPATITIS CO-INFECTION AMONG HIV POSITIVE PATIENTS IN EKITI STATE, NIGERIA.

Oladejo Babayemi Olawale*, Omoloye Olawale Tolulope, Ogundare Yemisi Rejoice
Department of Microbiology, Federal University of Technology, P.M.B. 704, Akure, Nigeria.
***Corresponding author**: booladejo@futa.edu.ng
Tel: +2348026267734

ABSTRACT

Opportunistic infections have been reported in HIV patients undergoing antiretroviral therapy (ART) which often lead to frequent morbidity and mortality cases, thereby shortening the life span of infected patients. Viral infections such as Cytomegalovirus (CMV), Hepatitis B (HBV) and C (HCV) are more prevalent in HIV infected individuals due to immunosuppression. The co-infection of CMV, HBV and HCV among HIV positive patients attending ART clinics across hospitals in Ekiti State, Nigeria, were studied. Ninety-two (92) blood samples from HIV positive individuals were collected and serologically screened for CMV antibodies (IgM) using enzyme linked immunosorbent assay (ELISA) while HBV and HCV surface antigen were determined using standard test kit. The viral loads were determined using Real Time Polymerase Chain Reaction (qPCR). Socioeconomic factors including age, sex, pregnancy and marital status were linked with the viral loads. Out of the 92 samples screened, 35%, 18% and

47% were positive for CMV, HBV and HCV respectively. 19% had CMV + HBV co-infection with a viral load of < 20 - 60 copies/ml, 44% had CMV+ HCV co-infection with the highest viral load of < 20 – 51783 copies/ml and 31% for HCV + HBV co-infection (<20-13294 copies/ml). Samples from HIV positive pregnant individuals revealed 1.1% and 2.2% occurrence of CMV + HCV and HBV + HCV co-infection respectively. However, there were no occurrence of CMV + HBV and CMV + HBV + HCV Co-infections in the blood samples from the pregnant women. The high prevalence rate of CMV with Hepatitis co-infection among these HIV positive individuals further support the role of viral reactivation in immunocompromised patients.

Keywords: Co-infection, HIV, CMV, HBV, HCV, ELISA, qPCR

MPM 137

PREVALENCE OF HEPATITIS B AND C AMONG PREGNANT HIV INFECTED WOMEN ATTENDING NATIONAL INSTITUTE FOR PHARMACEUTICAL RESEARCH AND DEVELOPMENT (NIPRD), ABUJA, NIGERIA.

Y. Ya'aba [1,3]*, S. B. Mohammed[1], K. T. Olatunji[1], A. Abubakar[1], M. Usoroh [1], O. C. Daniel[1], A. R. Abdulmumin[2] and J. F. Nfongeh[3]

[1]Department of Microbiology and Biotechnology, National Institute for Pharmaceutical Research and Development (NIPRD) Abuja, Nigeria.

[2]Department of Microbiology, Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria.

[3]Department of Microbiology, Federal University Lafia, Nasarawa State, Nigeria.
*Correspondence: E-mail: yakyabnig@yahoo.com, Phone no: +2348033326544

ABSTRACT

Introduction: Viral Hepatitis and Human Immune Deficiency Virus (HIV) are most common ten top ranking leading causes of infectious disease deaths worldwide. If remain unidentified and untreated among pregnant HIV infected women, children born to these pregnant women are at high risk of Hepatitis B (HBV) and/or Hepatitis C (HCV) infection.

Aims: The aim of the study was to determine the sero-prevalence of HBV and HCV among pregnant HIV infected women in Abuja, Nigeria.

Methodology: A cross sectional study among 330 HIV infected pregnant women coming for antiretroviral therapy (ART) at National Institute for Pharmaceutical Research and Development (NIPRD), Abuja, Nigeria were studied. The women were screened for the presence of HBV and HCV antibodies. A pre-tested questionnaire was used to obtain demographic data prior to enrollment. Data were analyzed using statistical product and service solutions (SPSS) (version 20.0).

Results: Out of the 330 HIV infected pregnant women, 90(27.3%) were HBV positive, while 5(1.5%) were HCV positive ($p = 0.42$). The highest prevalence was observed among the age group of 20 – 29. However, none of the participant tested positive for both HBV and HCV.

Conclusion: The findings of this study indicated that infection with viral hepatitis is common and of public health

concern. Therefore, concerted effort should be put in place to mitigate the epidemics.

Keywords: Hepatitis B Virus, Hepatitis C Virus, Human Immune Deficiency Virus, sero-Prevalence, cross sectional, NIPRD

MPM 138

ISOLATION AND IDENTIFICATION OF METHICILLIN RESISTANT *Staphylococcus aureus* (MRSA) FROM URINE SAMPLE OF SOME PATIENTS ATTENDING SPECIALIST HOSPITAL SOKOTO

*Fardami, A.Y.[1], Opeyemi, A.N.[1], Kawo, A.H. [2], Ibrahim, U.B. [1], Nataala, M.K. [1], Jodi, A.M. [1] and Garga, M.A.[1]

[1]Department of Microbiology, UsmanuDanfodiyo University Sokoto Nigeria

[2]Department of Microbiology, Bayero University Kano, Kano State, Nigeria

Correspondence: aminufy@gmail.com

ABSTRACT

Methicillin-Resistant *Staphylococcus aureus* is a strain of *Staphylococcus aureus* that is resistant to methicillin or β-lactasmase resistant to penicillin. The study was carried out in order to isolate and identify methicillin-resistant *Staphylococcus aureus* from urine sample of patients attending Specialist Hospital Sokoto. A total of 10 urine samples collected were analysed by standard bacteriological methods. Screening for MRSA was carried out by antibiotic sensitivity testing using disk diffusion method with cefoxitin (30μg) disc on Mueller-Hinton agar. A total of 4(40%) were *Staph. aureus* obtained of which 2(20%) were

found to be MRSA. Both MRSA isolates obtained were from male urine consisting of an adult and a child and none from females. All the MRSA isolates were resistant to penicillin (100%) and (50%) resistance to each of gentamycin, erythromycin, ciprofloxacin, co-trimoxazole, rifampicin and fusidic acid. It was found out that both isolates were (100%) susceptible to both climdamyan and vancomycin antibiotics. Therefore treatment of MRSA should strictly be based on prior determination of its local resistance pattern.

Keywords: Methicillin-Resistant *Staphylococcus aureus* (MRSA)*;* urine sample; climdamyan; vancomycin

MPM 139

STUDIES ON SINGLE AND CO-INFECTIONS OF *Salmonella* AND SCHISTOSOMIASIS AMONG SUBJECTS IN SELECTED RURAL COMMUNITIES AND GENERAL HOSPITAL IN ZONE A SENATORIAL DISTRICT OF BENUE STATE, NIGERIA

[1, 2*]Yandev, Doowuese, [1]Chigor, Vincent N., [1]Eze, E.A

[1]Department of Microbiology, Water and Public Health Research Group, University Of Nigeria Nsukka

[2]Department of Microbiology, University of Mkar, Gboko, Benue State, Nigeria

Corresponding author: *Yandev, D. (yandevdoowuese@gmail.com; 0818939304597)

ABSTRACT

This study determined the prevalence of co-infection of typhoidal salmonellosis and schistosomiasis in Zone A, Benue State Nigeria. Five locations were randomly selected: Iange, Sati, Korgyen, Ikov Sati and Adikpo. A total of 180

subjects were studied. Two clinical samples (urine and stool) were collected from each subject. A total of 360 clinical samples were investigated using microscopic, cultural and biochemical methods. *Salmonella* culture, isolation and biochemical tests were carried out from faecal samples. Schistosomiasis was diagnosed following standard guideline. There were 25 cases of *Salmonella* infection out of 180 samples in prevalence of 13.89% in zone A axis of Benue State. Prevalence across the communities from highest to lowest are: Ikov Sati (21.67%), Adikpo (15%), Sati (11.1) and Iange (4.76%). No Salmonella cases were recorded at Korgyen community among 21 samples. Sex status revealed 36% male and 64% female. Occupational status showed 60% farmers as the most infected group, 12% each for student and marketers and 8% each for civil servants and okada riders. Age group 21-30 years were the most vulnerable as they constituted 32% of the infected subjects. Age group 1-10 years was 1% while 61-70 years had no salmonella cases. There were 8 cases of *Salmonella*-schistosomiasis co-infections out of 180 samples with a total prevalence of 4.44% in the study area. Across the communities, Iange and Korgyen had no co-infection cases while Adikpo had the highest prevalence of 8.33%, followed by Sati (5.55%). Male and female had equal proportion of co-infection cases while farming was the highest (50%) among the occupational type and Age group 21-30 was the highest (38%) among the age groups. The information given is vital in the control of *Salmonella* and its co-infections with schistosomiasis in the study area.

