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## ABSTRACT 1

# VIABLE BIOLOGICAL AND ENVIRONMENTAL PARAMETERS FOR COMMERCIAL AQUATIC BIORESOURCE PRODUCTION: INSIGHT FROM SPAWNING OF CLARIAS GARIEPINUS FOR FOOD SECURITY, NUTRITION AND ECONOMIC GROWTH FROM IMO RIVER, IMO STATE, NIGERIA

Patrick O. Nwokocha[1], Okose C. Vivian[2], Chukwu C. Modesta[3], Efi U. Joshua■, Njoku C. Mercy[3]

*[1]Bioresources Development Centre, BIODEC Abuja/Uburu @ NBRDA, Nigeria; [2]Effraya, Cross River State; [3]Uburu, Ebonyi State; ■Jalingo, Taraba State*

*Email: Patricks.givanas@gmail.com | WhatsApp: 08185159651*

## ABSTRACT

Fish farming activities had reportedly been considered means of good livelihoods and source of nutrition for rural dwellers and the general populace respectfully. Nigerian riverine settlements depend hugely on traditional fishing from rivers, streams and lakes for commercial gains. Thus, there is need to evaluate and improve on its potentials to alleviate poverty while serving nutritional purposes. Biologically viable parameters and environmental determinants of commercial *Clarias gariepinus* production were examined from Imo River, in Imo state, such as Gonadosomatic Index (GSI), condition factor (K), fecundity and water parameters. A total of 40 samples were collected with length ranging from 18.5cm - 37.9cm and weight ranged between 490g -2500g. The male to female ratio was 2:1 and chi square showed no significant difference (p<0.05). Positive correlation exists between fecundity and the following: length (r = 0.92), weight (r = 0.96), condition factor (r = 0.92), and GSI (r = 0.96). Fecundity ranged from 964 eggs -18,625 eggs. From the above, results portrayed positive correlation between fecundity and other body parameters. In contrast to other tropical fish spp, *Clarias gariepinus* had all year round breeding, leveraging on the large varieties of food items which are a plus for gonadal material production. The availability of suitable environment had also impacted positively and may be responsible for extended breeding in Imo River. Thus, it is primary to state that the size suitable for fish culture (spawning range) falls between 1kg - 2.5kg for species of *Clarias gariepinus* which are reproductive categories and can be used as source of brood stock for production in even domestic hatchery and table sizes grow-out for viable enterprise.

***Keywords:*** *Biological parameters, Condition factor (K), Environmental determinants, Fecundity ratio, Gonadosomatic index (GSI), Length-weight, Spawning size range*

## ABSTRACT 2

# COMPARATIVE ANALYSIS OF THE ANTIOXIDANT AND NUTRITIONAL POTENTIALS OF DIOSCOREA DUMETORUM AND DIOSCOREA ALATA

Chinenye Azuka Mere & Prisca Ifeoma Umeibekwe

*Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

## ABSTRACT

*Dioscorea dumetorum* is commonly known as trifoliate yam and serves as food of choice for the diabetic patients and as herb for the treatment of various ailments. *Dioscorea alata* (Water yam) is the most economically important yam species. Protein helps in the structural and functional activities of cell as well as to regulate the metabolic activities in all living organisms. The aim of the study is to comparatively analyze antioxidant and nutritional potential of *Dioscorea dumetorum* and *Dioscorea alata*. This study compares the antioxidant properties of *Dioscorea dumetorum* and *Dioscorea alata* using the ferric ion reducing power assay (FRAP). The aqueous 1M acetic acid extracts of the samples were tested at varying concentrations (15 \u03bcl/ml, 30 \u03bcl/ml, and 45 \u03bcl/ml) and compared to standard antioxidants, butylated hydroxyltoluene (BHT) and alpha-tocopherol. Carbohydrate and protein content of the *Dioscorea* spp were checked using phenol-sulphuric method and Lowry's method respectively. The results showed that both *Dioscorea dumetorum* and *Dioscorea alata* possess antioxidant potentials, with *Dioscorea alata* exhibiting higher reducing power at all checked concentrations. *Dioscorea alata* demonstrated a concentration-dependent increase in reducing power, with values of 0.132, 0.149, and 0.153 at 15 \u03bcl/ml, 30 \u03bcl/ml, and 45 \u03bcl/ml, respectively. *Dioscorea dumetorum* showed reducing power values of 0.076, 0.088, and 0.093 at the respective concentrations. The protein content of *D. dumetorum* and *D. alata* was 10.16% and 15.75% while the carbohydrate content of *D. dumetorum* and *D. alata* is 65% and 57%. *D. alata* has higher reduction potential, higher protein content and lower carbohydrate content than *D. dumetorum*. This suggests why *D. alata* is of higher demand as diet for diabetics.

***Keywords:*** *Antioxidant, Nutritional potential, Trifoliate yam, Carbohydrate, Protein*

## ABSTRACT 3

# PEROXIDASE ACTIVITY IN GERMINATING SEEDS OF CITRULLUS ECIRRHOSUS AND CUCUMIS MELO UNDER HEAVY METAL STRESS: TEMPORAL AND CONCENTRATION-DEPENDENT RESPONSES

Chukwudi Jude Chikwendu[1]*, Collins B Lukong[1], Chukwuemeka Egbuna[2], Terrence B. Jaff[1]

*[1]Department of Biochemistry, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State, Nigeria; [2]Schrix Institute of Academic Learning, Research, and Innovation (SIALRI Africa)*

*Corresponding: chikwendujc70@gmail.com*

## ABSTRACT

Background: Heavy metal contamination of agricultural soils poses serious threats to plant germination and seedling establishment. Peroxidase (POD; EC 1.11.1.7), a heme-containing antioxidant enzyme that scavenges hydrogen peroxide ($H_2O_2$) using aromatic electron donors, plays a central role in plant defence against metal-induced oxidative injury. However, POD responses of African cucurbit species to comprehensive heavy metal panels across defined germination time points remain poorly characterised. Objectives: This study investigated the temporal and concentration-dependent modulation of POD activity in germinating seeds of *Citrullus ecirrhosus* and *Cucumis melo* exposed to ten heavy metals across five concentration levels and three germination time points. Methods: Seeds of both species were exposed to Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd, Hg, and Pb at concentrations of 50, 100, 200, 400, and 800 ppm. Germinating seeds were harvested at 24, 48, and 72 hours post-exposure. POD activity was determined spectrophotometrically and data analysed by two-way ANOVA (p < 0.05). Results: In *Cucumis melo*, significant POD elevation was observed at 24 hours under Fe, Cu, and Cd, while Cr consistently suppressed activity across all time points. Most metals induced progressive POD upregulation by 48 and 72 hours in both species. In *Citrullus ecirrhosus*, Pb stimulated POD across all concentrations and time points, whereas Cr caused sustained inhibition throughout the entire germination period. Conclusion: The notable interspecies concordance in POD response patterns suggests a conserved enzymatic defence strategy within Cucurbitaceae under heavy metal stress. The consistent Cr-mediated inhibition in both species implicates metal-specific enzyme inactivation, possibly through binding to heme or cysteine residues. These findings support the potential use of both species as bioindicators of heavy metal soil contamination in African agricultural ecosystems.

***Keywords:*** *Peroxidase, Heavy metals, Oxidative stress, Citrullus ecirrhosus, Cucumis melo, Seed germination, Cucurbitaceae*

## ABSTRACT 4

# SYNERGISTIC EFFECTS OF VERNONIA AMYGDALINA (BITTER LEAF) AND CURCUMA LONGA (TURMERIC) ON BIOCHEMICAL PARAMETERS OF ALLOXAN-INDUCED DIABETIC WISTAR RATS

Amatu, Chisom S.[1], Nwaka, Andrew C.[1], Okafor Irene N.[1], Nwaka, Chinyere S.[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding: sydneyamatu@gmail.com*

## ABSTRACT

Diabetes Mellitus (DM) is a severe disorder of sugar, protein, and fat metabolism, primarily characterized by elevated blood glucose. In this study, two medicinal plants were used which are *Vernonia amygdalina* and *Curcuma longa*. These plants have been used in various diabetic studies. *Vernonia amygdalina* is a shrub common in West Africa and Asia. It is a member of the Asteraceae family and a genus of Vernonia having green-colored leaves. *Curcuma longa* contains a mixture of curcuminoids such as curcumin, desmethoxycurcumin, and bisdemethoxycurcumin. It has been used as a spice, turmeric, for thousands of years in several Asian countries and has also been used as an anti-inflammatory and anti-microbial compound in several traditional medicinal practices. This present study was conducted to investigate the synergistic effect of the ethanol extract of *Vernonia amygdalina* and *Curcuma longa* at varying doses on biochemical parameters of alloxan-induced diabetic Wistar rats. Sixty-three (63) Wistar rats were randomized into nine groups with each group containing seven (7) rats. The first group known as Group A served as the normal control. Group B served as the negative control (diabetes untreated). Group C served as the positive control and was administered 100 mg/kg of metformin. Groups D to I were the experimental groups administered 100 mg/kg ethanol extract of *V. amygdalina*, 300 mg/kg ethanol extract of *V. amygdalina*, 100 mg/kg ethanol extract of *C. longa*, 300 mg/kg ethanol extract of *C. longa*, 100 mg/kg combination of *V. amygdalina* and *C. longa*, and 300 mg/kg combination of *V. amygdalina* and *C. longa* respectively. Diabetes was induced by intraperitoneal injection of alloxan (130 mg/kg) body weight. Phytochemical, proximate, vitamin and mineral constituents of the plant samples were evaluated using standard methods. Lipid profile parameters (TCHOL, TRIG, LDL, HDL, and VLDL), liver function parameters (AST, ALT, ALP, D. BIL and T. BIL), kidney function parameters (Creatinine and Urea), and lipid peroxidation inhibition activity were also determined using standard diagnostic methods. The results showed that administration of *V. amygdalina* and *C. longa* extracts produced beneficial effects on the biochemical parameters evaluated. The lipid profile, liver function parameters, kidney function parameters, and lipid peroxidation results showed the potency of *V. amygdalina* and *C. longa* in ameliorating the damage caused by alloxan-induced diabetes, with the combination of the two extracts showing a more proficient and efficacious outcome when compared to the individual extracts. This study has shown the synergistic protective effects of *V. amygdalina* and *C. longa* on biochemical parameters and may support the potential use of these extracts as natural agents for the management of diabetes and its associated complications when combined. Although, further studies are needed to elucidate underlying mechanisms and evaluate long-term safety.

***Keywords:*** *Diabetes Mellitus, Synergistic effects, Vernonia amygdalina, Curcuma longa, Biochemical parameters*

## ABSTRACT 5

# INVESTIGATION OF THE SYNERGISTIC ANTIDIABETIC EFFECTS OF A COMBINATION OF VERNONIA AMYGDALINA (BITTER LEAF) AND CURCUMA LONGA (TURMERIC) ON GLYCEMIC PARAMETERS OF ALLOXAN-INDUCED DIABETIC WISTAR RATS

Amatu, Chisom S.[1], Nwaka, Andrew C.[1], Okafor Irene N.[1], Nwaka, Chinyere S.[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding: ac.nwaka@coou.edu.ng*

## ABSTRACT

Diabetes Mellitus (DM) is a severe disorder of sugar, protein, and fat metabolism, primarily characterized by elevated blood glucose. In this study, two medicinal plants were used which are *Vernonia amygdalina* and *Curcuma longa*. These plants have been used in various diabetic studies. *Vernonia amygdalina* is a shrub common in West Africa and Asia. It is a member of the Asteraceae family and a genus of Vernonia having green-colored leaves. *Curcuma longa* contains a mixture of curcuminoids such as curcumin, desmethoxycurcumin, and bisdemethoxycurcumin. It has been used as a spice, turmeric, for thousands of years in several Asian countries and has also been used as an anti-inflammatory and anti-microbial compound in several traditional medicinal practices. This present study was conducted to investigate the synergistic effect of the ethanol extract of *Vernonia amygdalina* and *Curcuma longa* at varying doses on fasting blood glucose concentration and body weight in alloxan-induced diabetic Wistar rats. Sixty-three (63) Wistar rats were randomized into nine groups with each group containing seven (7) rats. The first group known as Group A served as the normal control. Group B served as the negative control (diabetes untreated). Group C served as the positive control and was administered 100 mg/kg of metformin. Groups D to I were the experimental groups administered 100 mg/kg ethanol extract of *V. amygdalina*, 300 mg/kg ethanol extract of *V. amygdalina*, 100 mg/kg ethanol extract of *C. longa*, 300 mg/kg ethanol extract of *C. longa*, 100 mg/kg combination of *V. amygdalina* and *C. longa*, and 300 mg/kg combination of *V. amygdalina* and *C. longa* respectively. Diabetes was induced by intraperitoneal injection of alloxan (130 mg/kg) body weight. Body weight and fasting blood glucose concentrations were determined using standard diagnostic methods. The results of the experimental groups showed a decrease in body weight when compared to the non-diabetic groups but in subsequent weeks there was an increase in body weight which suggests the efficacy of *V. amygdalina* and *C. longa*. There was also a decline in fasting blood glucose levels in the experimental groups when compared to the untreated diabetic rats. Administration of *V. amygdalina* and *C. longa* extracts produced beneficial effects by significant reduction (p<0.05) of fasting blood glucose when compared to untreated diabetic rats at varying doses, with the combination of the two extracts showing a more proficient and efficacious outcome. This study has shown the synergistic antidiabetic effect of *V. amygdalina* and *C. longa* on glycemic parameters and may support the potential use of these extracts as natural agents for diabetes management when combined. Although, further studies are needed to elucidate underlying mechanisms and evaluate long-term.

***Keywords:*** *Diabetes Mellitus, Antidiabetic effects, Vernonia amygdalina, Curcuma longa, Glycemic parameters*

## ABSTRACT 6

# ALTERATIONS IN OXIDATIVE STRESS MARKERS AND TRACE ELEMENTS AND EFFECT OF REHYDRATION DURING EXERCISE

Michael Chinedu Olisah[1] & Walter C. Nwafia[2]

*[1]Department of Medical Biochemistry; [2]Department of Physiology, Faculty of Basic Medical Science, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

## ABSTRACT

Regular exercise has many health benefits, including reducing the risk of death from all causes and reducing the risk of cardiovascular diseases, cancer and diabetes. Paradoxically, it is also clear that skeletal muscle contraction produces free radicals, and prolonged and intense exercise can lead to oxidative damage to cellular components. The aim is to determine the alterations in oxidative stress markers and trace elements and effect of rehydration during exercise. Two football teams comprising of 11 players each were used for the study. The players were allowed to play football for at least 1hour with a 15 minutes break interval. Blood samples were collected from all the subjects prior to the exercise. Post-Exercise blood Samples were collected within 5 minutes after first half of the exercise. They were given 1 liter of water each and were allowed to exercise for 45 minutes again before the final blood samples were collected. The blood samples were analyzed for oxidative stress markers using standard spectrophotometric method and trace elements using atomic absorption spectrophotometer. Results revealed that the antioxidants (GPx and SOD) were significantly reduced after first half of exercise when compared with the values prior to the commencement of the exercise (0.82 ± 0.32, 15.52 ±1.86; 0.94 ± 0.12,16.53 ± 1.05). The value of MDA were significantly raised when also compared. However, the values of the antioxidants (GPx and SOD) tend to increase at the end of second half after ingestion of water (0.84 ± 0.14, 16.12 ±1.41) when compared with that values after first half. Trace elements do not differ significantly during the whole half of the exercise. Strenuous exercise can induce oxidative stress but rehydration during exercise may reduce the levels of oxidative stress.

