



7th

## PHARMA-FOOD CONGRESS

*JABU 2025*

**THEME:**

**THE FUTURE OF WELLNESS:**

**Functional Foods, Nutraceuticals and  
Phytomedicines as Key Drivers**



**VENUE:**

**JOSEPH AYO BABALOLA UNIVERSITY, IKEJI-ARAKEJI, NIGERIA.**

**DATE:**

**SUNDAY, SEPTEMBER 28 – WEDNESDAY, OCTOBER 1, 2025**

**PROGRAMME & BOOK OF ABSTRACTS**



## CONFERENCE PROGRAMME

| DATE   | THEMES                            | EVENTS  | TIME            |
|--|-----------------------------------|---|-----------------|
| <b>Day 1 (Sunday)</b><br><b>28<sup>th</sup> September, 2025</b>  | Arrival                           | Arrival of guests and participants  | From 12:00 noon |
| <b>Day 2 (Monday)</b><br><b>29<sup>th</sup> September, 2025</b>  | Opening ceremony                  | Introduction of guests  | 10:00 am        |
|  |                                   | Welcome address- <b>Dr L.J. Babatola</b><br>(Chairman, LOC Pharma-Food Congress 2025)   | 10:15 am        |
|  |                                   | President's address- <b>Dr A.O. Ademosun</b><br>(President, FFNAN)  | 10:30 am        |
|  |                                   | Convener's address- <b>Prof G. Oboh</b><br>(Convener, Pharma-Food Congress)   | 10:45 am        |
|  |                                   | Vice-Chancellors Speech- <b>Prof. O.A. Fakolujo</b><br>(VC, Joseph Ayo Babalola University Ikeji-Arakeji, Nigeria)  | 11:00 am        |
|  | Keynote Lecture 1                 | The Future of Wellness: Functional Foods, Nutraceuticals and Phytomedicine as Key Drivers<br><br><b>Speaker: Prof. O.C. Adebooye</b><br>VC, Osun State University, Osun, Nigeria  | 11:30 am        |
|  | <b>Vote of thanks</b>             |   | 12:50 am        |
|  | <b>Tea break/Group photograph</b> |   | 1:00 pm         |
|  | Plenary lecture 1                 | Reproductive Dysfunction: The Power of Phytomedicine and Functional Foods<br><br><b>Prof M.T. Yakubu</b><br>(Department of Biochemistry, University of Ilorin, Nigeria)   | 1:30 pm         |
|  | Plenary lecture 2                 | From Farm to Pharma: Harnessing Bioactive Phytochemicals in Functional Foods for Precision Nutrition and Chronic Disease Prevention<br><br><b>Dr. S.M.O. Awoniyi</b><br>Ag. Dean<br>School of Agriculture and Natural Sciences<br>Joseph Ayo Babalola University Ikeji-Arakeji, Nigeria | 2:10 pm         |
| <b>Lunch</b>   |                                   | 3:30 pm   |                 |
| <b>Round table/ Cocktail</b>                                     |                                   | 4:30 pm   |                 |
| <b>Day 3 (Tuesday)</b><br><b>30<sup>th</sup> September, 2025</b> | Plenary Lecture 3                 | Fostering Functional Food and Phytomedicine Research and Industrial Linkages  | 9:00 am         |

|   |                     |  |          |
|---|---------------------|--|----------|
|   |                     | <b>Prof G.N. Elemo</b><br>Lagos State University of Science and<br>Technology, Ikorodu, Lagos  |          |
|   | Plenary lecture 4   | Functional Foods and Phytomedicine Research for<br>Societal Impact<br><br><b>Prof G. Oboh</b><br>Director, Centre for Entrepreneurship<br>The Federal University of Technology Akure   | 9:50 am  |
|   | Plenary lecture 5   | Alternative Research Model for Investigating<br>Therapeutic Potentials of Functional Foods,<br>Nutraceuticals and Phytomedicine<br><br><b>Dr O.B. Ogunsuyi</b><br>Department of Medical Biochemistry<br>School of Basic Medical Sciences<br>The Federal University of Technology Akure | 10:40 am |
|   | <b>Tea Break</b>    |  | 11:00 am |
|   | Technical session 1 | Presentation of research papers<br><b>PFC2025 001-075</b>  | 11:15 am |
|   | <b>Lunch</b>        |  | 1:00 pm  |
|   | Technical session 2 | Presentation of research papers<br><b>PFC2025 076-151</b>  | 1:30 pm  |
|   | AGM                 | <b>FFNAN Annual General Meeting</b>  | 3:00 pm  |
|   | <b>Closing</b>      |  | 5:00 pm  |
| <b>Day 4 (Wednesday)</b><br><b>1<sup>st</sup> October, 2023</b> | Departure           | <b>Departure</b>   | 8:00 am  |