Key word: Salmonella, Schistosomiasis, Co-infection, Prevalence, Control

MPM 140

AN OVERVIEW ON NECROTISING ENTEROCOLITIS AND ITS PATHOGENESIS ASSOCIATED WITH FAECAL MICROBIOME AMONG PRETERM INFANTS

*Abdulkadir, B[1]and Bello, H.B[2]

[1] Department of Microbiology,Umaru Musa Yaradua University Katsina

[2] Department of Microbiology Kebbi State University of Science and Technology Aliero

ABSTRACT

Necrotizing enterocolitis (NEC) is primarily a disease process of the gastrointestinal (GI) tract of premature neonates that results in inflammation and bacterial invasion of the bowel wall. It is the most common gastrointestinal (GI) emergency in neonatal intensive care units (NICUs), making it one of the leading causes of long-term disability in preterm infants. Despite advances in the care of premature infants, NEC remains one of the leading causes of morbidity and mortality in this population. It occurs in 1-5% of all neonatal intensive care admissions and 5-10% of all very low birth weight (<1500 g) infants. Necrotizing enterocolitis (NEC) is primarily a disease of premature infants, but may also be present in 10% of term and near term babies. It is the most common gastrointestinal (GI) medical/surgical emergency occurring in neonates. Preterm infants show delayed colonization by "healthy commensal" organisms, especially bifidobacteria and lactobacilli. All

these data suggest that low colonization of Bifidobacterium and Lactobacillus in preterm VLBW infants may serve as a predisposing factor in microbial infection and NEC. The presence of a higher proportion of *Proteobacteria has an association with faecal microbiome among preterm infants.* Thus, the focus of this review is to provide an in-depth summary of the current knowledge regarding its association with faecal microbiome among preterm infants. Different search engines were carefully implored in analyzing scientific articles, journals, and online published data. Preventing NEC is instrumental in decreasing the morbidity and mortality from this gastrointestinal emergency. Human milk (breastfeeding) has been proved to be protective against NEC likewise probiotic supplementation as a means for addition nutrition has reduced both incidence and severity of necrotising enterocolitis in preterm neonates. Also, the intervention of surgery, laparotomy likewise the use of stem cells in clinical neonatology is therapeutic options with huge potential. With its multifactorial pathogenesis, disease prevention remains a challenge, although, probiotic supplementation has reduced both incidence and severity of necrotising enterocolitis in preterm neonates.
Keywords: Faecal microbiome, Gastrointestinal Necrotizing Enterocolitis, Preterm, Pathogenesis

MPM 141

ISOLATION OF *Entaemoeba histolytica* AMONG OPD PATIENTS ATTENDING SIR YAHYA MEMORIAL HOSPITAL BIRNIN KEBBI KEBBI STATE NIGERIA

Abdulkadir B.[1] M. Sa'adu. Zayyanu U.T.[2] and Isah M[2].
[1] Department of Microbiology Umaru Musa Yaradua University Katsina
[2] Department of Microbiology Kebbi State University of Science and Technology Aliero
*Corresponding Author: bashir.abdulkadir@umyu.edu.ng
Tel:+2348065137374)

ABSTRACT

Entamoeba histolytica infection is a major public health problem worldwide. *Entamoeba histolytica* is the most common cause of amoebic dysentery among people. The prevalence of *Entamoeba histolytica* carried among patient attending general hospital sir yahaiya. This was a prospective cross-sectional study conducted among 243 patient attending General Hospita Sir Yahaiya and aimed to determine the prevalence of *E. histolytica* and risk of progression to amoebic dysentery among participants. The prevalence of *E. histolytica* among Male was 77.01% and Female 22.99%. Prevalence in settlement in urban is 44.01%, semi Urban is 32.51% and Rural 23.46%. Among the positive result Male has 77.01% which indicate progressive risk of having amoebic dysentery. Age and gender did not have any association in term of having *E. histolytica* disease this indicate that gender and age are independent of one another.

Keywords: Amoebic, Dysentry *Entamoeba histolytica,* Prevalence and Risk of Progression

MPM 142

ANTIBIOFILM AND PHYTOCHEMICAL PROPERTIES OF *AZADIRACHTA INDICA* (NEEM) EXTRACTS ON MICROORGANISMS ISOLATED FROM TOOTH PLAQUE

Galleh, P. Raphael[1*], Fenu, M. Jezhi[2], Jibrin Ismaila[3]

[1]Department of Oral and Maxillofacial Pathology, School of Clinical Dentistry, University of Sheffield, S10 2TA, United Kingdom.

[2'3]BSc, Department of Microbiology, Nasarawa State University, Keffi

***Corresponding author:** rpgalleh1@sheffield.ac.uk

Tel: +447501255290

ABSTRACT

The oral cavity supports a diverse microbial community which exists as structurally-organized plaques (biofilms) on mucosal and dental surfaces. Dental biofilm has been reported to be resistant to multiple drugs. This present study therefore aimed at screening for the phytochemicals present in *Azadirachta indica* (Neem) extracts and determining its antibiofilm activities on microorganisms isolated from tooth plaque. Eleven (11) swabs samples were collected from the oral cavity of participants presented with tooth decay and were inoculated in Nutrient broth for 24 hours. Of the microorganisms isolated, *Streptococcus mutans* and *Lactobacillus acidophilus* had the highest percentage of

occurrence (18.75%) while *Bacillus subtilis* and *Candida albicans* had the lowest percentage of occurrence (6.25%). Maceration method revealed the presence of tannins, reducing sugar and alkaloids in both leaf and stem aqueous and ethanolic extracts while anthraquinones, trepenoids, flavonoids, saponins, phlobotannins, cardiac glycosides, glycosides, steriods, cardenolids, and phenols were also present. Crystal violet assay was used to determine the positive biofilm producers also, both the aqueous and ethanolic extracts showed 50% reduction in the biofilm formed although the leaf aqueous had no antibiofilm activity on *Lactobacillus acidophilus* at the concentrations tested. Phytochemicals, antimicrobial and antibiofilm properties of this plant makes it a good candidate for development of drugs as an alternative for oral health.