***Keywords:*** *Malondialdehyde, Superoxide dismutase, Glutathione peroxidase, Trace metals, Exercise*

## ABSTRACT 7

# MOLECULAR ANALYSIS OF BACTERIAL ISOLATES FROM FROZEN CHICKEN: ANTIBIOTIC RESISTANCE PROFILE

O. H. Obiefuna[1], A. C. Nduka[1], E. C. Onwuofor[1], B. O. Uba[1], P. A. Egbe[1], C. A. Mere[2], I. N. Ebenebe[3]

*[1]Department of Microbiology, COOU Uli Campus; [2]Department of Biochemistry, COOU Uli Campus; [3]Department of Pharmaceutical Microbiology and Biotechnology, Nnamdi Azikiwe University*

## ABSTRACT

The increasing prevalence of antibiotic-resistant bacteria in the food chain poses a significant threat to public health. Frozen chicken, a widely consumed protein source, can be contaminated with bacteria that harbor antibiotic resistance genes. Despite the importance of this issue, there is a paucity of data on the molecular characterization of bacterial isolates from frozen chicken and their antibiotic resistance profiles in Awka Metropolis. This study aims to address this knowledge gap by investigating the molecular analysis of bacterial isolates from frozen chicken and determining their antibiotic resistance profiles. A total of 50 frozen chicken samples were collected and analyzed using standard microbiological techniques. The results revealed the presence of four bacterial species: *Staphylococcus aureus* strain C868, *Pseudomonas aeruginosa* strain 214, *Vibrio cholerae* strain 112Vc02, and *Salmonella enterica* subspecies *enterica* serovar Enteritidis. The antibiotic susceptibility testing showed that 42.76% of the isolates were resistant to conventional antibiotics, while 57.24% were susceptible. Notably, 33.33% of the resistant strains exhibited single antibiotic resistance, and 66.67% displayed multiple antibiotic resistance (MAR). Statistical analysis using the student t test and one-way analysis of variance (ANOVA) confirmed the significance ($p \leq 0.05$) of these findings. The study's results highlight the risk of food-borne disease outbreaks associated with the consumption of frozen chicken contaminated with antibiotic-resistant bacteria. The high prevalence of MAR among the bacterial isolates underscores the need for improved sanitation practices, regular water quality monitoring, and public awareness campaigns to mitigate the spread of antibiotic-resistant bacteria.

***Keywords:*** *Molecular analysis, Bacterial isolates, Frozen chicken, Antibiotic resistance*

**ABSTRACT 8**

# QUANTITATIVE ANALYSIS OF HELMINTH FAUNA OF BROWN RATS RATTUS NORVEGICUS IN URBAN AREAS OF ONITSHA SOUTH LGA OF ANAMBRA STATE

Obiajulu, A.N. & Emmy-Egbe, I.O.

*Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

## ABSTRACT

Quantitative analysis of helminth fauna of brown rats *Rattus norvegicus* was carried out in and around the residential areas of Onitsha urban area of Onitsha South Local Government Area of Anambra State within a period of 10 months. A total of one hundred and eighty-seven brown rats *Rattus norvegicus* (93 males and 94 females) were collected and surveyed for infections with helminth parasites. One hundred and sixty-three (87.2%) of these were infected with helminths. Thirty-four (20.86%) of the infected rats had cestodes: adult *Hymenolepis diminuta* (Hymenolepidea) and their cysticerci. One hundred and seventeen (71.78%) of the infected rats had four species of nematodes: *Ascaris* sp (Ascaridoidea), *Strongyloides* sp (Strongyloidea), *Nippostrongylus* sp (Trichostrongylidea) and *Syphacia* sp (Oxyuroidea). Twelve (7.36%) of the infected rats had the acanthocephalan - *Moniliformis moniliformis* (Archiacanthocephala). Of all these parasites, *Ascaris* sp had the highest prevalence of 26.38% while *Moniliformis moniliformis* had the least prevalence of 7.36%. *Ascaris* sp also had the highest mean intensities in both sexes (22.14%) and in the different weight classes. The higher prevalence (97.85%) of parasites in males than in females (76.60%) was attributed, amongst other reasons, to a more active foraging capability of the males. The pattern of infection showed monthly and seasonal variations. Among the different weight classes, rats of 100 - 130g were more infected (98.5%) than those weighing > 130g (88.1%) and < 100g (77.03%). There were also differences in prevalence between the sexes within the weight classes. Considering the rat - man proximity, these findings have considerable public health implications.

***Keywords:*** *Quantitative analysis, Helminth fauna, Rattus norvegicus, Urban areas*

**ABSTRACT 9**

# ENVIRONMENTAL ASSESSMENT OF MICROORGANISMS IN BUILT ENVIRONMENTS AND SICK BUILDING SYNDROME

Uzoagba, Christiana Ebere[1], Umeaku, C.N.[1], Uzoagba Gerald Chijioke[1]

*[1]Department of Microbiology, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli, Anambra State*

*Corresponding: Christyeby01@gmail.com*

## ABSTRACT

Microbial contamination in indoor environments is a growing concern due to its impact on structural integrity and its link to sick building syndrome (SBS). This study examined the diversity, pathogenicity, and environmental parameters in indoor spaces. Environmental parameters such as temperature, humidity, and ventilation were measured. Microbial isolates were identified using culture-based techniques and confirmed through 16S rRNA and ITS sequencing. Cytotoxicity assays and metagenomic analysis were also performed. High levels of microbial contamination were found, especially in poorly ventilated and humid areas. Common isolates included *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Aspergillus niger*, and *Stachybotrys chartarum*. Many isolates displayed virulence characteristics like biofilm formation and enzyme production, with 45% showing multidrug resistance. Cytotoxicity assays indicated the potential of microbial metabolites to harm human cells, and metagenomic analysis identified additional toxin-producing and antibiotic-resistant species. These results suggest that microbial growth in deteriorating buildings may contribute to SBS symptoms and pose significant health hazards. Improved ventilation, regular environmental monitoring, and inclusion of microbiological surveillance in building maintenance are recommended, especially in tropical regions.

***Keywords:*** *Environmental assessment, Microorganisms in built environments, Sick building syndrome*

**ABSTRACT 10**

# BIONOMICS OF MOSQUITOES IN AWKA SOUTH LOCAL GOVERNMENT AREA, SOUTHEASTERN, NIGERIA

Ifejika, C.C[1], Umeanaeto, P.U.[2], Uzochukwu, C.U.[2], Ezeani, A.C[1], Umeanor, B.C.[2], Nwagbo, O.D[2], Okeke O.G[2]

*[1]Department of Biological Sciences, COOU; [2]Department of Parasitology and Entomology, Nnamdi Azikiwe University*
*Author Email: eifejika@gmail.com*

## ABSTRACT

The presence of mosquito vectors poses a public health risk for diseases like malaria, yellow fever, chikungunya, filariasis etc. This study investigated the bionomics of mosquitoes in Awka South Local Government Area (LGA) of Anambra State, Nigeria. The aim was to identify composition, species, breeding habitats, seasonal and spatial distribution patterns, and the influence of environmental and physicochemical factors on mosquito abundance. Mosquito sampling was conducted for twelve months across four communities that were randomly selected, pyrethrum knock-down collection (PKC) for indoor mosquitoes, human bait catch (HBC) for outdoor collections, and larval sampling from varied aquatic habitats such as man-made containers, ground pools, and plant axils. A total of 711 adult mosquitoes and 207 larval specimens were collected and morphologically identified to species level. Physicochemical parameters of breeding sites (e.g., pH, dissolved oxygen, salinity, TSS, TDS, and surface temperature) were measured. Statistical analyses, including descriptive statistics, bar and scatter plots, ANOVA, correlation, and multiple regression, were conducted using Microsoft Excel and SPSS. The results revealed that *Culex quinquefasciatus* was the most abundant indoor biting, accounting for 128 samples (37.8%), and was consistently dominant across all towns while *Anopheles funestus* 19 (5.6%) was the least. This was statistically significant at (P= 0.01325287). Out of 277 mosquitoes collected outdoor, *Culex quinquefasciatus* 112 (40.4%) was the most abundant specie while *Culex tigripes* 4 (1.4%) was the least. This was statistically significant at (P= 0.01325287). The freshly fed group constituted the highest proportion at 125 (36.9%), while the gravid stage represented the lowest proportion 54(15.9%). This was not statistically significant (P=0.725975813). Man-made containers were the most productive habitat for breeding, yielding 98 (47.5%) mosquitoes larva collected, followed by ground pools 75 (36.2%) and plant axils 34(16.4%). There was significant difference in larval distribution between containers (P=0.0077). *Aedes aegypti* was present across all three habitats and had the highest overall count 63 (30.4%), while *Culex tigripes* was recovered only from containers and ground pools, and was the least larva collected 9 (4.34%). Indoor mosquitoes were more prevalent during the wet season (77.2%) than the dry season (22.8%). Mosquito abundance showed strong positive correlations with relative humidity ($R^2$ = 0.84, p < 0.001) and rainfall ($R^2$ = 0.93, p < 0.001), but had a weak negative correlation with temperature (p > 0.05). Significant relationships (p < 0.05) were also observed between larval abundance and physicochemical parameters, especially dissolved oxygen and pH, in breeding sites. The study shows the need for intensified vector control strategies, especially during the wet season, through improved environmental sanitation, larval source management, and targeted community-based interventions.

***Keywords:*** *Mosquito, Larvae, Breeding habitat, Physicochemical parameters*

**ABSTRACT 11**

# MICROBIOLOGICAL FACTORS INFLUENCING MAIZE CULTIVATION FROM PLANTING TO HARVEST UNDER SCREENHOUSE AND OPEN-FIELD CONDITIONS IN SOUTH EAST NIGERIA

Chioma, Perpetual Ajaero

*Department of Microbiology, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State, Nigeria*

*Corresponding Author Email: pimfarmltd@gmail.com*

## ABSTRACT

This study investigated the microbiological factors influencing maize (*Zea mays* L.) production under varying soil amendment regimes and cultivation environments in South East Nigeria. The research evaluated the effects of poultry manure, Black Soldier Fly (BSF) frass, nano fertilizer, and control treatments on soil microbial dynamics, plant growth, and yield performance under both screenhouse and open-field conditions. Plant growth-promoting rhizobacteria including *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, and *Rhizobium* were identified, with populations ranging from $10^5$ to 10■ CFU/ml. Results showed that poultry manure significantly enhanced microbial populations and recorded the highest yield (~6 t/ha), followed by BSF frass (~5 t/ha), nano fertilizer (~4 t/ha), and control (~2.5-3 t/ha). A strong positive correlation (r = 0.71-0.82) was observed between microbial population and maize yield. Epiphytic microorganisms were more abundant, while endophytes were more functionally stable. Neem extract showed higher biopesticidal effectiveness compared to rabbit urine. The study concludes that soil microbial dynamics are critical drivers of maize productivity and recommends the integration of organic amendments for sustainable maize production.

***Keywords:*** *Microbiological factors, Maize cultivation, Screenhouse, Open-field conditions*

**ABSTRACT 12**

# LARVAL ECOLOGY AND PHYSICOCHEMICAL PARAMETERS OF MOSQUITO BREEDING HABITATS IN AWKA SOUTH LOCAL GOVERNMENT AREA, SOUTHEASTERN, NIGERIA

Ifejika, C.C[1], Umeanaeto, P.U.[2], Uzochukwu, C.U.[2], Ezeani, A.C[1], Umeanor, B.C.[2], Nwagbo, O.D[2], Okeke O.G[2]

*[1]Department of Biological Sciences, Chukwuemeka Odumegwu Ojukwu University; [2]Department of Parasitology and Entomology, Nnamdi Azikiwe University, Awka, Nigeria*

*Author Email: eifejika@gmail.com*

## ABSTRACT

Mosquitoes are vectors for diseases like dengue fever, malaria, and lymphatic filariasis. Understanding their breeding ecology and the physicochemical characteristics of breeding sites is crucial for controlling mosquito-borne diseases. This study examined mosquito larvae ecology and the water quality parameters of breeding sites in the Awka South Local Government Area, Anambra State, over a 12-month period. The goal was to assess the impact of water quality on mosquito larva abundance. Larvae were collected from man-made containers, ground pools, and plant axils from four communities. Physicochemical factors analyzed included; pH, water temperature, total suspended solids (TSS), total dissolved oxygen (TDO), and salinity. A total of 207 adult mosquitoes representing six species were identified: *Aedes aegypti* (30.4%), *Aedes albopictus* (25.6%), *Culex quinquefasciatus* (22.7%), *Anopheles gambiae* (10.6%), *Aedes simpsoni* (6.2%), and *Culex tigripes* (4.3%). These mosquitoes were collected from man-made containers (98%), ground pools (75%), and plant axils (34%). The study found *Aedes aegypti* was most common in man-made containers and plant axils, while *Culex quinquefasciatus* dominated ground pools. Physicochemical analysis showed that man-made containers had a mean pH of 6.8, while ground pools had a higher pH of 7.4. TSS, TDS, and salinity were higher in man-made containers. Dissolved oxygen significantly influenced larval abundance ($p=0.004$), and *Culex quinquefasciatus* correlated with pH, salinity, TSS, and temperature. The findings highlight the importance of managing mosquito larvae in both natural and artificial habitats, particularly man-made containers, to control mosquito populations in Awka South.

***Keywords:*** *Mosquito, Larvae, Breeding habitat, Physicochemical parameters*

**ABSTRACT 13**

# REMEDIATION STRATEGIES FOR HEAVY METAL CONTAMINANTS IN SOIL AND WATER

Anyanwu, Veronica Chidera & Dibua, Nwamaka Anthonia

*Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding author: veronicaderaop@gmail.com*

## ABSTRACT

Heavy metal contamination of soil and water has emerged as a major environmental and public health concern in Nigeria due to increasing industrial activities, oil exploration, mining operations, agricultural inputs, and poor waste management practices. Toxic metals such as lead, cadmium, chromium, mercury, and arsenic persist in the environment, accumulate in the food chain, and pose serious risks including soil degradation, groundwater pollution, ecological imbalance, and human health disorders, especially in areas affected by artisanal mining, oil exploration, and industrial waste discharge. This seminar examines the sources, environmental behavior, and impacts of heavy metals, with emphasis on contamination scenarios within the Nigerian context, with exposure occurring through ingestion of contaminated food and water, inhalation of polluted dust, and dermal contact. Conventional remediation methods such as excavation, soil washing, chemical precipitation, and stabilization were reviewed, highlighting their effectiveness as well as their economic and technical limitations in developing countries, including inadequate funding, limited technical expertise, and weak monitoring systems. The study further explored sustainable and innovative approaches including phytoremediation, microbial bioremediation, biochar application, constructed wetlands, nanotechnology, and integrated remediation systems. Findings indicate that nature-based and locally adaptable technologies offer cost-effective, environmentally friendly, and practical solutions for large-scale remediation in Nigeria, because of their affordability, use of locally available materials, and low energy demand. The study concludes that effective management of heavy metal pollution requires stronger environmental regulation, increased research and funding, adoption of low-cost sustainable technologies, active community participation, and continuous environmental monitoring and enforcement of regulations to ensure long-term restoration of contaminated ecosystems.