## Welcome from the Chair



Distinguished Guests, Esteemed Colleagues, Ladies and Gentlemen,  
It is with great pleasure and a deep sense of honor that I, on behalf of the Local Organizing Committee, warmly welcome you all to this year's Pharma-Food Congress of our association, graciously hosted by Joseph Ayo Babalola University. We are gathered here at a critical moment in history, when the intersection of pharmaceutical and food sciences is playing an increasingly vital role in global health, nutrition, and sustainable development. This congress provides us with a unique platform to exchange ideas, showcase innovations, and strengthen collaborations that will drive progress in our industries and, most importantly, improve lives. Our theme for this year, "The future of wellness: functional foods, nutraceuticals and

phytomedicine as key drivers", reflects our shared vision to confront today's challenges with cutting-edge research, practical solutions, and strategic partnerships. It also reaffirms our association's commitment to fostering knowledge that bridges the gap between science, industry, policy, and society.

I wish to sincerely appreciate our distinguished speakers, panelists, and researchers who will be sharing their wealth of expertise, as well as our sponsors and partners whose support has made this event possible.

To our participants, both young and seasoned, your presence here today demonstrates your dedication to learning, networking, and shaping the future of pharma-food sciences. To Joseph Ayo Babalola University under the leadership of our Vice Chancellor, Prof. Olasebikan Fakolajo, our proud host, we say thank you for opening your doors and providing us with an atmosphere conducive for scholarship and innovation.

As we begin the congress, I encourage us all to participate actively, share generously, and build enduring collaborations. May this gathering not only enrich our knowledge but also inspire actionable outcomes for our communities, our nation, and beyond.

Once again, I welcome you all to JABU and to what promises to be a most impactful Pharma-Food Congress.

Thank you, and God bless.

**Dr. Leye Jonathan Babatola**

Chairman, Local Organizing Committee

7<sup>th</sup> Pharma-Food Congress 2025

## President's Welcome Address



Distinguished guests, plenary speakers, members and fellows of Functional Foods and Nutraceuticals Association of Nigeria (FFNAN), esteemed colleagues, ladies and gentlemen. I warmly welcome you to the 7<sup>th</sup> Pharma-Food Congress but 1<sup>st</sup> in the tenure of this present executive, with the theme: The Future of Wellness: Functional Foods, Nutraceuticals and Phytomedicine as Key Drivers. Today, we gather together at this great citadel of learning- Joseph Ayo Babalola University Ikeji-Araokeji, Nigeria, not just as scientists, entrepreneurs, and health professionals, but as visionaries shaping the next frontier of human well-being. We stand at a pivotal moment in history. The global wellness

movement is no longer a trend, it is a transformation. Consumers are demanding more than treatment; they seek prevention, vitality, and longevity. And at the heart of this shift lie three powerful forces: **functional foods, nutraceuticals, and phytomedicine**. While functional foods are redefining the way we nourish ourselves, infusing everyday meals with targeted health benefits, nutraceuticals are bridging the gap between nutrition and pharmaceuticals, offering potent, natural solutions to chronic conditions and phytomedicine is reviving ancient wisdom with modern science, unlocking the therapeutic potential of plants in ways we never imagined. This conference is therefore, more than a meeting of minds, it is a launchpad for innovation. Over the next few days, we will explore cutting-edge research, share transformative case studies, and spark collaborations that will ripple across industries and continents. Let us challenge assumptions. Let us ask bold questions. Let us imagine a future where wellness is accessible, personalized, and powered by nature. On behalf of Executive of this great association, I thank you for your presence, your passion, and your commitment to advancing the science and soul of wellness. May this conference inspire new ideas, forge lasting partnerships, and ignite a movement that benefits generations to come.

Welcome—and let the future of wellness begin.