Keywords: Tooth plaque; *Azadirachta indica* (Neem); Antibiofilm and Phytochemicals

MPM 143

ISOLATION AND SUSCEPTIBILITY ASSESSMENT OF BACTERIAL FLORA FROM READY TO DRINK HERBAL MEDICINE MARKETED WITHIN KADUNA METROPOLIS

Aliyu, Aisha, Gambo Juliana Bitrus*, Jamilu Hadiza.
Department of Applied Biology Kaduna Polytechnic, Nigeria
***Correspondence** Email: elaskagambo@yahoo.com
Tel: 08036010383, 08035890640

ABSTRACT

The study of isolation and susceptibility assessment of microbial flora from ready to drink herbal medicine was aimed to isolate and identify bacteria associated with ready

to drink herbal products marketed within Kaduna metropolis. The susceptibility of the isolates to commonly used antibiotics was also determined. The assessment of the contamination of the herbal product were carried out using standard procedures, total aerobic plate count, isolation identification and antibiogram of selected bacterial pathogens using the Kirbybauer method. The microbial analysis was carried out on twenty one (21) ready to drink herbal products with total mean bacterial count ranging from 3.5×10^7 to 4.14×10^7. The result also revealed that the samples had 40 bacterial isolates. The herbal drinks had a total mean aerobic bacterial plate count greater than 10^7cfu/ml. 32.5% of the herbal products were contaminated with *Eschericia coli*, 17.5% *Bacillus moniliformis*, *Staphylococcus aureus* 22.5%, *Pseudomonas aeruginosa* 12.5% while 7.5% was found with *Klepsiella spp*, and *Streptobacillus spp* respectively. The result of antibiogram on the bacterial isolates revealed that all the bacterial isolated were more susceptible to ciprofloxacin, pefloxacin and gentamycin. The ready to drink herbal products marketed in Kaduna metropolis are highly contaminated with pathogenic microorganisms and its preparation need strict hygienic practices and sanitation to reduce contamination of the product to make it safe for consumption.
KEYWORDS: Isolation, Susceptibilty, Antibiogram, Pathogen, Contamination, Herbal drink, Microorganisms.

MPM 144

INCIDENCE OF ENTEROVIRUSES IN CHILDREN AGED 0-5YEARS IN SOME GENERAL HOSPITALS IN LAGOS STATE.

Ozoadibe Ogechukwu Y [1,] Omilabu S A [2]
[1]Department of Microbiology, University of Nigeria, Nsukka, Nigeria, [2] College of Medicine, University of Lagos, Nigeria.

ABSTRACT

Febrile illnesses are usually prevalent in the age group of children aged between 0-5years, with the attendant symptoms of high temperatures, malaise, diarrhea and vomiting. The normal course of treatment is anti-malarial but studies have shown that Enteroviral infections also mimic these malaria-like symptoms. Stool specimens from 85 symptomatic and asymptomatic children, aged 0-5years were examined by reverse–transcriptase polymerase chain reaction (RT-PCR) using two primers MD 90 and EV71. Cell culture was performed on the first 40 samples in this study. Symptoms observed in the children were: fever, vomiting, rashes, diarrhea and cough. Random stool samples were collected from children from various general hospitals in Lagos state, between the months of June and August 2009. The stool samples were collected into wide mouthed universal stool sample containers. Statistical analysis were carried out. Enterovirus ssRNA were detected from 38 (44.71%) out of the 85 fecal samples by RT-PCR using MD 90 Primer; the EV71 Primer was negative for all the 85 samples. The children in the 0-5 months and 6-11 months age group were mostly affected as shown by the rates of positive results. There was no statistical significant

(p> 0.05) in the number of children affected in each age group. Enterovirus account for a significant portion of febrile illness requiring hospitalization in this age group in the vast age ranges of infant and children. However, those of 2 years and above group were mostly asymptomatic carriers.

MPM 145
ANTIBIOTIC SUSCEPTIBILITY PROFILE OF ENTEROBACTERIACEAE ISOLATED FROM STUDENTS' URINE

Baba, J and Solomon, E. T
Department of Microbiology, Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria.
Corresponding author: babajohn200133@yahoo.co.uk
Tel: 08036315364

ABSTRACT
This study was carried out in order to determine antibiotic susceptibility profile of *enterobacteriaceae* from student's urine. One hundred (100) midstream urine samples from students of Ibrahim Badamasi Babangida University were obtained and investigated. The samples were examined microscopically and cultured on MacConkey agar and blood agar. Disk diffusion method was used for antibiotic sensitivity testing. Out of the 100 urine Samples, 49 yielded significant growth, the isolates were further subjected to biochemical tests for possible identification. The bacteria identified includes: *Escheriachia coli* 20(40.8%), *Pseudomonas* sp 5(10.2%), *Proteus* sp 8(16.3%), *Klebsiella* sp 7(14.3%) and *Salmonella* sp 9(18.4%). *Escheriachia coli* isolates were the most predominant in the urine sample. The

isolates were very sensitive to Gentamicin (80%), Ciprofloxacin (70%), Pefloxacin (60%), Augmentin (55%) and Cotrimoxazole (50%), but showed resistance to Sparfloxacin (100%), Streptomycin (85%), Tarivid (75%) and Chloramphemicol (60%). The result of chi-square test of association indicated that the ages of the students, antibiotic usage, history of urinary tract infection and source of water were statistically significant to the occurrence of bacteria in the urine ($P < 0.01$). Sex was found to be statistically insignificant to the occurrence of bacteria in the urine ($P > 0.05$). It is very important for the students to practice good personal hygiene and hygienic handling of foods substances to reduce fecal contamination in order to avoid exposure to *Esherichia coli* and other possible bacteria.

Key words: *Enterobacteriaceae,* Profile, Susceptibility, Urine

MPM 146
THE PREVALENCE OF HEPATITIS C VIRUS AMONG BLOOD DONORS ATTENDING GENERAL HOSPITAL, MINNA NIGER STATE

Angulu, Caleb Ndako[1]; Adabara, Nasiru Usman[1] and Mamman, Godiya Peter[1,2]

[1]Department of Microbiology, Federal University of Technology, Minna, Niger State Nigeria

[2]Department of Biology, Nigerian Army University, Biu Borno State Nigeria

Corresponding author mail: calebndakoangulu@gmail.com

ABSTRACT

Hepatitis C is a progressive liver disease which eventually leads to cirrhosis with its attendant risks of liver (hepatocellular carcinoma), liver transplantation and death.

This study was carried out to determine the sero prevalence of Hepatitis C Virus among blood donors in General Hospital Minna, Niger State. Blood sample were collected from 200 blood donors in General Hospital Minna Niger State. Test for the presence of antibodies of Hepatitis C Virus using one step Hepatitis C Virus test strip (serum/plasma) manufactured by Gold Diagnostics. The results showed that 4(2.0%) of the donors had antibodies of HCV out of 200 samples collected. The result also showed a higher prevalence rate of 5.3% among females as compared to 1.7 in males as well as highest prevalence of 2.6% amongst blood donors of the age group 20-29 years. Statistical analysis, however, showed no significant difference. There is need for routine screening for Hepatitis C Virus among blood donors to avoid transmission of the virus to recipients, in which it may cause liver disease which may progress to liver cirrhosis.
Keyword: Blood donors, Hepatitis C virus, Prevalence

MPM 147
CHARACTERIZATION OF *Salmonella* Species AND DETERMINATION OF BASELINE ANTIBODY TITRE AMONG APPARENTLY HEALTHY INDIVIDUALS IN KADUNA STATE, NIGERIA

[1]Jaafaru I. A. and Aminu M.[2]
[1]Department of Microbiology, Kaduna State University, Kaduna, Nigeria.
[2]Department of Microbiology, Ahmadu Bello University, Zaria, Nigeria.
Email: Jaafarisah@yahoo.com Phone: +2348033543373