***Keywords:*** *Heavy metal, Remediation, Waste management, Water, Soil*

## ABSTRACT 14

# THE RISE OF ANTIMICROBIAL RESISTANCE: A GLOBAL HEALTH THREAT

Ifezue Clinton Chinedu & Dibua Nwamaka Anthonia

*Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding author: chineduifezue5@gmail.com*

## ABSTRACT

Antibiotics are among the most important discoveries of the 20th century, having saved millions of lives from infectious diseases. Microbes have developed acquired antimicrobial resistance (AMR) to many drugs due to high selection pressure from increasing use and misuse of antibiotics over the years. The transmission and acquisition of AMR occur primarily via a human-human interface both within and outside of healthcare facilities. A huge number of interdependent factors related to healthcare and agriculture govern the development of AMR through various drug-resistance mechanisms. The emergence and spread of AMR from the unrestricted use of antimicrobials in livestock feed has been a major contributing factor. The prevalence of antimicrobial-resistant bacteria has attained an inconsistent level worldwide and threatens global public health as a silent pandemic, necessitating urgent intervention. The emergence of antimicrobial resistance has increased the rate of morbidity and mortality globally and standard of living of individuals has been threatened. Therapeutic options of infections caused by antimicrobial-resistant bacteria are limited, resulting in significant morbidity and mortality with high financial impact. The paucity in discovery and supply of new novel antimicrobials to treat life-threatening infections by resistant pathogens stands in sharp contrast to demand. Immediate interventions to contain AMR include surveillance and monitoring, minimizing over-the-counter antibiotics and antibiotics in food animals, access to quality and affordable medicines, vaccines and diagnostics, and enforcement of legislation. An orchestrated collaborative action within and between multiple national and international organizations is required urgently, otherwise, a post antibiotic era can be a more real possibility than an apocalyptic fantasy for the 21st century. This narrative review highlights on the rise of antimicrobial resistance and its threat globally.

***Keywords:*** *Antibiotics, Resistance, Morbidity, Antimicrobial resistance, Mortality, Surveillance*

**ABSTRACT 15**

# INVESTIGATION ON THE PHYSICOCHEMICAL AND PRESERVATIVE POTENTIAL OF ESSENTIAL OIL FROM JANSA SEED (CUSSONIA BARTERI) ON POST-HARVEST LOSSES OF YAM (DIOSCOREA ROTUNDATA)

Ejimofor Chiamaka Frances[1] & Nwakoby Nnamdi Enoch[2]

*[1]Department of Biological Science; [2]Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus, Anambra State, Nigeria*

*Corresponding Author: cf.anyaegbu@coou.edu.ng | Phone: 08039729726*

## ABSTRACT

The main objective of this study is to investigate the physicochemical and preservative potential of essential oil from *Cussonia barteri* seeds against postharvest spoilage fungi isolated from yam. Essential oils was extracted from the seeds using hexane extraction method and its antimicrobial activity was tested against postharvest spoilage fungi isolated from spoilt yam using disk diffusion method and its MIC and MBC calculated. The result from the physiochemical assessment of *Cussonia barteri* (Jansa Seed) essential oil showed that the oil extracted was cream yellowish in colour with mild/subtle aroma and Smooth in texture and oil feeling. The pH is acidic (5.20), its electrical conductivity was 0.360Us/cm, concentration (0150mg/l), temperature 32.9\u00b0C. Three fungi strains (*Mucor* spp, *Penicillium* spp and *Aspergillus niger*) were isolated from spoilt yam and from the result, the *Cussonia barteri* (Jansa Seed) essential oil showed inhibition zone of (20.00mm, 17.50mm, 0.00mm and 0.00mm) for *Mucor* spp, in 500, 250, 125 and 62.50mg/L concentration respectively, *Aspergillus niger* showed inhibition zone of (18.00mm, 12.50mm, 10.00mm and 0.00mm) in 500, 250, 125 and 62.50mg/L concentration respectively, while *Penicillium* spp showed inhibition for only concentration of 500mg/l (15.00mm) and 250mg/l (10mm) but were resistance in all other concentrations. When compare with the commercial antibiotic (CFX), it showed inhibition for *Mucor* spp (57mm) *Aspergillus niger* (33mm) and *Penicillium* spp (57.50mm). The results of MIC and MBC of the *Cussonia barteri* (Jansa Seed) oil suggested that it can be used to control and prevent postharvest spoilage fungi and food poisoning diseases. The study have proved the seed to be potentially effective can be used as natural alternative preventives to control food poisoning diseases and preserve food stuff avoiding healthy hazards of chemically antimicrobial agent applications.

***Keywords:*** *Fungi, Isolation, Post-harvest, Spoilage*

**ABSTRACT 16**

# COMPARATIVE ANTI-INFLAMMATORY PROPERTIES OF SELECTED ETHNOMEDICINAL PLANTS USED IN THE MANAGEMENT OF DIABETES MELLITUS

Okafor, Irene Ngozi[1]* & Christopher, Emmanuel[2]

*Biochemistry Department, Chukwuemeka Odumegwu Ojukwu University, Uli Campus*

*Corresponding Authors: in.anene@coou.edu.ng or Christopheremmanuel.co@gmail.com*

## ABSTRACT

This study evaluated the bioactivity of six medicinal plant extracts, *Panicum sumantrese*, *Eleusine coracana*, *Vernonia amygdalina*, *Andrographis paniculata*, *Ocimum gratissimum*, and *Momordica charantia*-against standard drugs (Diclofenac sodium and Acarbose) using four in vitro assays: protein denaturation inhibition, alpha-amylase inhibition, alpha-glucosidase inhibition, and hypotonicity-induced hemolysis protection. In the protein denaturation assay, *Momordica charantia* and *Vernonia amygdalina* exhibited the highest inhibitory activity with an IC■■ values of 0.43 mg/ml and 0.45 mg/ml respectively, outperforming the standard Diclofenac sodium with an IC■■ of 0.88 mg/ml. *Ocimum gratissimum* also showed strong inhibition with an IC■■ of 1.20 mg/ml, while *Panicum sumantrese* and *Andrographis paniculata* had moderate activity with an IC■■ of 0.97 mg/ml each. For alpha-amylase inhibition, *Vernonia amygdalina* demonstrated the most potent activity with an IC■■ of 1.21 mg/ml and was closely followed by Acarbose with an IC■■ of 1.28 mg/ml. Other extracts such as *Momordica charantia* shows an IC■■ of 5.70 mg/ml and *Andrographis paniculata* IC■■ of 16.93 mg/ml) showed lower inhibitory effects. In the alpha-glucosidase inhibition assay, *Vernonia amygdalina* again showed strong activity IC■■ of 0.35 mg/ml, comparable to Acarbose IC■■ of 0.30 mg/ml. *Ocimum gratissimum* exhibits an IC■■ of 2.18 mg/ml and *Momordica charantia* IC■■ of 3.30 mg/ml also demonstrated notable inhibition, while *Panicum sumantrese* and *Eleusine coracana* had moderate effects. Regarding protection against hypotonicity-induced hemolysis, *Ocimum gratissimum* and Diclofenac sodium exhibited the highest protective effects with IC■■ values of 0.15 mg/ml and 0.13 mg/ml respectively. *Momordica charantia* IC■■ of 7.55 mg/ml and *Andrographis paniculata* of IC■■ of 6.21 mg/ml showed moderate protection, while *Vernonia amygdalina* had the least potent effect IC■■ of 9.59 mg/ml. *Vernonia amygdalina* and *Momordica charantia* consistently demonstrated strong bioactivity across multiple assays, indicating their potential as natural therapeutic agents. Their efficacy, particularly in protein denaturation and enzyme inhibition assays, was comparable or superior to standard drugs, highlighting their promise for further pharmacological development.

***Keywords:*** *Anti-inflammatory properties, Ethnomedicinal plants, Diabetes mellitus*

**ABSTRACT 17**

# INTEGRATIVE IN SILICO AND EXPERIMENTAL INVESTIGATION OF IN VITRO ANTIOXIDANT ACTIVITY AND ANTI-INFLAMMATORY POTENTIAL OF OCIMUM GRATISSIMUM LEAF EXTRACT FOR BIOPHARMACEUTICAL APPLICATION

Moneme, E.C[1]* & Nwaka, A.C[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State, Nigeria*

*Corresponding Author: emekamoneme5@gmail.com*

## ABSTRACT

This research is anchored on biotechnology applied to human health. In recent years, researchers have intensified the search for effective, non-toxic, anti-inflammatory Bioproduct with Free radical scavenging activity which could mitigate Oxidative Stress-induced diseases and improve general well being. Quantitative screening for active phytochemical composition of *Ocimum gratissimum* was conducted using standard methods, followed by In Silico Molecular Docking simulation against target proteins of NrF2 pathway (Keap1), Nf-kB pathway (P50,P65), Epigenetic regulation (HDAC1,DNMT1) and Oxidative stress (NOX2) using AutoDockVina. In Vitro Antioxidant (Nitric oxide, Ferric reducing property, Superoxide, Hydroxyl radical, Total antioxidant capacity and DPPH) activities were further determined. From the results, the extract displayed rich content of phytochemicals and bioactive metabolites. It exhibited high antioxidant and anti-inflammatory potentials which could be traced to the pharmacological activities of the biomolecules. The In Silico simulation data identified Pyrazolone, Epicatechin and Rutin as lead compounds based on their affinity to essential target proteins. In conclusion, *Ocimum gratissimum* leaf extract could help to ameliorate Oxidative stress and consequently improve health. The findings could be translated into innovative biotechnological health product that would contribute to public health, uplift the bioeconomy and improve societal well-being. The biomolecules identified from the In Silico simulation could be prioritized for further experimental validation.

***Keywords:*** *Ocimum gratissimum, Biotechnology, Oxidative stress, Inflammation, Free radicals, Biopharmaceuticals, Health*

**ABSTRACT 18**

# BIOCHEMICAL ALTERATIONS IN LIVER AND KIDNEY FUNCTION MARKERS INDUCED BY ETHANOL SEED EXTRACT OF TRIGONELLA FOENUM-GRAECUM LINN IN WISTAR RATS

Ifemeje, M.O.*[1], Nwaka, A.C.[2] & Ifemeje, J.C.[2]

*[1]Department of Medical Biochemistry; [2]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

*Corresponding Author Email: om.ifemeje@coou.edu.ng*

## ABSTRACT

Fenugreek, also known as *Trigonella foenum-graecum* linn, is a medicinal plant known for its potential hepatoprotective and nephroprotective effects, following oral administration. This study was aimed at determining the biochemical alterations in liver and kidney function markers fed with by ethanol seed extract of *Trigonella foenum-graecum* linn in wistar rats. Fifty-three (53) Male and female wistar rats were used for the study. Thirteen were employed for acute toxicity test (LD■■) while forty were divided into eight groups of five rats per group (M1-M4 for males) and (F1-F4 for females). M1 and F1 received normal rat chaw, M2 and F2 received 100mg/kg b.w, M3 and F3 received 200mg/kg, M4 and F4 received 400mg/kg of the extract. The rats were sacrificed after 28 days of feeding and blood samples were collected by cardiac puncture. Biochemical parameters (Serum Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), alkaline phosphates (ALP), total bilirubin, creatinine and urea levels) were assayed using Randox kit. Results of the LD■■ showed mortality at 5000 mg/kg b.w. The ALP level of the treated groups increased with increase in concentration of the extracts while the ALT and AST levels remained the same when compared to control group. Also urea and creatinine levels significantly decreased with increased concentration when compared to control. The effect of the ethanol seed extract of *T. foenum-graecum* on the organ markers was concentration-dependent, suggestive of both protective and adverse effects. *T. foenum-graecum* exhibited hepato-protective and nephro-protective potential however, its administration should be dose regulated to achieve a better efficacy.

***Keywords:*** *Trigonella foenum-graecum linn, Biochemical alterations, Nephro-protective, Hepato-protective, Ethanol seed extract*

**ABSTRACT 19**

# ANTHELMINTIC EFFICACY OF PLANT LEAF EXTRACTS AGAINST HOOKWORMS USING ALBINO RATS IN IDEMILI SOUTH LGA, ANAMBRA STATE, NIGERIA

Okonkwo J.O[1], Emmy-Egbe I.O[1], Anyaegbunam L.C[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

*Corresponding Author: ogochukwujoy503@gmail.com*

## ABSTRACT

Helminth infections continue to pose serious health challenges worldwide, and the increasing resistance of parasites to synthetic anthelmintic drugs has intensified the search for safer plant-based alternatives. This study investigated the phytochemical composition, safety profile, biochemical responses, body weight changes, histopathological alterations and anthelmintic potential of ethanolic leaf extracts of *Vernonia amygdalina* (bitter leaf), *Gongronema latifolium* (utazi), and *Carica papaya* (papaya) using helminth-infected Wistar rats. The research was carried out in Idemili South Local Government Area of Anambra State, Nigeria, between May to November, 2025. Phytochemical screening showed that the extracts contained several bioactive compounds including flavonoids, phenols, tannins, saponins, and alkaloids. Papaya leaf produced the highest extraction yield (19.90%), followed by bitter leaf (15.60%) and utazi (12.30%). Acute toxicity evaluation revealed no mortality at doses up to 1000 mg/kg, indicating that the extracts were relatively safe. The extracts produced significant (p < 0.05) and dose-dependent reductions in worm burden and faecal egg count compared with the infected untreated group. Papaya extract at 500 mg/kg showed the strongest anthelmintic activity with 78.6% worm reduction and 86.4% egg reduction, approaching the effect of albendazole (89%). Helminth infection caused marked alterations in biochemical parameters and body weight, but treatment with the extracts significantly improved lipid profile, glucose levels, and protein indices. Histopathological examination further revealed severe intestinal, hepatic, and renal damage in infected controls, whereas treated groups showed notable tissue recovery. Overall, the findings suggest that these medicinal plants possess considerable anthelmintic and protective properties, with papaya leaf extract demonstrating the highest therapeutic potential.

***Keywords:*** *Anthelmintic efficacy, Plant leaf extracts, Hookworms, Albino rats*

**ABSTRACT 20**

# UNTREATED PHARMACEUTICAL EFFLUENTS ON THE GROWTH OF MAIZE ZEA MAYS PLANT

Nwakoby Nnamdi Enoch[1] & Ejimofor Chiamaka Frances[2]

*[1]Department of Microbiology; [2]Department of Biological Science, Chukwuemeka Odumegwu Ojukwu University Uli, Anambra State, Nigeria*

*Email: cf.anyaegbu@coou.edu.ng | Phone: 08039729726*

## ABSTRACT

Pharmaceutical effluents are wastes generated during the process of drug manufacturing by pharmaceutical industries. When these effluents are discharged directly into the environment without proper handling and treatment, they affect both human health and the environments. Growth Performances, heavy metal contents and nutritive values of *Zea mays* (maize) seeds harvested from the experimented sites were also determined using instrumentation and gravimetric techniques. There was significant (P<0.05) reduction in the growth performances (major percentage on germination and seed weight) in UPE polluted sites mostly in 100L/9m$^2$ site (59.74% and 50% reduction). There were increased in heavy metal (Arsenic, Cadmium, Cobalt, Nickel, Lead) and decrease in nutritive (proteins, carbohydrates, fats) values of *Zea mays* seeds harvested from UPE polluted sites, and these were significant (P<0.05) in 100L/9m$^2$ sites. Therefore, this study has shown that the growth performances and nutritional values *Zea mays* seeds were significantly reduced, but the heavy metal levels of the seeds increased in UPE polluted sites, mostly in 100L/9m$^2$ site.