**Dr. Ayokunle Olubode Ademosun**

President, FFNAN

## Convener's Welcome Speech



It is with profound honor and enthusiasm that I welcome you all to the 7th Pharma-Food Congress, a gathering that continues to serve as a beacon for interdisciplinary collaboration and scientific advancement. This year's theme, **“The Future of Wellness: Functional Foods, Nutraceuticals and Phytomedicines as Key Drivers,”** reflects a growing global imperative to reimagine healthcare through the lens of nutrition science, ethnobotany, and integrative medicine.

As we confront the persistent health challenges facing sub-Saharan Africa, ranging from infectious diseases to chronic non-communicable conditions, it becomes increasingly clear that conventional healthcare systems alone cannot meet the full spectrum of our population's needs. Limited access to medical infrastructure, high treatment costs, and systemic inequities demand innovative, sustainable, and culturally relevant solutions. Fortunately, our region is endowed with a rich diversity of plant-based bio-resources, many of which possess therapeutic properties that have been validated both by traditional knowledge and emerging scientific research. This congress offers a timely and strategic platform to explore how functional foods, nutraceuticals, and phytomedicines can be harnessed not only to complement conventional therapies but also to serve as primary interventions in preventive and restorative health. We are privileged to host a distinguished array of speakers, academics, industry leaders, entrepreneurs, and policymakers, whose expertise spans pharmacognosy, food science, biotechnology, and public health. Their contributions will help illuminate pathways for translating indigenous knowledge into scalable innovations, fostering cross-sectoral partnerships, and aligning our efforts with global standards for safety, efficacy, and sustainability.

Ladies and gentlemen, the urgency of this dialogue cannot be overstated. As new diseases emerge and existing ones evolve, affecting both human and animal populations, we must embrace a more holistic and integrative approach to wellness, one that leverages our natural heritage and scientific ingenuity. The convergence of food and medicine is not merely a conceptual shift; it is a practical necessity for building resilient health systems and empowering communities. I am confident that by the end of this congress, we will be better equipped to advance the cause of sustainable healthcare through evidence-based applications of functional foods and phytomedicines. May your time here in Ikeji-Arakeji be intellectually stimulating, professionally rewarding, and personally enriching.

Thank you.

**Prof Ganiyu Oboh***fas, faas, ffnan*

**Convener**

**Pharma-Food Congress**



## **WELCOME ADDRESS BY THE VICE CHANCELLOR**

**AT THE 7<sup>th</sup> PHARMA-FOOD CONGRESS OF  
FUNCTIONAL FOOD & NUTRACEUTICAL  
ASSOCIATION OF NIGERIA HELD AT JOSEPH  
AYO BABALOLA UNIVERSITY (JABU), IKEJI-  
ARAKEJI, OSUN STATE**

Distinguished Guests, Esteemed Scholars, Respected Practitioners, Ladies and Gentlemen,

It is with great joy and a profound sense of responsibility that I warmly welcome you all to Joseph Ayo Babalola University, the first entrepreneurial university in Nigeria, and the proud host of this year's Pharma-Food Congress of

Functional food and nutraceutical association of Nigeria.

We are indeed honored to host this important gathering of thought leaders, researchers, industry experts, and young scientists who are united by a shared commitment to advancing knowledge and practice in the vital fields of pharmaceuticals and food sciences. This congress is not only timely but also strategic, as it seeks to address global and national challenges relating to health, food security, innovation, and sustainable development.

At JABU, we place high value on scholarship that connects with society's pressing needs. Hosting this congress therefore aligns perfectly with our mission to produce graduates who are intellectually sound, morally upright, and innovative in solving real-world problems. We are convinced that the deliberations, collaborations, and discoveries that will emerge from this gathering will contribute immensely to national development and global progress.

I wish to specially commend the Local Organizing Committee for their hard work and dedication in putting this event together, as well as the leadership of the association for choosing our university as the host. To our distinguished speakers, panelists, and delegates, we appreciate your commitment and look forward to the rich insights you will share.

I also encourage every participant not to view their presence on our campus merely as an academic exercise. In line with the motto of our University, *'For Knowledge and Godly Service,'* I urge you to take time during your stay to connect with the divine covenants upon which this institution was founded, so that you may secure future wellness.

On behalf of the Governing Council, Senate, Staff, and Students of Joseph Ayo Babalola University, I once again extend to you our warmest welcome. May your stay here be fruitful, impactful, and memorable.

Thank you, and God bless.