ABSTRACT

This study was conducted to determine the baseline antibody titre against *Salmonella* species from apparently

healthy individuals in Kaduna State, Nigeria. A total of 420 of each of stool and blood sample were collected from six Local Governments Areas (LGAs) of Kaduna State, with two LGAs from each Geopolitical Zones. All stool samples were cultured on Bismuth sulphite agar, and bacterial isolates where characterized. Widal slide agglutination and tube agglutination tests using Standard Salmonella "O" and "H" suspensions were carried out on the blood samples. The result showed that a total of 338 out of the 420 participants had antibody titre ≥1:20 against *Salmonella* species giving a total prevalence of 80.5%. The remaining 82 (19.5%) had antibody titre <1:20. The result also showed that 29.5% (124/420) had antibody against *Salmonella* Typhi <1:20 while 70.5% (296/420) had antibody against *Salmonella* Typhi ≥ 1:20. Similarly, 53.3% (224/420) and 46.7% (196/420) had antibody levels against *Salmonella* Paratyphi A <1:20 and ≥ 1:20 respectively. Antibody titre <1:20 was seen in 54.1% (227/420) participants, while antibody titre ≥ 1:20 was seen in 45.9% (193/420) against *Salmonella* Paratyphi B. The antibody titre against *Salmonella* Paratyphi C of <1:20 was detected in 83.1% (349/420), while titre ≥ 1:20 was seen in 16.9% (71/420) of the participants. The result showed that antibody titres against *Salmonella* Typhi, *Salmonella* Paratyphi B and *Salmonella* Paratyphi C up to 1:80 occurring in up to 5% of the study population, while antibody titres against *Salmonella* Paratyphi A up to 1:40 occurred in up to 5% of the study population. *Salmonella* Typhi was isolated from a total of 3 stool samples with 1 positive sample each from Zaria, Giwa and Kagarko LGAs. None of *Salmonella* Paratyphi A, B or C was isolated in the study. From the findings of the study,

it is suggested that antibody titres greater than 1:80 against *Salmonella* Typhi, *Salmonella* Paratyphi B, *Salmonella* Paratyphi C, and antibody titres greater than 1:40 against *Salmonella* Paratyphi A should be the baseline antibody titres for Widal tests in Kaduna State.

Keywords: S*almonella* Species, *Antibody Titre, Apparently Healthy Individuals, Kaduna State, Nigeria*

MPM 148
OCCURRENCE AND ANTIBACTERIAL RESPONSE PATTERN OF *Campylobacter jejuni* IN CHICKENS

[1*] Shamsuddeen U., [1]Haladu, A., [2]Panda, T. W.
[1]Department of Microbiology Faculty of Life Science Bayero University Kano PMB 3011
[2]Department of Microbiology Aminu Kano Teaching Hospital Kano-Nigeria

ABSTRACT

Food borne campylobacteriosis is distributed all over the world. Raw poultry become contaminated during processing when intestinal contents contact the meat surfaces. Chicken meat is considered the primary source of infection with *Campylobacter* spp. in humans. The aim of the research is to study the occurrence and antimicrobial response patterns of *Campylobacter jejuni* in chicken. Twenty (20) chicken samples were collected from different sites. All the samples were processed and analyzed in the laboratory using mCCDA selective media for isolation of *Campylobacter species*. The isolates were confirmed to be *Campylobacter jejuni* using Gram's stain, catalase, oxidase, mortility and Hippurate hydrolysis test. Ethanolic and aqueous extracts of

Syzigium aromaticum, Allium sativum, Zingiber officinale and *Piper nigrum* were tested against *Campylobacter jejuni* via disc diffusion techniques. Commercially prepared antibiotics (Erythromycin, Tetracycline, Clindamycin, Ciprofloxacine and Cotrimoxazole) were also tested against *Campylobacter jejuni.* From the 20 chicken samples examined, 10 samples were identified as *Campylobacter jejuni*. Based on the findings of this research work, occurrence of *Campylobacter jejuni* is (50%) from the samples tested, occurrence of this bacterium particularly in processed food samples is of serious public health importance. Statistical analysis revealed that there are significant differences ($P< 0.05$) in the bacterial count between (raw and processed) samples of chicken. *S. aromaticum, Allium sativum,* and *Zingiber officinale* extracts were active against *Campylobacter* jejuni. Among the antibiotics tested against *C. jejuni,* Ciproflaxacine (100%) and Erythromycin (79%) were active. All the plant extracts except *Piper nigrum,* showed antibacterial activity on *C. jejuni.* Both the ethanolic and aqueous plant extracts were not toxic ($LC_{50} > 1000$)

MPM 149

ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF CRUDE EXTRACTS OF *ALOE VERA* AND *CYMBOPOGON* SPECIE AGAINST HUMAN PATHOGENS

Madueke, S.N.[1,3], Chigor, C.B.[2,3], Umezude, U. T.[1] Ezemmaduka, M.F.[1] and Chigor, V.N.[1,3]

[1]Department of Microbiology, [2]Department of Plant Science and Biotechnology

[3]Water and Public Health Research Group (WPHRG), University of Nigeria, Nsukka, 40001 Nigeria.

Corresponding author's email: vincent.chigor@unn.edu.ng

ABSTRACT

The growing trend of antibiotics resistance has necessitated the search for new antibiotics to combat the eluding microorganisms and plants has proven to be a huge source of pharmaceutical materials. In this study, antibacterial activity of crude extracts from two medicinal plants; *Aloe vera* and *Cymbopogon* species at different concentration (12.5, 50. 100 and 200 mg/ml) were tested against *Klebsiella pneumoniae* NCTC 13368, *Pseudomonas aeruginosa* ATCC 27853 and *Listeria monocytogenes* ATCC 13932 using agar well diffusion method. Phytochemical components of these medicinal plants were also determined using standard methods for quantitative phytochemical analysis. The result revealed presence of alkaloids, flavonoid and terpenoid in both plants. The three bacterial pathogens were resistant to the aqueous crude extracts of both *A. vera* leaf and leaf-gel. On the contrary, *K. pneumoniae and L. monocytogenes* were sensitive to the aqueous crude extract of *Cymbopogon* species. Both

pathogens were also sensitive to the crude methanolic and ethanolic extracts of *A. vera* leaf, leaf-gel and *Cymbopogon* species. However, *Pseudomonas aeruginosa* was resistant to the methanolic extracts of *A. vera* leaf and *Cymbopogon* sp. at all the concentrations tested. The antibacterial activities exhibited by these plants may be linked to the presence of these phytochemicals.

Keywords: Medicinal plants, Antibacterial activity, Human pathogens.

MPM 150

DETERMINATION OF ANTIBACTERIAL ACTIVITIES OF METABOLITES FROM HEAD OF SOLDIER TERMITES (Macrotermes bellicosus) AGAINST SOME SELECTED PATHOGENS

Babayi* Hausatu, Shaibu Bose Ozohu, Afolayan Moradeke Esther

Department of Microbiology, School of Life Sciences, Federal University of Technology, Minna

Email: shaibubose9@gmail.com; Tel: 08030646854

ABSTRACT

Hexane, ethylacetate, methanol and aqueous extracts of metabolites from the head of soldier termites (*Macrotermes bellicosus*) were assayed for in vitro antibacterial activity against pathogenic microorganisms using agar dilution method. The Minimum Inhibitory Concentration (MIC) was done using broth dilution method. The inhibitory activities of all extracts were compared to ciprofloxacin (256ug/ml). Screening for the bioactive components of extracts was done using standard methods. Hexane extract inhibited growth of *Salmonella thyphi*, *S. paratyphi A, B, C* and *Staphyloccocus aureus* at 4000ug/ml. Ethylacetate extract

inhibited *S. paratyphi A*, and C at 4000ug/ml. The test organisms were resistant to methanolic and aqueous extracts. MIC of the hexane extract was 2000ug/ml for *S.paratyphi B* and C, 125ug/ml for *S.typhi* and *S. aureus,* and 250ug/ml *S.paratyphi A* respectively. The MIC of the ethylacetate extract was 4000ug/ml for *S. paratyphi B,* 2000ug/ml for *S. paratyphi C* and *S. aureus.* 500ug/ml for *S. typhi* and 250ug/ml for *S. paratyphi A* respectively. The hexane and ethylacetate extracts of metabolites from the gut of soldier termites exhibited bacteriostatic effects on the pathogens. The screening of the bioactive components revealed the presence of cardiac glycosides and alkaloids. The results of this research indicate that the hexane and ethylacetate extracts could be useful in treating infections caused by the test organisms.