***Keywords:*** *Waste, Nutrients, Maize, Pollution*

## ABSTRACT 21

# PLAUSIBLE GEO-HELMINTHIASIS HEALTH CONCERNS THROUGH LENSES OF COMPROMISED AGRICULTURAL AND ENVIRONMENTAL PRACTICES IN IZZI LGA AND ENVIRONS, EBONYI STATE

Patrick O.Nwokocha[1], Chukwu C. Modesta[2], Efi U.Joshua[3], Njoku C. Mercy[2], Odii N. Joshpine[2]

*[1]Bioresources Development Centre, BIODEC Abuja/Uburu @ NBRDA; [2]Jalingo, Taraba State @ NBRDA; [3]Uburu, Ebonyi State @ NBRDA*

*Patricks.givanas@gmail.com | WhatsApp: 08185159651*

## ABSTRACT

High morbidity prone infectious diseases from Inadequate environmental and compromised agricultural practices, has led to the proliferation of Geo-helminthiasis, which affects nutritional status in children and teenagers, causes growth retardation, anemia and some likelihood of medical complications. The study is aimed at evaluating; geo-helminthiasis infections through the lenses of agricultural and environmental practices in Izzi and environs, amongst junior secondary school students. The prevalence of helminth infections from soil and water contamination were objectively appraised using standard parasitological technique, which showcased data, acumen and recommendations on the subject under discuss. 300 students were examined for Geo-helminthiasis prevalence and results revealed 28.46%. Parasites identified were; *Ascaris lumbricoides* (9.95%), hook worm (8.65%), *Trichuris trichiura* (5.13%) and *Strongyloides stercoralis* (3.73%). These parasites were found in both sexes and all age group under review, but not affecting pattern of infection (p>0.05). Results showed slight observable variations at different degrees and not all students were disposed to water closet system. Although, there was no significant difference between the rate of helminth infection and source of drinking water, those using bore-hole source of drinking water were slightly less infected than other sources of drinking water. Therefore, the research work recommends intensified sanitary measures, reduce geo-pathogenic transmission of parasites from poor Agricultural practices (animal ranching), disinfect or treat stream waters while, a proactive deworming program in-place will help reduce high vulnerability to intestinal parasitic infections by Junior secondary school students.

***Keywords:*** *Ascaris lumbricoides, Environmental sanitation, Geo-helminthiasis infections, Intestinal parasites, Strongyloides stercoralis, Trichuris trichiura*

## ABSTRACT 22

# BIOREMEDIATION OF HEAVY METALS: POTENTIALS AND LIMITATIONS

Okpalaeke Ujunwa Maryann[1] & Dibua Nwamaka Anthonia[1]

*[1]Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding author: okpalaekeujunwa5@gmail.com*

## ABSTRACT

Heavy metal contamination refers to the accumulation of metals and metalloids with high atomic density and toxicity, such as lead, cadmium, mercury, chromium, and arsenic, in soil and water at levels that threaten ecosystems and human health. It results from industrialization, mining, agricultural runoff, and improper waste disposal. Unlike organic pollutants, these metals are non-biodegradable and persist in the environment, undergoing bioaccumulation and biomagnification through food chains, which leads to carcinogenicity, organ damage, and ecological disruption. Conventional remediation methods like chemical precipitation and excavation are costly, energy intensive, and can generate secondary pollutants. Bioremediation offers an eco-friendly alternative that uses microorganisms, plants, and fungi to detoxify, sequester, or immobilize metals. This review examines microbial bioremediation, phytoremediation, and mycoremediation. Key mechanisms include biosorption, bioaccumulation, biotransformation, and rhizofiltration by bacteria such as *Pseudomonas* and *Bacillus*, fungi like *Aspergillus*, and hyperaccumulator plants including *Thlaspi caerulescens*. Advantages include low cost, minimal site disturbance, public acceptance, and in situ treatment. Genetic engineering, nanobiotechnology, and microbial consortia are enhancing metal uptake and stress tolerance. Limitations persist. Bioremediation is slow, site specific, and sensitive to pH, temperature, and metal speciation. High concentrations inhibit organisms, and mixed contaminants reduce efficiency. Phytoremediation faces long timelines, shallow root depth, and biomass disposal challenges. Regulatory barriers also limit adoption. Integrated biological, chemical, and engineering approaches are needed for scalable cleanup. Future research should optimize consortia, improve metal bioavailability, and develop hybrid systems.

***Keywords:*** *Heavy metal contamination, Bioremediation, Phytoremediation, Biosorption, Microbial consortia*

**ABSTRACT 23**

# PREVALENCE OF GEOHELMINTHS PARASITES IDENTIFIED AMONG PRIMARY SCHOOL CHILDREN IN ANAMBRA NORTH SENATORIAL DISTRICT, SOUTHEAST NIGERIA

Onyenweife, L.C.[1], Mgbemena, N.A.[1], Anyaegbunam, L.C.[1], Igbodika, M.C.[1], Asomugha, N.C.[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

*Corresponding Author: onyenweifeleonard@gmail.com*

## ABSTRACT

Over the years Geohelminths infection has pose a significant risk to public health, the rate of co-infection of this helminthiasis with other infectious diseases has not been critically looked into, therefore this research aimed at determining the prevalence of Geohelminths parasitic infection, among primary school children in Anambra North. This was conducted from July 2024 - June 2025, in seven randomly selected primary schools across Anambra North, A total of 1029 faecal and blood samples were collected from children aged 3-15years and 700 water samples were also collected to access the environmental contamination, both samples were analysed for Geohelminths infection using flotation and sedimentation techniques. The Geohelminths eggs isolated were subjected to Polymerase Chain Reaction for confirmatory test before inoculation. Data obtained were analysed using SPSS version 20.0 with a significance level ($P \geq 0.05$). Out of 1029 samples, 1010 samples were examined, 175 pupils harboured at least one parasite species 175(17.32%). *Ascaris lumbricoides* 47(26.86%) is the most prevalence, while *Ancylostoma duodenale* record the least prevalence rate 28(16.00%). This study contributes to knowledge by showing that inhabitants of different villages in seven L.G.A, in Anambra North have high prevalence of Geohelminths *Ascaris lumbricoides*.

***Keywords:*** *Ancylostoma duodenale, Environmental contamination, Geohelminths infection, Sedimentation techniques*

## ABSTRACT 24

# MEDICINAL ANTIPARASITIC POTENTIAL OF SELECTED LOCAL HERBS AGAINST HUMAN INTESTINAL PROTOZOA IN ONITSHA, ANAMBRA STATE

Nwakonobi, S.O[1], Emmy-Egbe, I.O[1], Ejimofor, J.C.[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

*Corresponding Author: nwakonobioniah@gmail.com*

## ABSTRACT

Intestinal protozoan infections remain a major public health burden in Nigeria, particularly in densely populated urban settlements. This study was conducted to evaluate the antiprotozoal efficacy and tissue restorative potential of ethanolic extracts of *Allium sativum* (garlic) and *Vernonia amygdalina* (bitter leaf) against *Entamoeba histolytica* infection using albino rats (*Rattus norvegicus*) as experimental models. Fresh plant materials were collected and extracted using cold ethanol maceration, and subjected to phytochemical screening and GC-MS bioactive profiling. Experimental animals were inoculated with viable trophozoites of *E. histolytica* and grouped into negative control, positive control, metronidazole-treated, single extract-treated, and combined extract-treated cohorts. Parasite load reduction, body weight variation, hematological indices, and histopathological alterations were monitored. Data were analyzed using one-way ANOVA at p < 0.05. Metronidazole-treated and combined extract groups demonstrated the highest parasite clearance (5.4 ± 1.1 and 10.0 ± 1.5 cells/\u03bcL respectively on Day 14), with no significant difference ($p > 0.05$) between both. Significant improvements in hematological parameters and body weight were observed in the combined extract group, corresponding with marked mucosal regeneration and reduced inflammatory infiltration on histopathological assessment. The findings of this study provide scientific validation for the combined ethnomedicinal use of *A. sativum* and *V. amygdalina* in managing amoebiasis. The synergistic extract demonstrated comparable therapeutic potential to metronidazole with added mucosal healing benefits, indicating strong potential for development into standardized phytomedicine suitable for low-resource tropical healthcare systems.

***Keywords:*** *Medicinal antiparasitic potential, Local herbs, Human intestinal protozoa*

**ABSTRACT 25**

# SUSTAINABLE WASTEWATER MANAGEMENT: STRATEGIES FOR REDUCING ANTIMICROBIAL RESISTANCE

Nwayor Favour Chidiogor[1] & Dibua Nwamaka Anthonia[1]

*[1]Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus*

*Corresponding Author: nchidiogor@gmail.com*

## ABSTRACT

Antimicrobial resistance (AMR) refers to the ability of microorganisms such as bacteria to resist the effects of antimicrobial agents. This resistance can occur through Genetic mutations Horizontal gene transfer such as conjugation(plasmids), transduction(bacteriophages) and transformation, Antibiotic Resistance Genes(ARGs) enable bacteria to resist drug action through mechanisms such as drug inactivation, target modification, and efflux pumps. Major sources of Antimicrobial resistance in wastewater includes Municipal wastewater, which includes individuals and the community, Hospital wastewater, Pharmaceutical manufacturing and Agricultural activities. Conventional wastewater treatment has typical stages which includes Screening, and Sedimentation, Biological treatment like Activated Sludge, Disinfection. Although it is effective for reducing pathogens and organic matter, these systems were not designed to remove antibiotics or ARGs specifically, some antibiotics persist after treatment such as chlorination may kill bacteria but release extracellular DNA and these are limitations in this treatment. The use of advanced treatment technologies such as Membrane Bioreactors (MBR), Advanced Oxidation Processes (AOPs) holds more promising results. Preventing contamination at the source is most essential as prevention is more sustainable than relying only on treatment. Wastewater plays a crucial role in the environmental spread of AMR and conventional treatment alone is insufficient. A more comprehensive strategy is required and integrated to effectively reduce AMR risks.

***Keywords:*** *Antibiotics, Wastewater, Treatment, Antimicrobial resistance (AMR), ARGs*

**ABSTRACT 26**

# HAEMATOLOGICAL AND BIOCHEMICAL PROPERTIES OF JATROPHA TANJORENSIS LEAVES

Ureme Chiamaka Chiemena[1] & Mere Chinenye Azuka[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

## ABSTRACT

*Jatropha tanjorensis*, commonly known as hospital too far is a plant with edible leaves that have both traditional, medicinal and culinary uses, particularly in Nigeria. The study determined hematological and biochemical properties of leaves of *Jatropha tanjorensis*. Packed Cell Volume (PCV), Alanine aminotransferase activity, Aspartate aminotransferase activity, Alkaline phosphate activity, Serum Creatinine Concentration, Serum Urea Concentration, Vitamin Quantification and anti-oxidant assays (TAC and FRAP) were conducted using standardized methods. The results show that PCV increased in a dose-dependent manner at 100 mg/kg and 200 mg/kg, peaking at 71% at 200 mg/kg. Assessment of the Renal and Hepatic Functions revealed no adverse effect of *J. tanjorensis* leaves and so considered biochemically safe within the administered dosage range. Result of Vitamin Content revealed a higher concentration of Vitamin C in the dried leaves sample. Total Antioxidant Capacity (TAC) showed statistically significant difference between the fresh and dry leaves ($F=4.97$, $p=0.035$). Ferric Reducing Antioxidant Power (FRAP) showed no statistically significant difference between the fresh and dry leaves samples ($F=0.89$, $p=0.47$). The results obtained from this study contribute to the scientific validation for the use of this medicinal plant in traditional medicine which could be standardized culturally to as a broad spectrum for curing diseases.

***Keywords:*** *Jatropha tanjorensis, Haematological properties, Biochemical properties, Antioxidant activity, Vitamin C quantification, Hepatic function, Renal function*

## ABSTRACT 27

# PREVALENCE OF INTESTINAL HELMINTH PARASITIC INFECTIONS OF DOGS SLAUGHTERED IN IGBOUKWU TOWN, AGUATA LGA, ANAMBRA STATE NIGERIA

Ekesiobi, Anthony Oninna[1], Igbodika M.C.[1], Igwilo, Sopuru Peter[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

## ABSTRACT

A study was carried out to determine the prevalence of intestinal helminth parasitic infections of dogs slaughtered in Igboukwu town, Aguata Local Government Area between July and August, 2025. Faecal samples from Dogs' intestine were examined using standard parasitological (Direct wet mount and concentration) techniques. A total of 95 dogs were examined and 62 (65.26%) were positive for intestinal helminths infections. Male 34 dogs(69.39%) were infected more than the females 28 (60.87%) the difference in the rate of infection among sexes was not significant (P>0.05). Nematodes parasites, 14 (14.74%) recorded were *Ancylostoma caninum* 9(9.47%) and *Toxocara* Spp 5(5.26%). Cestode parasites 48(50.53%) recorded were *Diphylidium caninum* 32(33.68%) and *Taenia* spp 16(16.84%). The parasites did differ significantly in their prevalences (P>0.05). Dogs slaughtered in Igboukwu town harbored intestinal parasitic helminths and therefore are epidemiologically important in contributing to contamination of environment and serve as reservoir of important zoonotic infections to particularly the dog owners, butchers and generally inhabitants of Igboukwu. Regular deworming of dogs by the owners and awareness health education campaign are advocated.

***Keywords:*** *Prevalence, Igboukwu, Aguata, Nematode, Toxocara, Helminths*

**ABSTRACT 28**

# ASSESSMENT OF HEAVY METAL ACCUMULATION IN FIVE EDIBLE FISHES FROM RIVER NIGER

Udemezue, C.V[1]*, Ifemeje, J.C[2], Elemuo, J.F[3], Nebo, U.P.■

*[1]Federal College of Forest Resources Management, Ishiagu, Ebonyi State; [2]Department of Biochemistry, COOU Anambra State; [3]Federal Polytechnic Oko; ■National Institute for Fresh Water Fisheries, Imo State*

*Corresponding Author: chiomavivianokonkwo21@gmail.com | Phone: 08031397955*

## ABSTRACT

Heavy metal contaminants are ubiquitous in the environment and can be found in air, soil, water and various food product. Some of these heavy metals examples: Mercury, lead, cadmium etc could be detrimental to the body system and aquatic life and as such could lead to death if not properly handled. This study was aimed at evaluating the heavy metal contaminants in five edible fishes from fresh water using Atomic Absorption Spectrophotometer (AAS). In this study, a total of five different healthy fishes from River Niger (*Pimelodus pictus*, *Pimelodus maculatus*, *Amur calp*, African catfish, *Rutilus*) were used for the assessment. The evaluation of heavy metal concentrations in the five edible fishes revealed varying degrees of contamination, with copper and zinc being the most prevalent metals. The result showed that *Rutilus* exhibited the highest overall contamination (2.15±0.03mg/kg), mainly due to elevated levels of copper (0.88±0.01mg/kg), lead (0.53±0.00mg/kg), zinc (0.49±0.02mg/kg) followed by *P. pictus* (2.11±0.02 mg/kg) and the least was *A. calp* (1.54±0.00 mg/kg). Though some metals are essential in trace amounts, the presence of toxic metals like lead, cadmium, mercury indicated a potential health risk, particularly through chronic consumption. The findings demonstrated the extent of heavy metal contamination in various fishes raising alarms about their bioaccumulation and health risk potential to consumers.