**Professor Olasebikan Alade Fakolujo**

Vice Chancellor

Joseph Ayo Babalola University (JABU)

# ABSTRACTS

PFC2025\_001

**Integrating Soil and Location Weather Variables for Crop Type Prediction  
Oladipe Ebenezer Oluwole<sup>1\*</sup>, Osaghae Edgar<sup>2</sup> and Tunmise Tope Oladipe<sup>3</sup>**

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**ABSTRACT**

This study focused on enhancing crop type prediction accuracy using the Gradient Boosting Classifier algorithm in machine learning to address the issues of low accuracy and limited crop prediction by achieving a significantly improved accuracy rate. The data set from Agricultural Development Program database Lokoja, incorporates crucial agricultural factors: soil nutrients (nitrogen, phosphorous, potassium, soil pH) and location-based weather variables (temperature, relative humidity, rainfall). Through extensive data preprocessing, including handling missing values, normalizing units, and addressing outliers, the dataset is meticulously prepared. The integration of soil nutrient and weather data ensures a comprehensive understanding of the conditions affecting crop growth. The Gradient Boosting Classifier algorithm is selected due to its capacity to handle complex relationships between variables and its propensity to mitigate issues like underfitting and overfitting. The model's performance is evaluated using a robust validation approach, with a focus on achieving the highest predictive accuracy. Remarkably, the model achieves an exceptional accuracy rate of 98.9%, signifying a substantial improvement over prior methodologies that encountered accuracy limitations and provided fewer crop type predictions. This outcome signifies a significant advancement in crop type prediction, which holds promise for agricultural planning, resource allocation, and yield optimization, by integrating diverse data sources and employing a powerful machine learning algorithm, this research showcases the potential to revolutionize crop type prediction accuracy. The approach has the potential to usher in a new era of data-driven decision-making in agriculture, addressing challenges related to low accuracy and limited crop prediction capability, and contributing to enhanced food security and sustainable agricultural practices.

PFC2025\_002

**Effect of indigenous methods of extraction on the bioactive component and antioxidant activities of  
*Ocimum gratissimum* L.**

**Tunmise Tope Oladipe<sup>1\*</sup>, Ajayi Ajetomobi<sup>2</sup>, Ademuyiwa Adegbeji<sup>3</sup>, Tayo Timon Oludare<sup>4</sup>, Attah Friday<sup>5</sup>, Benedicta Leo<sup>1</sup>, Zahra Bello<sup>1</sup>**

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**ABSTRACT**

This study investigated the effects of indigenous methods of extraction (with 2% w/v NaCl and 40% v/v Lime juice) on the bioactive constituents and antioxidant activities of *ocimum gratissimum*. Phytochemical

screening, GC-MS, FTIR, and antioxidant analysis of various extracts (Ethanol (EtOHE) extract, Aqueous extract (AqE), Salt extract (NaClE) and Lime extract (LmE)) of the plant were carried out. Phytochemical screening revealed the presence of secondary metabolites such as; saponin, flavonoids, tannins, phenols, steroids, alkaloids, and glycoside, with EtOHE and AqE significantly  $p > 0.05$  containing the highest concentrations of these metabolites compared with NaClE and LmE. The GC-MS analysis revealed the presence of twenty-one bioactive compounds in the EtOHE, while there were only fifteen bioactive compounds identified in the AqE, NaClE and LmE respectively (with oleic acid > N-hexadecanoic acid > and 11-octadecanoic acids being the major compounds). The FTIR analysis revealed the extracts contain compounds with the presence of alcohol, carboxylic acids, amines, amides, aromatic compounds, long aliphatic chain, ketone, aldehyde etc. The antioxidant analysis showed that the EtOHE had significantly  $p > 0.05$  higher ( $26.08 \pm 0.76$ ) total antioxidant capacity (TAC)(AEQ) compared with AqE ( $7.79 \pm 0.61$ ), NaClE ( $7.82 \pm 0.81$ ) and LmE ( $3.49 \pm 0.48$ ) respectively, while the NaClE demonstrated superior antioxidant activity ( $IC_{50} = 44.30 \mu\text{g/mL}$ ) against ABTS compared with the EtOHE ( $IC_{50} = 60.39 \mu\text{g/mL}$ ), AqE ( $IC_{50} = 73.25 \mu\text{g/mL}$ ) and LmE ( $IC_{50} = 66.73 \mu\text{g/mL}$ ) respectively. In conclusion, this study revealed that bioactive and antioxidant properties of plant extracts significantly depend on the extraction methods used. Hence the use of herbal medicine needs thorough investigation to identify the potential health benefits and risks.