Keywords:

MPM 151
EVALUATION OF ANTIBACTERIAL ACTIVITY OF *EUDRILUS EUGENIAE* EXTRACT AGAINST SOME PATHOGENS

Babayi Hafsat Omeje Nkechi Kate and Adown Nedeojo Peter
Department of Microbiology, School of Life Sciences, Federal University of Technology Minna, P.M.B 65 Minna, Niger State, Nigeria.
Email: kateomijix@gmail.com

ABSTRACT

Successive extraction of powdered *Eudrilus eugeniae* (Earthworm) using organic solvents of different polarities yielded hexane (He), ethylacetate (ETe) and methanolic (METe) crude *extracts.* The antibacterial activity of these

extracts were determined by well diffusion method. The bioactive components of ethylacetate (ETe) extract was determined using standard procedures. The activity was compared with Amoxicillin (0.0025mg/ml). Ethylacetate extracts at 120mg/ml inhibited the growth of species of *Streptococcus* and *pseudomonas* with zone of inhibition of 19mm each while at 160mg/ml the zones of inhibition was at 23mm and 19mm for *Streptococcus* spp and *pseudomonas* spp respectively. *Klebsiella* was resistant to ethyiacetate extract. Hexane (He) and Methanolic (METe) extracts were inactive at the same concentrations. The Minimum Inhibitory Concentration of Ethylacetate (ETe) extract against species of *Streptococcus* and *pseudomonas* was 5.00mg/ml and 10mg/ml respectively. The Minimum Bactericidal Concentration of Ethylacetate (ETe) extract against species of *Streptococcus* and *pseudomonas* was 10.00mg/ml and 20.00mg/ml respectively. The result obtained suggests that ethylacetate of *E. eugeniae* may be useful in treating infections caused by species of *Streptococcus* and *Psuedomonas*

Keywords: *Eudrilus eugeniae*, antibacteria activity, ethylacetate, *Pseudomonas, Streptococcus.*

MPM 152

EVALUATION OF ANTIMICROBIAL ACTIVITY OF CRUDE SALIVARY EXTRACT OF LEECH AGAINST SOME SELECTED ORGANISMS

BABAYI, Hausatu*, OWOLABI, Babatunde Israel and BALOGUN, Abosede Blessing
Department of Microbiology, Federal University of Technology, Minna, Nigeria
Correspondence: acadbabayi@yahoo.com; 08033700406.

ABSTRACT

Leech (*Hirudo medicinalis*) salivary extract was studied for *in vitro* antimicrobial activity against some selected bacteria species (*Klebsiella pneumoniae*, *Streptococcus pneumoniae* and *Staphylococcus aureus*) and some fungal species (*Candida albicans* and *Penicillium* species) using agar dilution method. The crude salivary extract exhibited inhibitory effects on the growth of *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, *Candida albicans* and *Penicillium* species while there was no inhibitory effect on the growth of *Staphylococcus aureus*. Ampiclox and Nystatin were used as the standard antimicrobials in the study and it inhibited the growth of the bacteria and fungal test organisms respectively. The minimum inhibitory concentration of the salivary extract on the growth of *Klebsiella pneumoniae* was 0.1ml while that of *Streptococcus pneumoniae*, *Candida albicans* and *Penicillium* species were 0.5ml. The bioactive components contained in the crude leech salivary extract were determined using both qualitative phytochemical test and Gas Chromatography Mass spectrophotometer (GC-MS). The qualitative phytochemical test revealed the presence of

protein and alkaloid while Gas Chromatography Mass spectrophotometer the presence of seventeen (17) bioactive components which include the likes of fatty acid (oleic acid 33.9% and palmitic acid also known as hexadecanoic acid 22.6%), 4-bromobutyric acid (16.86%), 6,17-Octadiene-1-ol acetate 9.78% and octahydro-1,4,9,9-tetramethyl 5.21% which could be the reason for the activity of the extract against the test isolates. The crude leech salivary extract could be potentially used in the treatment of some microbial infections caused by these selected organisms that were used in this study.

Keywords: Leech salivary extract, Agar dilution, GC-MS, MIC, Bioactive components.

MPM 153
DETERMINATION OF SUSCEPTIBILITY AND THE RATE OF KILLING OF CASHEW (A*NACARDIUM OCCIDENTALE*) NUTSHELL LIQUID ON SELECTED PATHOGENS

*Jesse Innocent Apameio and Abalaka Moses Enemaduku
Department of Microbiology, Federal University of Technology, Minna, Nigeria
Correspondence author: jesseinnocent75@gmail.com
Telephone number: +234-7063090882

ABSTRACT

Cashew Nut Shell liquid is a versatile component of the Cashew nut and it is used in the traditional treatment of infections. This study was done to determine the rate of killing of cashew nut shell liquid (CNSL) against selected pathogens. CNSL extraction was done using soxhlet apparatus and hexane as solvent. The CNSL inhibited cell growth of *Staphylococcus aureus, Streptococcus pyogenes,*

Pseudomonas aeruginosa and *Escherichia coli* with *S. aureus* being the most susceptible pathogen. The population of bacteria cell count were observed for five hours at interval of one hour each. The population of the bacteria cells tends to decrease as the contact time with the extract increases. For the control, the population of the bacteria increases as time progresses. The CNSL extract eliminated *S. aureus* instantly, *E. coli* was eliminated at the fifth hour while *P. aeruginosa* and *S. pyogenes* decreased in population of viable bacterial cells count. This study shows that CNSL may provide novel precursors for antimicrobial drug development research.

Keywords: *Anacardium occidentale*, pharmaceutical, pathogens, killing

MPM 154
MOLECULAR DETECTION OF EXTENDED SPECTRUM BETA LACTAMASE RESISTANCE GENES AMONG BACTERIA ISOLATED FROM NON-STERILE ORAL DRUG FORMULATIONS

*Mukhtar G.L[1], Mukhtar M.D[2], and Magashi, A. M.[2]
[1]Department of Microbiology, Umaru Musa Yar'adua University, P.M.B 2218 Katsina
[2]Microbiology Department, Bayero University, P. M. B. 3011, Kano, Nigeria
***Corresponding Author**:
mukhtar.gambo@umyu.edu.ng(08060839389).

ABSTRACT
The presence of Extended Spectrum Beta-Lactamase (ESBL) genes among bacteria is of great public health concern, because these genes confer high level resistance to beta-lactam antibiotics which are the most widely used

antibiotics in clinical and veterinary practice. In this study, seventy four (74) bacteria isolates previously identified as multidrug resistant isolated as microbial contaminants from non-sterile oral drug formulations were screened for the presence of three ESBL resistance genes (blaTEM, blaSHV, and blaCTX) by PCR. In general, ESBL resistance genes were present in 63 (85.1%) of the tested MDR bacterial isolates. The ESBL genes; blaTEM, blaSHV, and blaCTX were present in 51.4%, 25.7% and 8.1% of the MDR isolates respectively. In conclusion, this study has demonstrated how widespread antimicrobial resistance especially to the beta-lactam antibiotics is and thus careful attention on the usage of these drugs by the medical practitioners and the general public is recommended.

Keywords: ESBL, Multidrug resistance, non-sterile oral drug formulations, PCR

SECTION THREE:

SOIL AND ENVIRONMENTAL MICROBIOLOGY ABSTRACTS (SEM)

SEM 048

BIODEGREDATION OF CRUDE OIL SUPPORTED ON DIFFERENT SOIL PARTICLE SIZES

[1]*Yahaya, S. and Bappa, M. A.

[1]Department of Microbiology, Bayero University, Kano, Nigeria.