***Keywords:*** *Heavy metals, Fishes, River Niger, Bioaccumulation, Public health risk*

**ABSTRACT 29**

# DEVELOPMENT AND TESTING OF POTENT HERBAL FORMULATIONS FOR RESISTANT HELICOBACTER PYLORI ULCER TREATMENT USING IN VITRO TECHNIQUE

Iche, I.[1] & Umeaku, C.N.[2]

*[1]Department of Microbiology, Federal Polytechnic, Nekede, Owerri; [2]Department of Microbiology, COOU Uli Campus*

## ABSTRACT

Antibiotic resistance in *Helicobacter pylori* (HP) is a growing clinical challenge that compromises the efficacy of standard triple therapy for ulcer and gastritis management, yet the development of safe, plant-based alternatives remains underexplored. This study addressed the research gap by evaluating the development and in vitro testing of potent herbal formulations against resistant HP strains isolated from ulcer patients in Owerri Metropolis. The aim was to identify and formulate the most effective extracts from *Persea americana* (PA), *Moringa oleifera* (MO), and *Nigella sativa* (GS) for the treatment of resistant HP ulcer infections. Gastric mucosal biopsies were collected from 100 consenting participants aged ≥2 years using purposive sampling, and HP was isolated via microaerophilic culture and confirmed by 16S rRNA sequencing with 100% identity to reference strains PIK2, 444A6 and HpGP-IDN-001. Antibiotic susceptibility testing revealed high resistance rates to amoxicillin (77.27%), clarithromycin (40.91%), and metronidazole (86.36%). Ethanolic and aqueous extracts of seeds, peels, leaves, and stems were prepared and tested using microbroth dilution. Results showed that GS seeds and PA seeds exhibited the lowest minimum inhibitory concentrations, with values as low as 0.008 and 0.017 against HPH1 and HPK2, respectively. Combination formulations, particularly PA/MO/NS at a 1:1:2 ratio, demonstrated synergistic activity with MIC values of 0.001 against HPH1, significantly lower than individual extracts. One-way ANOVA indicated significant differences among treatments ($F = 12.47$, $p < 0.001$), and post-hoc Bonferroni tests confirmed that combined formulations were significantly more effective than single extracts ($p < 0.01$). The study concludes that optimized herbal formulations, especially the triple combination of PA, MO, and GS seeds, provide potent anti-*H. pylori* activity and represent a promising adjunct for managing resistant ulcer infections. This contributes to knowledge by validating dose-dependent, synergistic herbal therapies as viable alternatives to conventional antibiotics.

***Keywords:*** *Helicobacter pylori, Antibiotic resistance, Herbal formulation, Persea americana, Moringa oleifera, Nigella sativa, Ulcer, In vitro, Synergism*

**ABSTRACT 30**

# ECOTOXICOLOGICAL EVALUATION OF BREWERY AND NOODLE EFFLUENTS ON AGRICULTURAL SOIL AND MAIZE SEEDS

Okolo, O.C.[1] & Uba, B.O.[1]

*[1]Department of Biological Sciences, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria*

*Correspondence: onyinye199@gmail.com | bo.uba@coou.edu.ng*

## ABSTRACT

Industrial effluents from brewery and noodle processing industries are major environmental pollutants capable of altering soil properties and contaminating agricultural crops. This study evaluated the physicochemical characteristics and heavy metal accumulation in maize (*Zea mays* L.) exposed to varying concentrations (5 - 100%) of brewery and noodle effluents. Physicochemical analysis revealed elevated nitrate concentrations of 63.00±0.50 mg/L and 100.00±0.80 mg/L in brewery and noodle wastewater respectively, exceeding WHO permissible limits. Conductivity values increased to 1.75±0.05 mS/cm and 1.54±0.02 mS/cm, while brewery wastewater exhibited alkaline pH (10.40±0.30) and noodle wastewater showed acidic pH (4.80±0.20). Heavy metals including lead, cadmium, nickel, cobalt, copper, and zinc were also above recommended limits. Soil irrigated with noodle effluent showed increased nitrate concentration from 0.50±0.01 mg/L in the control to 100.00±0.50 mg/L at 100% concentration, while lead increased from 0.10±0.01 mg/L to 4.55±0.05 mg/L. In harvested maize seeds, lead accumulation increased from 0.00±0.00 mg/L in the control to 0.46±0.02 mg/L and 0.41±0.02 mg/L in noodle and brewery effluent treatments respectively. Nickel and cadmium also accumulated progressively with increasing effluent concentration. The findings demonstrate that untreated industrial effluents significantly alter soil quality and promote heavy metal bioaccumulation in edible crops, thereby posing serious environmental and public health risks. Proper treatment and monitoring of industrial wastewater before agricultural use are therefore strongly recommended.

***Keywords:*** *Bioaccumulation, Brewery effluent, Heavy metals, Maize seeds, Noodle wastewater, Wastewater irrigation*

**ABSTRACT 31**

# ENVIRONMENTAL EQUITY AND MICROBIAL HAZARDS: INVESTIGATING THE REGULATORY IMPLICATIONS OF WASTE DISPOSAL AND INTEGRATING BACTERIOLOGICAL MONITORING INTO ENVIRONMENTAL POLICY IN UMUNYA, ANAMBRA

Awari, Victoria Ginika[1]* & Okonkwo, Christopher Obiajulu[1]

*[1]Department of Microbiology, Tansian University Umunya, Anambra State, Nigeria*

## ABSTRACT

The indiscriminate disposal of municipal solid waste (MSW) remains a critical challenge to environmental sustainability and public health in Nigeria. This study assessed the bacteriological load and microbial diversity in soil and leachate from unregulated dumpsites in Umunya, Oyi Local Government Area, Anambra State. Soil and leachate samples were collected from four strategic locations (Garage, Roundabout, Market, and Roadside). Standard microbiological techniques, including serial dilution and the pour plate method, were used for enumeration, while Gram staining and biochemical tests (catalase and oxidase) were used for identification. Results indicated high bacterial loads, with soil samples ranging from $6.1 \times 10^2$ to $9.9 \times 10^5$ CFU/g and leachate samples showing higher concentrations from $9.0 \times 10^2$ to $9.7 \times 10^5$ CFU/ml. Isolated genera included *Bacillus* spp., *Staphylococcus* spp., *Streptococcus* spp. (Gram-positive), and *Escherichia* spp., *Klebsiella* spp., and *Proteus* spp. (Gram-negative). The presence of these pathogens highlights a failure in waste regulatory policy and poses a significant risk of groundwater contamination and disease outbreaks. The study recommends the integration of biotechnological tools for bioremediation and the enforcement of stringent environmental ethics and waste management policies to achieve sustainable development goals.

***Keywords:*** *Municipal solid waste, Bacteriological assessment, Leachate, Environmental ethics, Biotechnology, Sustainable development*

**ABSTRACT 32**

# HARNESSING INDIGENOUS MICROBIAL FRONTIERS: A LOW-COST BIOTECHNOLOGICAL APPROACH TO SOIL BIOREMEDIATION FOR SUSTAINABLE ECONOMIC ADVANCEMENT IN UTU-JEREMI, DELTA STATE, NIGERIA

Awari, Victoria Ginika[1]* & Kalu Joseph Umah[1]

*[1]Department of Microbiology, Tansian University Umunya, Anambra State, Nigeria*

## ABSTRACT

Crude oil contamination in the Niger Delta remains a critical bottleneck for sustainable agricultural development and environmental health, particularly in communities like Utu-Jeremi, where oil exploration and pipeline leakages frequently contaminate the soil and the surrounding environment. This study focused on the isolation and characterization of indigenous hydrocarbon-degrading bacteria from contaminated soil in Utu-Jeremi, Delta State, using low-cost biotechnological protocols. Soil samples were collected from five oil-polluted points using sterile spatulas at a depth of 0-15 cm into unused labeled polythene bag. Soil samples from the five impacted sites were analyzed for Total Heterotrophic Bacteria Count (THBC) and Total Hydrocarbon-Utilizing Bacteria Count (THUBC) using Nutrient Agar and Bushnell Haas Mineral Salts (BHMS) media. THBC ranged from 4.0x10■ to 5.7x10■ CFU/g, while THUBC reached up to 4.1x10■ CFU/g. Predominant isolates identified included *Bacillus* spp. (40%), *Pseudomonas* spp. (30%), *Acinetobacter* spp., *Micrococcus* spp., and *Staphylococcus* spp. From this study, it was observed that out of the five bacterial isolates, three were hydrocarbon-utilizing bacteria. The study concludes that Utu-Jeremi soils harbor robust indigenous bacteria capable of crude oil degradation. This supports the potential of these hydrocarbon-utilizing bacterial isolates in bioremediation strategies for community-based restoration of oil-polluted lands in Nigeria. The results demonstrate that indigenous microbes possess significant adaptive potential for oil degradation. Leveraging these native microbial frontiers offers a financially viable and sustainable strategy for restoring polluted farmlands, thereby fostering economic advancement in oil-impacted communities.

***Keywords:*** *Bioremediation, Biotechnology, Hydrocarbon-degrading bacteria, Sustainable development, Indigenous microorganisms*

**ABSTRACT 33**

# DECIPHERING THE STRUCTURE OF BIOACTIVE MOLECULES FROM ASPERGILLUS (NEGRI SECTION) ASSOCIATED WITH MACROTERMES SPECIES: IMPLICATIONS FOR CONTROLLING ENTEROPATHOGENIC BACTERIA

Onyemekara N.N.[1]*, Iheukwumere I.H.[2], Igiri V.C.[1], Ogbonna J.O.[2]

*[1]Department of Biological Sciences, University of Agriculture and Environmental Sciences, Umuagwo; [2]Department of Microbiology, COOU Uli Campus*

*Corresponding email: globalnelly@yahoo.com | Phone: 08108576049*

## ABSTRACT

The rise of multi-drug resistant enteropathogenic bacteria poses a significant global threat to public health, necessitating the discovery of novel antimicrobial agents. This study investigates the symbiotic relationship between *Macrotermes* species and fungi from the *Aspergillus* (Negri section) in order to identify the potent bioactive secondary metabolites such as alkaloids, phenols and flavonoids which remain largely uncharacterised in terms of their molecular structure and therapeutic potentials. These fungi, thriving within the specialized environment of termite nests, produce a variety of these defensive compounds. This research aims to provide a scientific basis for developing new antimicrobial treatments derived from fungal-termite associations by deciphering the chemical structures of these bioactive molecules and evaluating their efficacy against common enteropathogenic bacteria such as *Salmonella*, *Vibrio cholerae*, and *Staphylococcus aureus*. *Aspergillus* species were isolated from *Macrotermes* samples and cultivated to induce the production of inhibitory metabolites. These compounds were extracted using organic solvents and purified through column chromatography. The antibacterial potency of the extracts was assessed by determining the Minimum Inhibitory Concentration (MIC) against clinical pathogens. The molecular structures of the most effective compounds were elucidated using Gas Chromatography-Mass Spectroscopy (GC-MS). In vivo testing was done using albino Wistar rats. Recovery times and safety profiles were observed following infection with enteric pathogens. The findings are expected to contribute significantly to the field of medical microbiology and drug discovery, offering a sustainable approach to managing foodborne illnesses and antibiotic resistance.

***Keywords:*** *Multidrug resistant enteropathogenic bacteria, Negri section, Bioactive metabolites, Antibacterial potency, Chromatography*

## ABSTRACT 34

# EVALUATION OF PHYTOCHEMICAL AND ANTIOXIDANT VITAMINS A, C, AND E COMPOSITIONS OF CHIA SEED AND TIGER NUT PROCURED FROM NNEWI, ANAMBRA STATE, NIGERIA

Nwaka, Chinyere S.[1], Ifemeje Jonathan C.[1], Nwaka, Andrew C.[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State*

*Corresponding email: andynwaka@yahoo.com*

## ABSTRACT

*Salvia hispanica* (Chia Seed) also known as chia seed, is an annual herbaceous plant, originally from Southern Mexico. Chia seeds have become one of the world's most recognizable foods based on their nutritional properties and medicinal values. *Cyperus esculentus* L. (Tiger Nut) is a valuable food for nourishment with significant health benefits, they are rich in vitamins and minerals. In this study, phytochemical and antioxidant vitamins A, C and E compositions of Chia Seed and Tiger nut procured from Nnewi, Anambra State were evaluated using standard methods. Phytochemical and bioactive contents of the samples were determined using Gas chromatography-flame ionization detector while antioxidant vitamins (A, C, E) were determined using Pearson method. Data obtained from the experiments were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Level of significance was set at p<0.05. The results of this study revealed that chia seed and tiger nut possess good quantity of antioxidant phytochemicals such as quercetin (6.86 ± 0.00 and 0.83 ± 0.00)ppm, nobeletin (1.21 ± 0.00 and 0.15 ± 0.00)ppm, resveratrol (0.32 ± 0.00 and 2.04 ± 0.00)ppm, vanillic acid (0.14 ± 0.00 and 18.28 ± 0.00)ppm respectively and antioxidant vitamins A (13.28 ± 0.02 and 25.00± 0.02)mg/l, C (117.65 ± 0.25 and 109.09±0.21)mg/kg and E (19.73± 0.02 and 31.49± 0.02)mg/l respectively. In conclusion, the results of this study revealed that chia seed and tiger nut possess good quantity of antioxidant phytochemicals and antioxidant vitamins and therefore could be very useful in neutralizing the free radicals normally generated in some disease conditions, hence in management of oxidative stress.

***Keywords:*** *Phytochemicals, Antioxidants, Vitamins, Chia seeds, Tiger nut*

**ABSTRACT 35**

# COMPARATIVE ANTIFUNGAL EFFICACY OF SOME SELECTED INDIGENOUS PLANT EXTRACTS AGAINST POSTHARVEST COCOYAM PATHOGENS IN MAJOR MARKETS IN ANAMBRA STATE

Izuegbunam Chinelo S., Ukpaka C.G., Ejimofor C.F.
*Department of Microbiology, COOU & Affiliates*
*chineloscholastica@gmail.com | Phone: 08032115467*

## ABSTRACT

This research evaluated the comparative antifungal efficacy of selected indigenous plant extracts against postharvest fungal pathogens associated with cocoyam tuber spoilage in major markets in Anambra State. Plants selected for this research includes *Vernonia amygdalina, Azadirachta indica, Morinda lucida, Hyptis suaveolens* leaves, and *Citrus limoni* fruit. The aim of this study is to establish the usage of indigenous plant extracts to control pathogenic fungi destroying farm produce. Specific objective includes; to isolate and identify the fungi responsible for spoilage of cocoyam tubers, to conduct qualitative and quantitative phytochemical analysis of selected plant extracts, and to compare the in vitro antifungal efficacy of the selected plant extracts against the fungal pathogens isolated from spoilt cocoyam tuber. Cocoyam tuber were collected from different markets in Anambra State. Standard Association of Official Analytical Chemists methods (AOAC) were employed for fungal isolation, while in vitro antifungal assays were conducted using graded extract concentrations. Five spoilage fungi were consistently isolated and identified: *Aspergillus flavus*, *Aspergillus niger*, *Fusarium solani*, *Rhizopus stolonifer*, and *Penicillium expansum*. Tabulated results of Phytochemical screening revealed the presence of some bioactive compound present in the so tested plant extracts in varying concentrations. In vitro assays demonstrated significant antifungal effects (p < 0.05), with inhibition zones increasing with extract concentration (100% > 50% > 25%). *V. amygdalina* exhibited the highest inhibitory activity against most isolates while *H. suaveolens* showed the lowest. Minimum inhibitory concentrations (MIC) ranged from 10.00-1000 mg/mL, while minimum fungicidal concentrations (MFC) varied between 50-1000 mg/mL, depending on the extract and test organism. The results confirm that ethanol extracts of these plants, particularly *V. amygdalina* and *A. indica*, possess potent antifungal properties and can serve as eco-friendly alternatives or supplements to synthetic fungicides.