### PFC2025\_003

#### Comparative Analysis of Antioxidant and Antimicrobial Potentials of Different Extracts of *Turraea vogelii* Hook.f. leaves

Olorunfemi R. Molehin<sup>1\*</sup>, Oluwasegun S. Dauda<sup>2</sup>, Oluwakemi V. Adeleke<sup>3</sup>, Joy F. David<sup>1</sup>,  
Testimony O. Oso<sup>1</sup>, Anne A. Adeyanju<sup>4</sup>

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#### ABSTRACT

*Turraea vogelii* Hook.f., is a plant valued for its medicinal properties. The aim of this research is to investigate the comparative analysis of antioxidant and antimicrobial potentials of different extracts of *Turraea vogelii* Hook.f. leaves. The fresh leaves of the plant were harvested, air dried, ground, and extracted with three solvents based on polarity (Dichloromethane (DCM), Ethyl Acetate and n-Hexane) via maceration procedure. Antioxidant and antibacterial potential were carried out to test for their efficacy. Fourier Transform Infrared Spectroscopy (FTIR) and Gas Chromatography Mass Spectrometry (GCMS) were used to analyse the functional group and organic compounds present in the drug materials respectively. Antioxidants screening identified flavonoids ( $24.63 \pm 0.47$ ,  $19.96 \pm 0.17$ ,  $21.04 \pm 0.04$ ) phenols ( $20.18 \pm 0.4$ ,  $17.61 \pm 0.11$ ,  $8.65 \pm 0.15$ ) in  $100 \mu\text{g/mL}$  of the DCM, ethyl acetate and n-hexane crude extracts respectively. The antibacterial evaluation showed the DCM extract demonstrated potent activity, with minimum inhibitory concentration (MIC) values as low as  $3.125 \mu\text{g/mL}$  and minimum bactericidal concentration (MBC) values ranging from  $6.25 \mu\text{g/mL}$  to  $50 \mu\text{g/mL}$  against pathogens such as *Escherichia coli* ATCC 35218, *Staphylococcus aureus* ATCC 2921, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Klebsiella pneumonia* ATCC 700303, and *Salmonella typhi* ATCC14028. FTIR analysis identified several functional groups in the extract, including hydroxyls, alkanes, amides, amines, and ethers, indicative of diverse bioactive compounds and GC-MS identified key compounds like squalene and Hexanoic acid. The results highlight the potential of the plant leaves possesses notable antioxidants and

antibacterial properties, supporting its traditional use in folk medicine and paving the way for the development of novel antibacterial agents.

#### PFC2025\_004

### Phytochemicals, antioxidants, antibacterial, alpha-amylase and alpha-glucosidase activities of locally made beverages

Momoh, A. O<sup>1</sup>, Abiola, M Asowata-Ayodele<sup>2\*</sup> & Aluku, F. M<sup>1</sup>.

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#### ABSTRACT

This study evaluated the phytochemical content, antioxidant potential, antibacterial activity and inhibitory effects on  $\alpha$ -amylase and  $\alpha$ -glucosidase enzymes in selected locally produced beverages in Nigeria using standard analytical procedures. The beverage “zobo” exhibited the highest  $\alpha$ -glucosidase inhibitory activity ( $1.03 \pm 0.00$ ), while “adoyo” recorded the lowest ( $0.31 \pm 0.01$ ). In terms of  $\alpha$ -amylase inhibition, “hospital too far” showed the highest activity ( $1.09 \pm 0.00$ ), whereas “adoyo” had the lowest ( $0.38 \pm 0.00$ ). Antibacterial screening revealed that *Bacillus cereus* was the most susceptible organism, with the largest zone of inhibition ( $10.20 \pm 0.20$  mm), while *Pseudomonas aeruginosa* showed no susceptibility ( $0.00 \pm 0.00$  mm). Ampicillin exhibited the highest activity against *Bacillus cereus* ( $7.00 \pm 0.00$  mm) but was ineffective against *Shigella dysenteriae*. Ofloxacin was most effective against *S. dysenteriae*. For antioxidant activity, “zobo” recorded the highest DPPH radical scavenging ability ( $62.46 \pm 0.27\%$ ), while “hospital too far” had the lowest ( $34.88 \pm 1.13\%$ ). The highest Ferric Reducing Antioxidant Power (FRAP) was observed in “adoyo” ( $14.30 \pm 0.10$   $\mu\text{mol Fe}^{2+}/\text{g}$ ), and the lowest in “hospital too far” ( $12.06 \pm 0.02$   $\mu\text{mol Fe}^{2+}/\text{g}$ ). The findings suggested that these traditional beverages contain bioactive compounds with significant antioxidant, antidiabetic and antibacterial properties, supporting their potential as sources of therapeutic agents.