***Correspondence author**: syahaya.mcb@buk.edu.ng

ABSTRACT

An expulsion in the world's population has led to increase in the search for crude oil and its products, which has become source of environmental pollution, which needs to be remediated. Thus, remediation by natural technique is believed to be very environmentally friendly and cost effective. The research was aimed at investigation the biodegradation of crude oil supported on different soil particle sizes. Soil samples were randomly collected and sieved into four (4) different particle sizes (0.6mm, 0.3mm, 0.15mm and 0.075mm). Exactly 200g of each of the sieved soil particle sizes were weighed and introduced into masonjar bottle. These were then uniformly amended with 60ml of crude oil. These were incubated aerobically at 37^{o}C for 56 days. Enumeration of total aerobic heterotrophic bacteria (TAHB) was done on Nutrient agar (NA), total fungi (TF) on potato dextrose agar (PDA), hydrocarbon utilizing bacteria (HUB) on Bushnell'Haas medium (BHM) supplemented with crude oil, while hydrocarbon utilizing fungi (HUF) on Bushnell'Haas medium (BHM) supplemented with crude oil and streptomycin. The degradation efficiency was confirmed by GC-MS analysis, which indicated that the microbial isolates utilized most of

the crude oil components. The result shows that the mean microbial counts for both TAHB and TF decrease from 5.93 x 10^5 ± 0.1 to 5.38 x 10^5± 0.08 cfu/g and 5.39 x 10^5 ± 0.09 to 4.8 x 10^5 ±0.04 cfu/g during 56 days period of the study. The result also revealed increase in the mean counts of both HUB and HUF from 0.00 x10^3 ± 0.0 to 3.74 x 10^3 ± 0.03cfu/g and 0.00 x10^3 ± 0.0 to 3.19 x10^3 ± 0.05cfu/g. Soil with particle sizes of 0.6mm has the highest increase in degradation rate. The Hydrocarbon utilizing bacteria identified were sp *Bacillus* spp, *Pseudomonas* spp, *Staphylococcus* spp, *Escherichia coli* spp and *Proteus* spp. While the Hydrocarbon utilizing fungi were *Aspergillus* spp, *Penecillium* spp *and Mucor* spp. The results indicate that larger particle size favors faster hydrocarbon biodegradation.

Keywords: Pollution, Biodegradation, *Bacillus* spp, Hydrocarbon

SEM 049

STUDY ON THE MICROBIAL POPULATION DYNAMICS DURING COMPOSTING OF TANNERY SLUDGE

[1]Lambu, Z.N., [2]Shamsuddeen, U, [2]Yahya, S., [1]Shehu, A.A., [1]Aliyu, A.S., [1]Abba, S.A.,

[1]Department of Microbiology, Kano University of Science and Technology, Wudil

[2]Department of Microbiology**,** Bayero University Kano.

Corresponding Author: zakarinuhulambu@gmail.com

Phone: 07032856539

ABSTRACT

A Study of changes of microbial population was carried out at an ecological garden of Bayero University Kano to

monitor the changes of microbial population during the month of October to November, 2017. The rapid composting method using effector microorganisms described by Hiraoka (2013) was used, the result show that, the bacterial population, changes from $8.2x10^8$ cfu/g to $2.0x10^5$ cfu/g from zero (0) day to six (6) days to the fungi population, changes from $1.03x10^2$ cfu/g to $3.3x10^4$ cfu/g while actinomycetes population changes, from $1.3x10^3$ cfu/ to $1.8x10^5$ cfu/g this shows the decrease in microbial population. The treatment, with effector microorganisms shows decrees in maturation period from nine (9) weeks to 4weeks compare with treatment without effector microorganism that shows maturation period of nine (9) weeks. Research recommend addition of effector microorganism for enhancing composting process.

Keywords: Tannery sludge, composting, and effector microorganism

SEM 050

EFFECT OF SPENT MUSHROOM SUBSTRATE ON THE GERMINATION EFFICIENCY OF *Amaranthus caudatus* AND *Corchorus olitorius*

Adigun M.O.[1**], Babalola O.A.[2], Adegoke C.O.[2], Abiola I.O.[3], Akinyemi P.O[1], Tanimowo E.W[1].

[1**]Department of Biological Sciences, Crawford University, Faith City, Igbesa, Ogun State, Nigeria.

[2]Department of Soil Science and Land Management, Federal University of Agriculture, Abeokuta, Nigeria

[3]Department of Horticulture and Landscape Technology, Federal College of Forestry, Jericho, Ibadan, Nigeria

***Corresponding author**: micadigun@crawforduniversity.edu.ng Tel: +234 8076346353

ABSTRACT

The effect of the addition of different soil ameliorants to soil on the growth of *Amaranthus caudatus* and *Corchorus olitorius* were studied in a pot experiment. Soil sample were screened out for total viable count, identification and characterization of specific organisms in the soil were done using the media and biochemical tests. Treatments included dried poultry dung, spent mushroom substrate and chemical fertilizer (NPK). The level of the microbial load in the sample was in range of 3.6×10^{-6} to 1.3×10^{-6}. Results statistically showed that there was a better germination of *Amaranthus caudatus* and *Corchorus olitorius* on the soil containing the spent mushroom substrate on the 17th and 21th day of planting (DAP).

Keywords: spent mushroom substrate, poultry manure, chemical fertilizer, *Amaranthus caudatus* and *Corchorus olitorius*

SEM 051
EVALUATION OF BIOFERTILIZING POTENTIAL OF FEATHER HYDROLYSATE GENERATED BY KERATINOLYTIC BACTERIA ON VEGETABLES AND MAIZE CULTIVATION

*Adeoluwa Nancy Balogun, Nasir Usman Adabara, Isiaka Adelere and Usman Abiola
Department of Microbiology Federal University of Technology Minna, Nigeria
Correspondence author's Email address: adebalogun5@gmail.com
Telephone number: +234-7031622722

ABSTRACT

In this study keratinolytic bacteria was isolated from using minimal medium for the production of crude enzymes as biofertilizer and the isolates were characterised using biochemical and molecular chacteristics techniques. Feathers were degraded in submerge state fermentation and the hydrolysate was evaluated for plant growth promoting ability on maize and vegetable cultivation. Pot experiment was considered which was filled with soil. Four maize seeds were planted into a pot and after germination were pruned to maintain two seedling. 0.3g of *Corchorus olitorius* were planted per pot, the experiment consisted of negative control involving water, positive control involving NPK, feather hydrolysate only, feather hydrolysate with bacteria

suspension, feather hydrolysate with NPK. The plants were uprooted the shoot height and root length were determine using tape measures. The chlorophy content of the leaves was analysed. The weight of leaves and roots were also determined and measured in grains.

Keywords: keratinolytic, minimal medium, chlorophy, suspension, hydrolysate

SEM 052

ISOLATION OF BACTERIA FROM SOIL TO PRODUCE BIOSURFACTANT

*Ramat Onyeneoyiza Raji & Oluwafemi Adebayo Oyewole.
Department of Microbiology, Federal University of Technology, Minna
Correspondence E-mail address: ramatraji91@gmail.com
Tel: 08068294685

ABSTRACT

Biosurfactants are amphiphilic compounds produced extracellularly by microorganisms on cell surfaces. The present study was focused on isolation of biosurfactant producing bacteria from soil sample using plate dilution methods and assessing the potential of these isolates by various standard methods. Five bacteria were isolated from the soil sample of which only one isolate, identified as *Pseudomonas aeruginosa* was positive for biosurfactant activity when oil spreading and drop collapse methods were used to screen the bacteria. The *P. aeruginosa* was then used to produce biosurfactant in a mineral salt medium utilizing crude oil as a sole carbon source. After 10 days of

incubation, 4.15g/L of surfactant was obtained. The results of this study suggest that *P. aeruginosa* have potential to utilize crude oil as a carbon source in a mineral salt medium to produce biosurfactant, and could be improved for large scale production of biosurfactant.

Key words: Biosurfactant, Pseudomonas, amphiphilic

SEM 053

DEGRADATION OF CRUDE OIL (ESCRAVOS LIGHT) BY BACTERIA ISOLATED FROM MILE TWO LAGOON LAGOS NIGERIA.