***Keywords:*** *Antifungal, Indigenous plant, Phytochemical, Bioactive compounds, Hyptis suaveolens, Fusarium solani*

**ABSTRACT 36**

# ASSESSMENT OF PHYSICOCHEMICAL CHARACTERISTICS, HEAVY METAL CONTAMINATION, AND BACTERIOLOGICAL QUALITY OF SELECTED WATER SOURCES

Uba, B.O.[1]* & Dokubo, C.U.[2]

*[1]Department of Microbiology, COOU Uli; [2]Department of Science and Laboratory Technology, Delta State Polytechnic Ogwashi-Uku*

*Corresponding author email: bo.uba@coou.edu.ng*

## ABSTRACT

Water quality deterioration poses serious environmental and public health concerns, particularly in developing countries where untreated water is frequently utilized for domestic purposes. This study evaluated the physicochemical properties, bacterial load, heavy metal concentrations, and water quality index (WQI) of stream, rain, and tap water samples. Standard analytical procedures were employed for all determinations. Physicochemical analysis revealed temperatures ranging from 27.50-27.70\u00b0C and pH values of 5.21-7.26. Conductivity values ranged from 7.50-31.90 \u03bcS/cm, while total dissolved solids (TDS) varied between 13.13 and 55.83 mg/L. Biochemical oxygen demand (BOD■) ranged from 15.00-29.00 mg/L, whereas chemical oxygen demand (COD) values were considerably elevated, ranging from 248.00 -1,208.00 mg/L, exceeding WHO and FEPA permissible limits in stream and tap water samples. Phosphate concentrations were also high in stream (95.21 mg/L) and rain water (184.34 mg/L). Bacterial loads were highest in tap water (630 CFU/mL), followed by rain water (516 CFU/mL) and stream water (135 CFU/mL). Heavy metal analysis showed elevated concentrations of arsenic (27.48 mg/L), lead (3.23 mg/L), cadmium (2.22 mg/L), chromium (1.58 mg/L), and mercury (24.00 mg/L), surpassing FEPA standards in several samples. The WQI results indicated poor water quality, suggesting significant contamination and possible health risks associated with consumption and domestic use. The study highlights the urgent need for routine monitoring, effective water treatment, and stricter environmental regulation to safeguard public health.

***Keywords:*** *Bacterial load, Heavy metals, FEPA standards, Physicochemical properties, Public health, Water pollution, Water quality index*

**ABSTRACT 37**

# DETERMINATION OF ANTIBIOTIC SUSCEPTIBILITY PATTERNS AND MULTIPLE ANTIBIOTIC RESISTANCE (MAR) INDEX OF URINARY TRACT INFECTION CAUSING BACTERIA

Kereakede E.[1]*, Haroun A.[1], Ahaji A.I.[1], Oyong A.I.[1], Hassan A.U.[1], Omenesa R.L.[2], Effiong T.[1], Romanus A.[1], Danjuma A.[3], Yurkusi M.M.■

*[1]Department of Biotechnology, Nigerian Defence Academy; [2]Department of Biological Sciences, NDA; [3]Forestry Research Institute of Nigeria; ■Biology Unit, Air Force Institute of Technology*

*Corresponding Author: ekereakede@nda.edu.ng | Phone: +2347032506981*

## ABSTRACT

Antimicrobial resistance is a major clinical problem in treating infections caused by different uro pathogens and has increased over time. Resistance to antibiotics by bacteria is a natural adaptation phenomenon; the emergence of multidrug-resistant (MDR) bacteria is steadily increasing and threatening the world population. MARI is suggested as an effective tool for risk assessment. Bacterial identification and susceptibility testing are essential for selecting appropriate antimicrobial agents to treat UTIs bacterial. The study aimed to determine antibiotic susceptibility patterns and multiple antibiotic resistance (MAR) index of bacterial causing UTIs. The bacteria isolates were subjected to fourteen different antibiotics belonging to different classes of antibiotics using Kirby-Bauer disk diffusion method according to the guidelines of the Clinical and Laboratory Standard Institute. The study revealed resistance/susceptibility patterns of uropathogens bacteria causing urinary tract infections. The highest percentage of resistance of *E. coli* was recorded against Levofloxacin 130 (87.2%), *K. Pneumonia* against Amoxicillin-clavulanic 70 (92.1%), *P. aeruginosa* against Amoxicillin-clavulanic 77 (85.6%) and *S. aureus* against Levofloxacin 54 (85.7%) while the sensitivity patterns indicated that *E. coli* were mostly susceptibility to ciprofloxacin 85 (57.0%), *P. aeruginosa* against cefuroxime 61 (67.8%), *K. Pneumonia* against Nitrofurantoin 43 (56.6%) and *S. aureus* against Augmentin 35 (55.6%). These antimicrobial agents are regarded as suitable for empirical management of urinary tract infections. This study revealed varying degree of Multiple Antibiotics Resistance Index values ranged between 0.28-1; which signifies existence from high risk contaminated sources with frequent/indiscriminate use of antibiotics. Our findings substantiate the necessity of optimizing antibiotic prescribing practices in UTI treatment to curb antibiotic resistance.

***Keywords:*** *Urinary tract infection, Antibiotic susceptibility patterns, MARI, Multidrug-resistant*

**ABSTRACT 38**

# MANAGING INFECTIONS THROUGH ONE HEALTH PROGRAM: REVIEW OF IMPACT ON PUBLIC HEALTH, CHALLENGES AND FUTURE TRENDS

Ezeumeh, Eucharia Nkiruka[1] & Dilibe, Eucharia[1]

*[1]Department of Medical Laboratory Science and Technology, Faculty of Health Sciences and Technology, Chukwuemeka Odumegwu Ojukwu University*

*Correspondent author: eucharia.ezeumeh@gmail.com*

## ABSTRACT

One Health proffers an integrated approach to managing health by exploring the interconnectedness between human, animal, and environment. This work was done to review the extent of implementation, challenges, and future trend of one health as par disease treatment and control. The study reviewed key journal papers and commentaries on One Health approach using a randomized trial method. In any case involving infectious disease management, we need to look at the bigger picture by involving professionals across disciplines. Implementation rate today, was found to be less than 20% compared to over 50% in developed nations. Challenges to effective implementation include - structural and institutional barriers, traditional stereotype mode of health care delivery, limited financial resources to sponsor research and capacity building, as well as cultural and social factors. To overcome this, public awareness and community engagement are critical for the acceptance and implementation of health interventions. The future of One Health approach lies in the expansion of frameworks to encompass broader issues such as food security, antimicrobial resistance, and biodiversity conservation represents a promising avenue for future research and policy development. To really make the most of One Health, stakeholders need to come together to build strong partnerships, invest in research, education, and training to give the next generation of health professionals the skills and knowledge they need for tackling tough health problems while conserving the environment.

***Keywords:*** *One health, Multidisciplinary, Community engagement, Training, Research*

**ABSTRACT 39**

# COMPARATIVE ANTIBACTERIAL ACTIVITY OF GONGRONEMA LATIFOLIUM (UTAZI) AND VERNONIA AMYGDALINA (BITTER LEAF) ON STAPHYLOCOCCUS AUREUS AND ESCHERICHIA COLI ISOLATED FROM OLIGOSPERMIA PATIENTS

Chukwumbah, Emmanuel C.[1], Ndibe, ThankGod O.[1], Onwuka, Udeh A.[1]

*[1]Department of Microbiology, University on the Niger, Umunya, Anambra State, Nigeria*

*Corresponding author: emmanuel.chukwumbah@uniniger.edu.ng | Tel: 08165604637*

## ABSTRACT

Oligospermia is a condition where a man has a lower than normal sperm count in semen, which can reduce fertility, most cases of infertility caused by oligospermia could be traced to bacteria infection. The aim of these study was to compare antibacterial activity of *Gongronema latifolium* and *Vernonia amygdalina* extracts on *Staphylococcus aureus* and *Escherichia coli* isolated from oligospermia patients. Samples were collected from the Hospital and cultured on Eosin methylene blue agar and Mannitol salt agar using spread plate method. The antibacterial activity was done using disc diffusion method. Ethanol extracts and aqueous extracts of *Gongronema latifolium* and *Vernonia amygdalina* were used in the study, *Staphylococcus aureus* and *Escherichia coli* were predominately isolated and identified based on their biochemical test. The ethanoic extract of *Gongronema latifolium* showed inhibition on *Escherichia coli* (15mm) and 16mm for *Staphylococcus aureus*. The *Gongronema latifolium* aqueous extract showed inhibition at 8mm for *Escherichia coli* and 10mm for *Staphylococcus aureus*. In similar manner ethanoic extract of *Vernonia amygdalina* showed inhibition on the *Escherichia coli* (8mm) and (12mm) for *Staphylococcus aureus*, while no zone of inhibition was observed on *Vernonia amygdalina* aqueous extracts for *E. coli* whereas aqueous extract showed inhibition at 8mm for *Staphylococcus aureus*. Comparatively both extracts showed varying degree of antibacterial activity while wider zone of inhibition was observed with *Gongronema latifolium* on both isolates. Hence the finding of the study suggests that the blend of *Gongronema latifolium* and *Vernonia amygdalina* can be used to formulate new drugs for the treatment of infections associated with the bacteria isolate.

***Keywords:*** *Gongronema latifolium, Vernonia amygdalina, Antibacterial, Inhibition, Oligospermia*

**ABSTRACT 40**

# ANTIBACTERIAL AND PHYTOCHEMICAL CONSTITUENTS OF BEETROOT (BETA VULGARIS) EXTRACTS AGAINST STAPHYLOCOCCUS AUREUS AND ESCHERICHIA COLI

Chukwumbah, Emmanuel C.[1] & Ogbonnaya Ogochukwu C.[2]

*[1]Department of Microbiology, University on the Niger; [2]Department of Microbiology, Federal Polytechnic Oko*

*Corresponding author: emmanuel.chukwumbah@uniniger.edu.ng | Tel: 08165604637*

## ABSTRACT

The present study investigated the antibacterial activity of Beetroot (*Beta vulgaris*) extracts against *Staphylococcus aureus* and *Escherichia coli*. The isolates were obtained from the University on the Niger Medical Microbiology Laboratory and tested against the beetroot extract. The phytochemical compounds present in beetroot were tannin which was slightly present and cardiac glycosides and alkaloids were moderately present, while flavonoids and saponin were highly present. The extracts were prepared using ethanol and water as solvents, and the antibacterial activity was evaluated through the agar disc diffusion method. The results showed that both ethanoic and aqueous extracts inhibited the growth of the test organisms, with the ethanoic extract exhibiting higher activity. At 100 mg/mL, the ethanoic extract produced inhibition zones of 15 mm against *S. aureus* and 16 mm against *E. coli*, while the aqueous extract at the same concentration yielded 8mm and 10 mm, respectively. At lower concentrations (50 mg/mL), reduced inhibition zones were observed, indicating dose-dependent activity, the ethanoic extract showed inhibition zones of 8 mm against *S. aureus* and 9 mm against *E. coli*. The aqueous extract also showed inhibition on *E. coli* 6mm and *Staphylococcus aureus* 7mm. The findings suggest that ethanol is a more effective solvent for extracting bioactive compounds with antibacterial potential from beetroot. Although ciprofloxacin, used as a positive control, exhibited higher inhibition zones (25 mm for *S. aureus* and 16 mm for *E. coli*), the results confirm that beetroot extracts possess promising antibacterial properties. Based on these findings, it is recommended that further studies be carried out to isolate and characterize the specific phytochemical compounds responsible for the antibacterial activity observed in beetroot, and to evaluate their potential applications in the formulation of natural antimicrobial agents for clinical and food preservation purposes.

***Keywords:*** *Beta vulgaris, Beet root, Antibacterial, Inhibition, Ethanoic extracts, Aqueous extracts, Phytochemical*

**ABSTRACT 41**

# MOLECULAR CHARACTERIZATION OF MULTIDRUG-RESISTANT BACTERIAL ISOLATES AND IMPLICATIONS FOR PLANT-BASED ANTIMICROBIAL SYNERGY

Oyong, I.A.[1], Haroun, A.[1], Magaji, Y.[1], Kereakede, E.[1]*

*[1]Department of Biotechnology, Nigerian Defence Academy, Kaduna State, Nigeria*

*Corresponding Author's email: oyongimelda@yahoo.com*

## ABSTRACT

Antimicrobial resistance remains a major public health challenge, particularly in hospital environments where multidrug-resistant (MDR) pathogens are prevalent. This study investigated the phenotypic and molecular characteristics of bacterial isolates recovered from clinical and environmental samples. A total of 80 samples were collected from urine, wound swabs, and hospital working bench surfaces. Antibiotic susceptibility testing (AST) using the disc diffusion method identified 28 multidrug-resistant isolates and 52 antibiotic-sensitive isolates. Bacterial species identified included *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*. Molecular screening of MDR isolates using multiplex polymerase chain reaction (PCR) revealed the presence of extended-spectrum beta-lactamase (ESBL) genes (blaTEM, blaCTX-M, blaSHV) and carbapenemase genes (blaOXA-48 and blaVIM). The co-existence of multiple resistance genes within individual isolates confirms their extreme multidrug-resistant status. These findings provide strong justification for further evaluation of the synergistic antimicrobial effects of *Azadirachta indica*, *Psidium guajava*, and *Ocimum gratissimum* and for molecular docking studies targeting resistance-associated enzymes.

***Keywords:*** *Multidrug resistance, ESBL, Carbapenemase, PCR, Medicinal plants, Nigeria*

**ABSTRACT 42**

# PREVALENCE, IDENTIFICATION AND ANTIMICROBIAL RESISTANCE PROFILE OF URINARY TRACT BACTERIAL PATHOGENS AMONG FEMALE STUDENTS IN A TERTIARY INSTITUTION

Iweriolor, S.N.[1] & Umeaku, C.N.[2]

*[1]Department of Microbiology, University of Delta, Agbor; [2]Department of Microbiology, COOU Uli Campus*

*Corresponding author: sandra.iweriolor@unidel.edu.ng*

## ABSTRACT

Urinary tract infection (UTI) remains one of the most common bacterial infections affecting female students in tertiary institutions. This study evaluated the prevalence, distribution, identification, and antimicrobial resistance profile of bacterial pathogens associated with UTIs among female students. A total of seventy (70) midstream urine samples were collected and analyzed microbiologically using Cysteine Lactose Electrolyte Deficient (CLED) agar, MacConkey agar, Mannitol Salt Agar, and *Bacillus cereus* agar. Out of the 70 samples examined, 48 (68.6%) showed significant bacterial growth, while 22 (31.4%) showed no growth. The predominant isolate was *Escherichia coli* 18 (37.5%), followed by *Staphylococcus aureus* 10 (20.8%), *Klebsiella pneumoniae* 7 (14.6%), *Proteus mirabilis* 5 (10.4%), *Pseudomonas aeruginosa* 3 (6.3%), *Bacillus cereus* 3 (6.3%), and *Enterococcus faecalis* 2 (4.1%). Antimicrobial susceptibility testing revealed high resistance of *Staphylococcus aureus* to AMX (80.0%) and CTZ (60.0%), while CPX and LEV exhibited the highest antibacterial activity with resistance rates of 10.0% and 0.0%, respectively. The study revealed a high prevalence of UTI and increasing antimicrobial resistance among the isolates. Continuous surveillance and proper antibiotic stewardship are therefore recommended.

***Keywords:*** *Antimicrobial resistance, Bacteriuria, Female students, Tertiary institution, Urinary tract infection*

**ABSTRACT 43**

# EFFECT OF BIOSYNTHESIZED NANOPARTICLES ON THE GERMINATION PROFILE OF ZEA MAYS UNDER SALINITY STRESS

Ekwenze, T.N.[1], Uba, B.O.[2], Dibua, N.A.[2], Ike, V.E.[3], Mere, C.A.■, Chikwendu, J.C.■

*[1]Tansian University Umunya; [2]COOU Uli; [3]UAES Umuagwo; ■COOU Biochemistry*

## ABSTRACT

Production of crops for optimum human sustainability has faced diverse challenges in the agricultural sector globally. Mitigating these challenges in food production has been prioritized in different agricultural-related fields of research globally. This study was carried out to evaluate the effect of biosynthesized nanoparticles on germination profile of *Zea mays* under salinity stress. Garden soil samples were collected at Oba, Idemili South LGA, Anambra State using a soil auger. Filamentous fungi were isolated and purified using a standard microbiological technique. The fungal isolates were characterized based on cultural and microscopic features. Fungal biomass and natural nanoparticles were prepared using standard mycological technique. The biosynthesized nanoparticles were characterized using ultraviolet-visible spectrophotometric technique while the effects of the biosynthesized nanoparticles on the germination indices of *Zea mays* under salinity stress were ascertained using standard germination test. The filamentous fungal isolates were identified as *Fusarium* species and *Aspergillus niger*. The biosynthesized nanoparticles as detected by UV-VIS spectrophotometer were calcium (ii) oxide nanoparticles (CaONPs) and potassium nanoparticles (KNPs). CaONPs showed higher absorbance (0.14) compared to KNPs (0.0275) at different wavelength, indicating more composition and potency. There was an increase in the % germination and germination speed in the presence of the biosynthesized nanoparticles under zero concentration (0 mM) of sodium chloride. Therefore, it is noteworthy that fungal species are capable of synthesizing nanoparticles, which are potent and environmental friendly, and can support the growth of *Zea mays*, even when there is a high salinity.

***Keywords:*** *Calcium nanoparticle, Filamentous fungi, Potassium nanoparticle, Salinity, Zea mays*

**ABSTRACT 44**

# BIOCHEMICAL AND HISTOLOGICAL EFFECTS OF ETHANOLIC EXTRACT OF GARLIC ON THE LIVER OF ADULT MALE WISTAR RATS

Afulukwe, S.C.[1], Akudu, L.S.[2], Emeh, D.C.[2]

*[1]Department of Medical Laboratory Science, COOU Igbariam; [2]Department of Anatomy, COOU Uli*

*Address for Correspondence: afulukwestella30@gmail.com*

## ABSTRACT

Garlic (*Allium sativum*) possesses many bioactive compounds which have antioxidant, anti-inflammatory, anti-malaria and hepatoprotective effects. This study was aimed to ascertain the biochemical and histological effects of ethanolic extract of *Allium sativum* on the liver of adult male Wistar rats. A total of twenty (20) healthy male Wistar rats were obtained for the study. The rats were acclimatized for a period of two weeks (14 days) before they were grouped into four (4). Group A (Control) received only feed and water, Group B received low dosage (0.1ml), Group C received medium dosage (0.15ml) and Group D received high dosage (0.2ml) of garlic extract for twenty-one (21) days. The rats were sacrificed and livers were harvested for histopathological analysis. The result of the study revealed no statistically significant difference in renal biochemical parameters (AST, ALT, ALP, CB and TB) among groups (A, B, C and D) of the subjects (p>0.05). The histological findings of this study also revealed focal areas of inflammatory background with mild vascular congestion when compared with the control group which showed normal liver histology. It was concluded in this study that garlic extract has no adverse effects on the renal functions of the rats.

***Keywords:*** *Garlic, Liver, AST, ALT, ALP, Antioxidant*

**ABSTRACT 45**

# COMPARATIVE STUDY OF HEAVY METALS ACCUMULATION IN SELECTED FUNCTIONAL SEEDS

Jideani, F.C.[1]*, Ifemeje, J.C.[1], Olisa, M.C., Okafor, A.C.[1], Ifemeje, M.O.[1], Christopher, E.[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Anambra State*

*Corresponding Author's Email: jc.ifemeje@coou.edu.ng*

## ABSTRACT

Functional seeds like Chia (*Salvia hispanica*), black seed (*Nigella sativa*), coriander seed (*Coriandrum sativum*) and flax seed (*Linum usitatissimum*), sunflower seed (*Helianthus annuus*), fenugreek seed (*Trigonella foenum-graecum*), apart from their rich sources of protein, carbohydrates, vitamins as well as their culinary properties, have been known over decades for their additional health benefits. This study was aimed at comparing the heavy metal accumulation in the above seeds. The seeds were bought from superstore in Awka and pulverized. The samples were then analyzed for heavy metals using atomic absorption spectrophotometer (AAS). The result of the study showed that among all the metals assessed, Chromium concentration was high in Fenugreek, Black seed and Sunflower seeds (> 7.00±0.03 mg/kg), in contrast, Coriander (COR) had the lowest Chromium level (0.04 mg/kg). The highest concentration of Lead (Pb) was observed in Sunflower (0.07±0.01 mg/kg), while the lowest was in Fenugreek (0.026±0.02 mg/kg). Cadmium (Cd) levels were relatively consistent in all the seeds but peaked in Chia seed (0.07±0.00 mg/kg), with the lowest value seen in Coriander, Fenugreek, and Sunflower (0.03±0.01 mg/kg). Nickel (Ni) concentrations ranged between 0.01±0.00 - 0.06±0.01 mg/kg, with the highest value in Black seed (0.06±0.02 mg/kg) and the lowest in Coriander (0.01±0.00 mg/kg). These findings suggested that the seeds exhibited varying degrees of heavy metal accumulation, while some metals remain within recommended reference dose some exceeded recommended Reference Dose (RfD) values thus posing serious health concerns.

***Keywords:*** *Heavy metals, Accumulation, Functional seeds, Chia seeds, Black seeds*

**ABSTRACT 46**

# ANTIFUNGAL SUSCEPTIBILITY PATTERNS OF SOIL DERMATOPHYTES TO CONVENTIONAL AGENTS

Ike, V.E.[1], Umeaku, C.N.[2], Iheukwumere, I.H.[2]

*[1]Department of Microbiology, UAES Umuagwo; [2]Department of Microbiology, COOU Uli Campus*

*Email: Ike.victore@gmail.com*

## ABSTRACT

Dermatophytes present in soil serve as important environmental reservoirs capable of causing superficial fungal infections in humans. The increasing resistance of dermatophytes to conventional antifungal agents poses a significant challenge to effective treatment. This study evaluated the antifungal susceptibility patterns of dermatophytes isolated from garden soils to commonly used conventional antifungal agents. Soil samples were collected from various locations and processed for the isolation of dermatophytes using standard culture techniques. Pathogenic isolates were identified through macroscopic, microscopic, biochemical, and molecular characterization. Antifungal susceptibility testing was performed using the microdilution method to determine the minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) of selected antifungal agents, including ketoconazole, fluconazole, griseofulvin, cotrimazole, terbinafine, and tinidazole. Four pathogenic dermatophyte species were identified: *Trichophyton mentagrophytes*, *Paraphyton cookei*, *Trichophyton rubrum*, and *Trichophyton tonsurans*. Susceptibility testing revealed generally low sensitivity of the isolates to most conventional antifungal agents. Terbinafine demonstrated the highest antifungal activity, showing lower MIC and MFC values compared to other agents. Variations in susceptibility patterns were observed among the isolates, indicating possible differences in resistance mechanisms. Dermatophytes isolated from environmental soil sources exhibit varying levels of resistance to commonly used antifungal agents. Terbinafine remains the most effective antifungal agent among those tested. Continuous surveillance of antifungal susceptibility patterns is essential to guide effective therapeutic strategies.

***Keywords:*** *Dermatophytes, Antifungal resistance, Environmental fungi, Minimum inhibitory concentration, Minimum fungicidal concentration, Terbinafine*

**ABSTRACT 47**

# MICROSCOPY AND MOLECULAR CHARACTERIZATION OF SOME FAECAL PARASITES OF PATIENTS ATTENDING HOSPITALS IN AWKA/ONITSHA METROPOLIS, ANAMBRA STATE–NIGERIA

Ekekwe, E.N., Emmy-Egbe, I.O., Orji, N.M.
*Department of Biological Sciences, COOU & Affiliates*
*Corresponding author: en.ekekwe@unizik.edu.ng*

## ABSTRACT

Intestinal parasites are significant contributors to global health problems. Subgroup intestinal helminths are among the listed neglected tropical diseases. The study aimed at determining the magnitude of intestinal parasites infections, associated risk factors, comparative study of microscopy and PCR, and knowledge, attitude and management practices (KAP) of intestinal parasites in the study areas. A cross-sectional study was conducted from April 2020 to October 2021 on 1440 individuals from six health facilities: three from Awka and three from Onitsha. A total of 1440 individuals aged >10 to 51 years and above were enrolled for the study of which 724 were males and 716 were females. The overall prevalence of intestinal parasites was 33.3% using microscopy while PCR gave a prevalence of 46.0%. Seven intestinal parasites were identified. *Giardia lamblia* (11.3% for microscopy; 12.1% for PCR), *Entamoeba histolytica* (10.8% for microscopy; 11.8% for PCR), *Cryptosporidium parvum* (8.3% for microscopy; 10.0% for PCR) *Ascaris lumbricoides* ( 24.2 % for microscopy;21.4% for PCR ) , Hookworm (21.3% for microscopy;10.2 % for PCR), *Trichuris trichiura* ( 19.6% for microscopy;18.2% for PCR ) and *Strongyloides stercoralis* ( 4.6%for microscopy; 7.4% for PCR ). The prevalence of intestinal parasites in both males and female were higher in PCR ( males 45.6% and females 47.8% ) than microscopy ( males 32.7% and females 33.9% ) . The prevalence decreased with increase in age with the highest infection rate observed among individuals less than ten years old (53.2% for microscopy;58.9% for PCR). Those who live in Onitsha (35.1%) were significantly more infected than those who live in Awka (30.4%). Highest prevalence (47.2%) was recorded among the traders. Those with primary education had the highest prevalence (56.1%). Findings reflected inadequate knowledge, attitudes and practices in relation to intestinal parasites, while awareness was high (87.5%). In conclusion, prevalence of intestinal parasite infections was still a public health problem in Awka and Onitsha. Public enlightenment and emphasis on personal hygiene and clean environment is advocated.

***Keywords:*** *Microscopy, Molecular characterization, Faecal parasites, Patients*

**ABSTRACT 48**

# MERCURY CONTAMINANTS IN SOIL FROM RICE FARMS IN MINING COMMUNITIES OF EBONYI STATE, NIGERIA

Okafor, A.C.*., Jideani, F.C.[1], Ifemeje, J.C.[1], Olisa, M.C.[1]

*[1]Department of Biochemistry, Chukwuemeka Odumegwu Ojukwu University, Anambra State*

*Corresponding Author's Email: okaforac11785@gmail.com*

## ABSTRACT

Mercury is genotoxic; it is known to induce DNA damage, epigenetic changes and has been implicated in the contamination of Agricultural soils. Its incidence in the food chain is a potential risk to food safety. In this study, soil samples from rice farms in mining communities of (Agalegu Ameri, Akpoha and Nkaleke) Ebonyi state were collected and evaluated for mercury content using Atomic Absorption Spectrophotometer (AAS). The result of the analysis showed the presence of mercury in the soil of selected rice farms in the mining communities of Ebonyi State, Nigeria. The findings showed that on average, about 17.11±0.9 mg/kg of Mercury was detected in the soil samples from the three mining communities under study, indicating a potential bioaccumulation of Mercury in the rice grains cultivated in rice farms from these communities. The concentration of mercury (17.11mg/kg) in the sampled area was much higher than the permissible concentration of 0.5 - 1.0mg/kg in food, Therefore, continuous usage of soils in the sampled areas for rice cultivation without treatment may lead to bioaccumulation of Mercury in the rice grains and their eventual entry into the food chain may pose potential health risks to consumers.

***Keywords:*** *Mercury, Rice, Bioaccumulation, Ebonyi State, Contamination, Soil*

**ABSTRACT 49**

# PHYTOCHEMICAL PROFILE, FREE RADICAL SCAVENGING CAPACITY AND BIOACTIVE COMPOUNDS IN SOURSOP (ANNONA MURICATA) LEAVES, PULP, SEEDS AND PEEL

Elemuo, J.F.[1], Ifemeje, M.O.[2], Ifemeje, J.C.[3], Udemezue, C.V.■

*[1]Federal Polytechnic Oko; [2]Medical Biochemistry COOU; [3]Biochemistry COOU; ■Federal College of Forest Resources, Ishiagu*

*Corresponding Author: judithfrancis90@gmail.com*

## ABSTRACT

Soursop (*Annona muricata*) is a tropical fruit celebrated for its rich nutritional profile and bioactive compounds with potential health benefits. Despite its widespread use in traditional medicine and culinary applications, comprehensive studies on the phytochemical composition, free radical scavenging capacity, and bioactive compounds in different parts of the soursop plant (leaves, pulp, seeds, and peel) remain limited. This study addresses this gap by analyzing the phytochemical composition, in vitro antioxidant capacity (DPPH, FRAP, and TAC), and bioactive compounds of soursop extracts using standard methods. Results revealed significant variations in phytochemical concentrations across different plant parts, with seeds exhibiting the highest levels of catechin (61.96 mg/ml), apigenin (192.05 mg/ml), and epicatechin (28.82 mg/ml), while pulp showed elevated levels of resveratrol (2.81 mg/ml) and syringic acid (3.11 mg/ml). Antioxidant assays demonstrated notable scavenging activity, particularly in leaves, which achieved the highest DPPH scavenging activity (94.83% at 80 mg/ml), followed by bark (89.04%), seeds (85.06%), and pulp (83.32%). Total Antioxidant Capacity (TAC) and Ferric Reducing Antioxidant Power (FRAP) showed no statistically significant differences (p>0.05) among the extracts though bark and seeds generally exhibited higher values. Vitamin analysis highlighted the pulp as the richest source of vitamins A (36.55 mg/L), B■$_2$ (25.50 mg/L), and C (71.17 mg/L). This study provides valuable insights into the nutritional and medicinal potential of soursop, contributing to its sustainable use and development as a functional food source.

***Keywords:*** *Soursop, Nutritional profile, Free radical, Scavenging capacity, Bioactive compound*

**ABSTRACT 50**

# EFFECT OF SUSTAINABLE BUSINESS PRACTICES ON THE GROWTH OF PLASTIC MANUFACTURING FIRMS IN ANAMBRA STATE, NIGERIA

Okoye, Vincent Chekwubechukwu

*Department of Entrepreneurship, Faculty of Management Sciences, Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus*

## ABSTRACT

The study examined the effect of sustainable business practices on the growth of plastic manufacturing firms in Anambra State, Nigeria. The objectives of the study were to examine the effect of social sustainability on growth of plastic manufacturing firms in Anambra State, Nigeria; Assess the effect of economic sustainability on growth of plastic manufacturing firms in Anambra State, Nigeria; Investigate the effect of environmental sustainability on growth of plastic manufacturing firms in Anambra State, Nigeria. The study was anchored on Resource-Based View (RBV). The descriptive survey design approach was applied. One hundred and forty-four (1,810) staff made up the population for this study. The sample size of three hundred and eighty-four (384) was derived through taro yamane. Primary source data were employed in this study. Data from the respondents were gathered using structured questionnaire, analysis wad done using percentage table and regression method. Findings show that; Social sustainability has significant effect on growth of plastic manufacturing firms in Anambra State, Nigeria (t=8.970, p, 000); Economic sustainability has significant effect on growth of plastic manufacturing firms in Anambra State, Nigeria (t=3.269, p, 000); Environmental sustainability has significant effect on growth of plastic manufacturing firms in Anambra State, Nigeria (t=2.963, p, 008). The study concluded that sustainable business practices are not merely ethical obligations but strategic imperatives for growth. Manufacturing firms in Anambra State that integrate social, economic, and environmental sustainability into their core operations are more likely to achieve sustained growth, improved performance, and long-term success. It was recommended that; Manufacturing firms should invest more in social sustainability initiatives such as employee welfare, training and development, workplace safety, and community engagement. Firms should focus on efficient financial management, cost control, and optimal allocation of resources to ensure long-term profitability.