*Usman, O.O and Obayori O.S
Department of Microbiology, Faculty of Science
Lagos State University, Ojo, Nigeria
Corresponding Author: Olayinka.usman@yahoo.com Tel: +2347086528254

ABSTRACT

Clean up of polluted environment require adequate information about the properties of the site as well as the biodegradability of the microbial community. Crude oil (Escravos light) is composed of thousands of components and thus the major sources of pollutants because petroleum products are transported across Lagos frequently, thereby causing oil spills heavily concentrated. Oil spill pollute ground water, destroys vegetation, hence the study isolated bacteria from mile two lagoon. Water sample were obtained, Isolates were identified using morphological characteristics, Gram stain reaction and further subjected to biochemical test .Organisms were able to lyse red blood cells (alpha and

beta heamolysis) and produced no biosurfactants. Isolates were later identified using the Analytical profile index (Microbact 12E) as followed my manufacturer prescriptions and isolates identified were *Pseudomonas aeruginosa, Klebseilla pneumonia, Enterococcus* spp. The degradation rate which was checked by residual oil hydrocarbon capacity using spectrophotometer , total viable count in CFU/ml, pH was monitored every two days from 2.800 to 1.193, $3x10^8$ to $2x10^5$ respectively.

SEM 054
STUDIES ON BACTERIA AND FUNGI ABILITY TO DEGRADE OIL-POLLUTED SOIL

[1]Akinro E.B., [2]Olanrewaju, S.O., [1]Obiremi E.O.,
[2]Adetuberu, I.A. and [2]Oyewale, M.O.
[1]Department of Science Laboratory Technology, Osun State Polytechnic, Iree, Nigeria
[2]Department of Applied Sciences, Osun State Polytechnic, Iree, Nigeria
olanrewaju4success@gail.com, 08064802845

ABSTRACT

Soil polluted with oil has been a continual practices by an individual, especially during the loading of petroleum products from the oil producing areas and even in the mechanical workshops. This tends to deprive the soil from the important uses, therefore, this research is aimed to isolates microorganisms both bacteria and fungi from contaminated sites with petroleum product. The samples were collected from three different towns in Osun State (Ile-Ife,Osogbo and Ilesa). The oil polluted soils were taken and transported to microbiology laboratory of Osun State

Polytechnic, Iree for analysis. The micro,rganisms associated with these sites were isolated, characterised identified and tested for degradability. The identified bacteria were confirmed as follows: *Bacillus cereus, Salmonella spp, Pseudomonas aerugenosa, Staphyllococus aureus,* and *Escherichia, coli.* The fungi associated were identified as: *Aspergillus niger, Penicillium spp, Absidia parriada, Actinomucor elegans, Helmitrichia serpula, Reticulocephalis gyrosus, Trichia faroginea and Mycloclad*us *corymbifera*. From all microorganisms identified (Bacteria and Fungi), *Bacillus cereus, Pseudomonas aerugenosa, Staphylococcus aureus, Aspergillus niger, Penicillium spp, and Absidia parriada* have the ability to degrade the mineral oil. Those found degrading the mineral oil serve as the best tools for bioremediation of oil polluted soil which will eventually restore the land for other important purposes. Further studies must be encouraged to check for their ration pathogenecity whether they would pose threat to the inhabitant of that environment.

Key Words: oil-polluted soil, bacteria, fungi, degradability.

SEM 055

BACTERIOLOGICAL EFFECT ON FERMENTATION OF COOKED *Parkia biglobosa* SEEDS USED AS FOOD CONDIMENT IN NIGERIA.

Efunwole, O. O.[1], Olarewaju, S. O.[2] and Aboderin E.A[2]
1. Department of Science Laboratory Technology, Osun State Polytechnic, Iree
2. Department of Applied Sciences, Osun State Polytechnic, Iree
*Corresponding author: efunwoleho@gmail.com Tel: *08066568844*

ABSTRACT

Fermented African locust bean seed (*Parkia biglobosa*) is a culinary product that are used to enhance or intensify meatiness in soups, sauces and other prepared dishes**.** The seeds of African locust bean are not used for food in their raw state, they have to be cooked and fermented. Fermentation permits the use as food and also assist in its digestibility. Study was made on the microbiological quality of the processed seeds before and after fermentation using convectional microbiological methods. The results showed that *Bacillus brevis*, *Micrococcus luteus Bacillus megaterium* and *Erwinia amylovora* were isolated after cooking and each decreased gradually in bacteria load at 24, 48 and 72 hour of fermentation till the last day of fermentation, but at 48th hour of fermentation *Lactobacilli spp* was isolated and the loads increased till the last fermentation day. The study showed that since the loads of isolated microorganism decreased at the last day of fermentation, hence eating the processed seed is safe and

cannot cause any disease most especially when eaten as" iru oju" which need not to be added and cooked along with soup after processing. Also, the *Lactobacilli* isolated is a probiotic which is useful for the gastrointenstines.

Keywords: *Parkia biglobosa*, Food condiment, *Bacillus subtilis*, Cooking, Fermentation.

SEM 056
COMPOSTING OF TANNERY WASTE WITH SAWDUST FOR ORGANIC MANURE PRODUCTUION

Usman Ahmadu *, Udeme J.J. Ijah and Aliyu Jagaba
Department of Microbiology, Federal University of Technology P.M.B. 65 Minna, Nigeria.
Correspondence author:
usmanahmadu97@yahoo.com; +2348039146966

ABSTRACT
The utilisation of tannery waste (TW) in combination with sawdust (SD) as compost manure for agricultural use was studied. The wastes were collected and mixed in ratios (TW/SD) 1:1, 1:5, 5:1, 1:10 and 10:1 respectively. The composting were done under aerobic condition with frequent turning (6 weeks) for proper aeration. Microbiological and physicochemical parameters of the raw samples (tannery waste pH 7.65, and sawdust pH 4.69), compost as well as the experimental soil were determined. The microorganisms isolated from the wastes were species of *Bacillus*, *Streptococcus*, *Staphylococcus*, *Aspergillus*, *Candida* and *Saccharomyces*. The resultant compost was odourless, stable and had earthly smell. Beside

it had carbon to nitrogen ratio ranging from 13.46 to 24.9 and pH ranging 5.1 to 6.9. The compost was used to assess the growth of maize (*Zea mays*) in the field as compared to NPK and Amazing organic fertiliser. This was applied at duration of two and four weeks after planting. The results of the field study revealed that TW/SD 10:1, 5:1 and 1:1 gave good response two weeks after germination with respect to leaves (44.6cm, 38.4cm, 33.2cm), stem girth (3.2cm, 2.8cm, 2.4cm), plant height (38.0cm, 35.2cm, 30.2cm) respectively. However, low responses were recorded in TW/SD 1:5, and 1:10 with regard to leaves (30.3cm, 29.4cm), stem girth (2.2cm, 2.1cm), and plant height (26.2cm, 23.0cm). The results obtained suggest that tannery waste and sawdust in the right combination can be applied for the improvement of soil organic matter after six weeks of composting.
Keywords: Compost, tannery waste, sawdust, microbiological and physicochemical properties

SEM 057
ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF CRUDE EXTRACTS OF *Aloe vera* and *Cymbopogon* sp AGAINST HUMAN PATHOGENS

Madueke, S.N.[1,3], Chigor, C.B.[2,3], Umezude, U. T.[1]
Ezemmaduka, M.F.[1] and Chigor, V.N.[1,3]
[1]Department of Microbiology, [2]Department of Plant Science and Biotechnology
[3]Water and Public Health Research Group (WPHRG), University of Nigeria, Nsukka, 40001 Nigeria.
Corresponding author's email: vincent.chigor@unn.edu.ng

ABSTRACT

The growing trend of antibiotics resistance has necessitated the search for new antibiotics to combat the eluding microorganisms and plants has proven to be a huge source of pharmaceutical materials. In this study, antibacterial activity of crude extracts from two medicinal plants; *Aloe vera* and *Cymbopogon* species at different concentration (12.5, 50. 100 and 200 mg/ml) were tested against *Klebsiella pneumoniae* NCTC 13368, *Pseudomonas aeruginosa* ATCC 27853 and *Listeria monocytogenes* ATCC 13932 using agar well diffusion method. Phytochemical components of these medicinal plants were also determined using standard methods for quantitative phytochemical analysis. The result revealed presence of tannins and saponin in *Cymbopogon* species, phenol and steroid in *Aloe vera* and alkaloids, flavonoid and terpenoid in both plants. The three bacterial pathogens were resistant to the aqueous crude extracts of both *A. vera* leaf and leaf-gel. On the contrary, *K. pneumoniae and L. monocytogenes* were sensitive to the aqueous crude extract of *Cymbopogon* species. Both pathogens were also sensitive to the crude methanolic and ethanolic extracts of *A. vera* leaf, leaf-gel and *Cymbopogon* species. However, *Pseudomonas aeruginosa* was resistant to the methanolic extracts of *A. vera* leaf and *Cymbopogon* sp. at all the concentrations tested. The antibacterial activities exhibited by these plants may be linked to the presence of these phytochemicals.
Keywords: Medicinal plants, Antibacterial activity, Human pathogens.