***Keywords:*** *Sustainable business practices, Business growth, Plastic manufacturing firms, Environmental sustainability, Social sustainability*

**ABSTRACT 51**

# BIO-FABRICATED, SELF-REPAIRING, AND BIO-RESPONSIVE MATERIALS FOR EMBODIED AND OPERATIONAL ENERGY REDUCTIONS IN BUILDINGS: A REVIEW

Chijioke Chinyere Onwuzuligbo[1]*, Jude Barnaby[2], Chidiebele E.J Uzoagba[3],■

*[1]Department of Architecture, Chukwuemeka Odumegwu Ojukwu University, Uli campus, Nigeria; [2]Department of Architecture, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria; [3]Centre for Climate Change Adaptation and Mitigation Studies, African University of Science and Technology, Abuja, Nigeria; ■Materials Science and Engineering, African University of Science and Technology, Abuja, Nigeria*

**Corresponding Author: cc.onwuzuligbo@coou.edu.ng*

## ABSTRACT

The buildings and construction sector accounts for approximately 30-34% of total final energy demand and over 37% of energy-related carbon dioxide emissions. Addressing this challenge calls for a fundamental rethinking of construction materials across the full lifecycle of a building. This review examines the emerging class of bio-fabricated, self-repairing, and bio-responsive materials and evaluates their dual potential to reduce both embodied and operational energy within the built environment. Published literature on laboratory studies, computational modelling, and early-stage building integration trials were synthesised, and advances across these three material properties were mapped. Broadly, bio-fabricated materials, such as mycelium-based composites, bacterial cellulose, and biopolymer foams, offer low-carbon strategies for structural and insulation applications by significantly lowering production-phase energy demands. Self-repairing materials, through intrinsic and vascular repair mechanisms, extend service life and reduce the energy costs associated with material replacement and maintenance. Bio-responsive materials, capable of dynamically adapting to environmental conditions such as temperature, humidity, and light, present interesting opportunities for passive climate regulation, effectively reducing heating, cooling, and lighting loads without active mechanical systems. Furthermore, key performance indicators were identified and assessed. These include thermal conductivity, carbon footprint, healing efficiency, and actuation responsiveness. Barriers to mainstream adoption, such as scalability, durability under service conditions, regulatory frameworks, and cost competitiveness, are also discussed. The paper concludes by identifying priority research directions and proposing an integrated material-design framework that positions these biologically-derived systems as viable components of a low-energy, circular built environment.

***Keywords:*** *bio-fabricated materials, bio-responsive materials, embodied energy, net-zero buildings, operational energy, passive climate control, self-repairing materials, sustainable buildings*

**ABSTRACT 52**

# PHENOTYPIC DETECTION AND ANTIMICROBIAL SUSCEPTIBILITY PROFILE OF EXTENDED SPECTRUM BETA LACTAMASE PRODUCING ESCHERICHIA COLI FROM SUSPECTED CASES OF URINARY TRACT INFECTION IN KANO METROPOLIS, NIGERIA

Mohammed, A.[1]*, Magashi, A. M.[2], Yushau, M.[2]

*[1]Department of Pharmaceutical Microbiology and Biotechnology, Faculty of Pharmaceutical Sciences, Bayero University Kano; [2]Department of Microbiology, Faculty of Life Science, Bayero University Kano*

**Corresponding authors' email: amohammed.phb@buk.edu.ng*

## ABSTRACT

Urinary tract infections (UTIs) caused by antimicrobial-resistant bacteria, especially ESBL-producing *Escherichia coli* can be life-threatening as therapeutic options available to treat infected patients are limited. Resistance due to ESBL-producing bacteria poses a peculiar challenge in treating infections because of its association with multidrug resistance. The aim of this study was thus to determine the susceptibility pattern and phenotypic detection of ESBL-producing *E. coli* from UTI patients. Two hundred and forty-six (246) *E.coli* isolates obtained from patients with suspected urinary tract infections were studied. The identity of the isolates was confirmed using standard biochemical tests. Antibiotic susceptibility testing was carried out using the Kirby-Bauer Disc Diffusion Technique. Screening for ESBL production was done using the Clinical Laboratory Standards Institute breakpoint. Suspected ESBL producers were subjected to confirmation using the Double Disc Synergy Test. Standard Discs of Augmentin (AMC 30\u03bcG Oxoid England), Ceftazidime (CAZ 30\u03bcG, Oxoid England) and Cefotaxime (CTX 30\u03bcG, Oxoid England) were used for the screening and confirmation. Multidrug-resistant *E.coli* were found to be 65.4%. Screening for ESBL production showed 67.1% suspected ESBLs producing *E.coli*. The Double Disc Synergy Test showed 22.4% confirmed ESBLs producing *E.coli*. Antimicrobial sensitivity of the ESBLs producing organisms showed 100% resistance to augmentin, ceftriaxone, ceftazidime, ciprofloxacin and cefotaxime while resistance to gentamicin was 91.1%, chloramphenicol 89.2%, nitrofurantoin 78.4%, and cotrimoxazole 94.6%. A 100% sensitivity to imipenem was also observed. ESBL-producing *E.coli* are present in Kano metropolis and are resistant to commonly prescribed antibiotics. We, therefore, suggest screening and confirmation for ESBL, to prevent treatment failure.

***Keywords:*** *UTI, Escherichia coli, Extended-spectrum Beta-Lactamase, 3rd Generation Cephalosporins, Antimicrobial susceptibility, Imipenem*

**ABSTRACT 53**

# DIGITAL PROFILING OF POLYPHENOL OXIDASE ACTIVITY IN WHITE YAM TUBER DIOSCOREA ROTUNDATA POIR.

Ezenwa J. Chukeze, Chioma Ezenwaka, Francis Umeoguaju

*1 Dept of Biochemistry, Paul University, Awka, Anambra State, Nigeria; 2 Pamo Medical University, Port Harcourt, Nigeria*

*Corresponding author: Dr Chioma Ezenwaka, Dept of Biochemistry, Paul University, Awka, Anambra State, Nigeria*

## ABSTRACT

Polyphenol oxidase (PPO) is an ubiquitous enzyme found to be abundant in yams of the Dioscorea species. The enzyme catalyzes the oxidation of polyphenols with oxygen to generate coloured adducts in yam tubers. How PPO reactions protect the tubers from stress and infections is not known. Yams are diverse plants with many species and cultivars. The report that taxonomic classification studies on yams often end up with uncertainty hinders progress in research and development of yam output. Since PPO is a survival marker for the Dioscorea species, we have developed a procedure for in situ mapping and distribution of the enzyme in yam tubers. To generate a digital data yam tuber is sliced neatly, and the sliced surface is dipped into 50mM catechol or catechin solution in 0.2M sodium phosphate buffer pH 5.8. The cut surface is scanned in a digital scanner. The image of the scan is uploaded into UN-SCANT-IT(tm) gel software, version 6.1 (Silk scientific, Orem, Utah) to re-scan images quantitatively in grayscale and enable PPO activity estimation as change in pixel intensity per unit area of the scan. The digital data generated is deployed for 2-dimentional or 3-dimensional plots of choice. These figures are used to adduce data to support a hypothesis or compare images with other yam cultivars. Images of different yam tuber cultivars referred to as digital signals can be used as traits in taxonomic studies.

***Keywords:*** *polyphenol oxidase (PPO), Cultivars, Dioscorea species, UNSCAN IT gel software, grayscale, digital signals, taxonomic studies*

**ABSTRACT 54**

# EMPOWERING YOUNG STUDENTS FINANCIALLY AND INTELLECTUALLY

Obasi Chiagozielem Worship

*Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University*

## ABSTRACT

Academic excellence alone is no longer sufficient for future relevance and stability. Many students possess potential but lack practical financial and professional exposure. We created a project that will end financial disability in the academic sector forever. It entails a course into web3 and our very own cryptocurrency. It's called Project Katalambano. The project bridges the gap between education and real-world empowerment. Focuses on combining academics with digital and business opportunities. Encourages intentional growth, innovation, and self-development among students. Promotes financial literacy, leadership, communication, discipline, and consistency. Emphasizes ethical living and responsible decision-making. Aims to raise productive, solution-oriented, and purpose-driven individuals. Equips students with practical skills for sustainable personal and professional growth. Seeks to develop a generation that excels both academically and beyond the classroom. The course is purchased at N5000 but students get access to it for N3000 if they follow us on any platform. Join us in the revolution, let's change our world.

***Keywords:*** *Student Empowerment, Financial Literacy, Academic Excellence, Youth Development, Digital Opportunities*

**ABSTRACT 55**

# MICROBIOLOGICAL FACTORS INFLUENCING MAIZE CULTIVATION FROM PLANTING TO HARVEST UNDER SCREENHOUSE AND OPEN-FIELD CONDITIONS IN SOUTH EAST NIGERIA

C. P. Ajaero, I. A. C. Mbachu, B. O. Uba

*Department of Microbiology, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State, Nigeria*

*Corresponding Author Email: pimfarmltd@gmail.com*

## ABSTRACT

This study investigated the microbiological factors influencing maize (*Zea mays* L.) production under varying soil amendment regimes and cultivation environments in South East Nigeria. The research evaluated the effects of poultry manure, Black Soldier Fly (BSF) frass, nano fertilizer, and control treatments on soil microbial dynamics, plant growth, and yield performance under both screenhouse and open-field conditions. Plant growth-promoting rhizobacteria including *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, and *Rhizobium* were identified, with populations ranging from $10^5$ to 10■ CFU/mL. Results showed that poultry manure significantly enhanced microbial populations and recorded the highest yield (~6 t/ha), followed by BSF frass (~5 t/ha), nano fertilizer (~4 t/ha), and control (~2.5-3 t/ha). A strong positive correlation (r = 0.71-0.82) was observed between microbial population and maize yield. Epiphytic microorganisms were more abundant, while endophytes were more functionally stable. Neem extract showed higher biopesticidal effectiveness compared to rabbit urine. The study concludes that soil microbial dynamics are critical drivers of maize productivity and recommends the integration of organic amendments for sustainable maize production.

***Keywords:*** *Biopesticide, Black soldier fly, Nano-fertilizer, Plant growth-promoting rhizobacteria, Poultry manure*

**ABSTRACT 56**

# CATALASE ACTIVITY AS A BIOMARKER OF HEAVY METAL-INDUCED OXIDATIVE STRESS DURING GERMINATION OF CITRULLUS ECIRRHOSUS AND CUCUMIS MELO

Chukwudi Jude Chikwendu[1]*, Collins B Lukong[1], Chukwuemeka Egbuna[2], Chukwuemelie Z. Uche[3]

*[1]Department of Biochemistry, Faculty of Natural Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli Campus, Anambra State, Nigeria; [2]Schrix Institute of Academic Learning, Research, and Innovation (SIALRI Africa); [3]Department of Medical Biochemistry and Molecular Biology, Faculty of Basic Medical Sciences, University of Nigeria, Enugu Campus, Nigeria*

**Corresponding author: chikwendujc70@gmail.com*

## ABSTRACT

Background: Catalase (CAT; EC 1.11.1.6) is a tetrameric heme-containing enzyme that decomposes hydrogen peroxide ($H_2O_2$) directly into water and molecular oxygen without requiring a reductant, positioning it as one of the most energetically efficient antioxidant enzymes in plant cells. Its sensitivity to disruption by exogenous toxicants makes it a valuable biomarker of heavy metal-induced oxidative load, particularly during the critical developmental window of seed germination. Despite this, CAT responses in germinating African cucurbit species under simultaneous multi-metal exposure remain poorly documented. Objectives: This study evaluated the temporal and concentration-dependent modulation of CAT activity in germinating seeds of *Citrullus ecirrhosus* and *Cucumis melo* under ten heavy metal treatments. Methods: Seeds of both species were exposed to Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd, Hg, and Pb at concentrations of 50, 100, 200, 400, and 800 ppm. Germinating seeds were harvested at 24, 48, and 72 hours post-exposure. CAT activity was determined spectrophotometrically and data analysed by two-way ANOVA (p < 0.05). Results: In *Cucumis melo*, CAT activity increased markedly under Cd and Co at all concentrations at 24 hours, while Cu consistently suppressed activity across all concentrations and time points. By 72 hours, Zn, Hg, Cd, Mn, Fe, and Co at 200 and 800 ppm significantly elevated CAT activity. In *Citrullus ecirrhosus*, Fe and Co induced CAT across all concentrations at 24 hours, while Cu and Mn caused early suppression. At 48 and 72 hours, 200 ppm emerged as the critical threshold concentration driving CAT induction across most metals in both species. Conclusion: The concentration-dependent and time-progressive nature of CAT modulation, particularly the 200 ppm threshold effect consistently observed across both species, establishes CAT as a reliable and sensitive biomarker for monitoring heavy metal phytotoxicity during seed germination in cucurbit species native to African agricultural environments.

***Keywords:*** *Catalase, Heavy metals, Oxidative stress, Citrullus ecirrhosus, Cucumis melo, Seed germination, Biomarker, Phytotoxicity*

# ABSTRACT 56

## ANTIMICROBIAL RESISTANCE IN WATER ENVIRONMENT CAUSES AND CONSEQUENCES

Nnaegboh Rosemary Ugonnia and Dibua Nwamaka Anthonia

Department of Microbiology, Chukwuemeka Odumegwu Ojukwu University Uli Campus

Corresponding author: ru.nnaegboh.stu@coou.edu.ng

ABSTRACT

The presence of antibiotic-resistant bacteria (ARB) and antibiotic-resistant genes (ARGs) in water environments, including drinking water systems, surface waters, and wastewater treatment plants, has been increasingly reported worldwide. The overuse and misuse of antibiotics contribute to antimicrobial resistance in water. This review discusses prevalence, transmission, detection, public health risks and interventions including improved surveillance, advanced treatment technologies and stricter antibiotic regulation.

Keywords: Bacteria, antibiotics, water, antibiotic resistant

# ABSTRACT 57

## Development and Evaluation of Malted Wheat–Soybean Based Weaning Foods Fortified with Cucumber and Egg White: Nutritional Innovation for Bio-economy and Sustainability.

Agbo, Anthony Ogbonnia*1 and Ikegwu Theophilus Maduabuchukwu2

1Department of Science Laboratory Technology, School of Science and Technology, Federal Polytechnic, Ohodo, Enugu State, Nigeria.

2Department of Food Science and Technology, Faculty of Agriculture, Nnamdi Azikiwe University, Awka, Anambra State

*Corresponding Author: anthonyagbo2019@gmail.com, +234 8066668686.

Abstract Complementary feeding remains essential for preventing protein–energy malnutrition and micronutrient deficiencies in early childhood, particularly in developing regions. This study developed nutrient-enriched weaning foods from malted wheat–soybean blends fortified with cucumber and egg white to improve nutritional quality, functional properties, and safety. Four formulations (60:20, 50:30, 40:40, and 30:50 wheat–soybean ratios) were produced and compared with a commercial maize-based ogi as control. Each formulation included 10% cucumber and 10% egg white, with minor additions of sugar, salt, and flavor for palatability. Standard analytical methods were used to evaluate functional and proximate properties, while mineral and vitamin contents were determined using atomic absorption spectrophotometry and spectrophotometric techniques. Microbial quality was assessed using serial dilution and spread plate methods, and sensory evaluation was conducted using a 5-point hedonic scale with 20 trained panelists. Results showed significantly higher protein content (24.40–24.66%) in the formulated blends compared to the control (13.67%), alongside improved mineral and vitamin levels, particularly B-complex vitamins and carotenoids. Functional properties such as water absorption capacity (98.43–220.10%) and foaming stability (20–43 mL) were enhanced. Microbial loads remained within acceptable limits, unlike the control, which exhibited higher contamination. Sensory evaluation indicated that the 30:50 formulation had the highest overall acceptability. Statistical analysis ($p < 0.05$) confirmed significant differences among formulations. These findings highlight the potential of malted wheat–soybean complementary foods fortified with cucumber and egg white as safe, acceptable, and nutrient-dense options for improving child nutrition within a sustainable bio-economy framework.

Keywords: Complementary feeding, Malted wheat, Soybean fortification, Weaning food and Nutritional enhancement