SEM 058
POLYETHYLENE BIODEGRADATION POTENTIALS OF *Pseudomonas aeruginosa* AND *Micrococcus* sp. ISOLATED FROM WASTE DUMPS AND FARMLANDS IN NSUKKA, ENUGU STATE, NIGERIA

Vincent Chigor[1]*, Chidiebele Nwankwo[1,2], Uchenna Ogbodo[1] and Joseph Ugwu[1]**

[1]Department of Microbiology, University of Nigeria, Nsukka

[2]Natural Science Unit, School of General Studies, University of Nigeria, Nsukka

*Corresponding author's email: vincent.chigor@unn.edu.ng

**Presenting author

Abstract

Low Density Polyethylene (LDPE) are plastic materials extensively used in packaging constituting recalcitrant environmental pollutants that defy natural degradation processes. This study isolated bacteria from a Nigerian environment and assessed their potential for LDPE biodegradation. Using standard procedures, Bacteria were isolated from polythene samples collected from farmlands and waste dump sites in Nsukka metropolis . Mineral salt medium (MSM) was prepared, with LPDE as sole carbon source, and used for isolation. *Pseudomonas aeruginosa* and *Micrococcus* sp. were identified based on morphological and biochemical characteristics. Ability to grow on LDPE as a sole carbon source was studied as evidence of polyethylene biodegradation. Organisms were inoculated into the MSM and incubated at 37 □C and 50 □C for 15

days. Optical density (OD_{600} nm) was used to study bacterial growth of LDPE as sole carbon source as proof of biodegradation. Both organisms demonstrated steady growth on LDPE over time. Maximum growth was recorded after 15 days of incubation for both organisms. *P. aeruginosa* and *Micrococcus* sp. showed steady growth at 37 □C as well as 50 □C. *Micrococcus* sp. recorded highest growth; 0.324 nm and 0.312 nm at 37 □C and 50 □C respectively, after the 15 days. Similarly, *P. aeruginosa* recorded highest growth of 0.40 and 0.258 for 37 □C and 50 □C respectively. LDPE degradation increase with increase in time. This study demonstrates the enormous polyethylene-degrading potentials of *P. aeruginosa* and *Micrococcus* sp. isolated from Nsukka, Nigeria.
Keywords: Low Density Polythene, P. aeruginosa, Micrococcus sp., biodegradation, contaminants

SEM 059
PHYSICAL AND BACTERIOLOGICAL WATER QUALITY CHARACTERISTICS OF ASATA RIVER IN ENUGU METROPOLIS

Chizoba A. Ozochi and Vincent N. Chigor
Water and Public Health Research Group (WPHRG),
Department of Microbiology, University of Nigeria, Nsukka

ABSTRACT

Asata River is one of the two major surface waters that run through Enugu metropolis. It serves as a source of water for fresh produce irrigation, food processing, fish farming, recreation and domestic activities. This study aimed at assessing the physical and bacteriological quality of Asata River water. Following standard methods, a total of 72 samples were collected from six points across the water course and analysed over a one-year period (Sept – Aug 2018) for some physical (temperature, pH, total dissolved solids [TDS] and electrical conductivity [EC]) and bacterial (*E. coli*, total coliform [TC]) indicators of water quality. The physical parameters were determined in-situ using appropriate meters, while bacterial indicators were analysed using membrane filtration technique. Differences in means were compared using student's *t*-test (for the rainy and dry seasons) and one-way analysis of variance (ANOVA), and Duncan's multiple range tests, for the mean variations observed across the sampling sites and months. Statistical significance was set at $P < 0.05$. The physical parameters ranged from 24.8 – 26.8 ^{o}C, 4.0 – 7.1, 10.8 – 20.1 mg/L, 15.8 – 29.5µS/cm for temperature, pH, total dissolved solids, electrical conductivity respectively. Significant

higher differences were observed in the rainy season over dry season for all analysed parameters, except pH. Bacterial indictors were high, with mean values of 1.7 x 10^5 and 4.2 x 10^5 for *E. coli* and TC respectively. These exceeded the recommended maximum values suggested by national and international guidelines for water used for drinking and domestic use, raw water abstraction for full treatment, as well as for irrigation of fresh produce. Site 2 had significantly higher counts compared to the other sites throughout the sampling months, indicating continuous faecal pollution at that point. These results show that the bacteriological quality of Asata River is poor and constitutes a potential significant public health hazard and a very high disease risk level if used without prior treatment.
Keywords: River, Asata, Faecal, Pollution, Hazard

CARBON DIOXIDE CAPTURE POTENTIAL OF *Anabaena* sp and *Spirogyra* sp.

Abdulsalam, R.,[1]* Oyeleke, S. B.,[1] Egwim, E. C.,[2] Adabara, N.U.[1] and Bala, J. D[1].

[1]Department of Microbiology, Federal University of Technology, Minna, Niger State

[2]Department of Biochemistry, Federal University of Technology, Minna, Niger State

*Corresponding author: a.ramatu@futminna.edu.ng; 08039659124

ABSTRACT

Global warming has been a great concern and scientists over the world are making concerted effort to minimize the emission of carbon dioxide ($C0_{2)}$ as well as capturing of $C0_2$ and other greenhouse gases.

Algae can play a pivotal role to reduce effects of global warming by reducing atmospheric $C0_2$. This study was undertaken to culture algae in the laboratory for carbon dioxide capture. Algae samples (*Anabaena* sp and *Spirogyra* sp) were collected by filtration and were identified. Modified Bold Basal Media (MBBM) was used to culture *Anabaena* sp and *Spirogyra* sp. Four set-ups were prepared for % carbon dioxide capturing potential – MBBM enriched with 1.0 g of chicken dropping (2 set-ups) and MBBM enriched with 1.0 g of urea (two set-ups) for both *Anabaena* sp and *Spirogyra* sp – The carbon dioxide (CO_2) was produce by reacting 11.2 g of calcium carbonate ($CaCO_3$) with 25 ml of 2% Hydrochloric acid (HCl) in a sealed buckner flask and channeled into the algae culture in a bioreactor. The optimum growth and % carbon dioxide capturing potential of *Anabaena* sp and *Spirogyra* sp in MBBM enriched with chicken droppings are 0.83 nm, 85.19% and 0.66 nm, 78.26% respectively while the optimum growth and % carbon dioxide capturing potential of *Anabaena* sp and *Spirogyra* sp in MBBM enriched with urea are 0.79 nm, 81.82% and 0.54 nm, 78.57% respectively. The results obtained show that algae have a good carbon dioxide capture potential and the quantity captured correlates well with the algae growth. Incorporating algae cultures tanks into industrial exhaust could be used to mitigate greenhouse gases (CO_2).
Keywords: Carbon dioxide capture, Algae, Modified bold basal media.