#### PFC2025\_005

### Microbiological quality assessment of ready-to-eat foods and snacks in Ilara-mokin, Ondo State, Nigeria.

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#### ABSTRACT

Ready-to-eat (RTE) foods are commercially prepared for convenience and immediate consumption, yet their microbial quality remains a public health concern. This study investigated the microbial load, identification and antibiotic sensitivity of microorganisms associated with RTE foods and snacks obtained from vendors within and around Elizade University, Ilara-Mokin, Ondo State, using standard microbiological procedures. Food samples were collected from multiple outlets, including the popularly called “Dubai” selling point, which recorded the highest microbial load. Among the samples, spaghetti exhibited the highest mean bacterial load ( $8.20 \pm 0.67$  cfu/g), while beans showed the highest fungal load ( $7.00 \pm 0.22$  cfu/g). Egg rolls had the highest bacterial load ( $2.10 \pm 0.12$  cfu/g) among snacks. Bacterial isolates included *Enterobacter aerogenes*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus vulgaris*,

*Salmonella typhi*, *Shigella dysenteriae*, and *Pseudomonas aeruginosa* (all Gram-negative), alongside *Bacillus subtilis* (Gram-positive). Fungal isolates comprised *Aspergillus* spp., *Fusarium* spp., *Penicillium* spp., *Mucor mucedo*, and *Rhizopus stolonifer*. *Klebsiella pneumoniae* was identified in beans, egg rolls and fufu, while *Staphylococcus aureus* was detected in beans, egg rolls, jollof rice and fufu from various outlets. *Staphylococcus saprophyticus* and *Proteus vulgaris* were also commonly present across multiple samples. The results suggested that the analyzed RTE foods did not meet acceptable microbiological quality standards, posing potential health risks to consumers.

**PFC2025\_006**

**Proximate, Mineral, and Vitamin Analysis of Tiger Nut (*Cyperus esculentus*) Milk**  
**Rukayat O. Opatokun-Saliu<sup>1\*</sup>, Basheer A. Jaji<sup>1</sup>, Rofiat A. Aderinoye-Rabiu<sup>1</sup>, Sururah. R. Agboola-Azeez<sup>2</sup>, Azeezat A. Faniran<sup>3</sup>.**

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**ABSTRACT**

Tiger nut (*Cyperus esculentus*) is an underutilized tuberous crop with significant nutritional value. This study evaluates the proximate, mineral, and vitamin composition of tiger nut to highlight its potential as a functional food. The proximate, mineral, and vitamin composition of Tiger nut (*Cyperus esculentus*) milk was determined using standard analytical techniques. The proximate compositions were: moisture (10.11±0.05%), crude protein (5.35±0.10%), fat (23.20± 0.08%), fiber (9.96± 0.18%), ash (1.55± 0.03%), and carbohydrate content (49.88± 0.08%). The minerals were sodium (57.00± 0.01%), potassium (179.00± 0.01mg/kg), calcium (60.00± 0.02mg/kg), magnesium (36.00± 0.01mg/kg), iron (0.27± 0.00mg/kg). The vitamins were vitamin A (99.75mg/g), and vitamin C (42.92mg/g). The results revealed that tiger nut is rich in carbohydrates, healthy fats, moisture, and crude fiber making it a good energy source. It also contains essential minerals such as calcium, magnesium, potassium, and iron, contributing to bone health, muscle function, and oxygen transport. Furthermore, the presence of vitamins including vitamin A, and vitamin C enhances its antioxidant and metabolic benefits. These findings suggest that tiger nut is a nutritionally dense food with potential applications in dietary formulations and functional food development.

PFC2025\_007

**Isolation and Structural Elucidation of Taraxer-14-en-3-one compound from the leaves of *J. tanjorensis* (Hospital too far)**

**Authors:**

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<sup>3</sup>Department of Biochemistry, Faculty of Biological Sciences, and Alex Ekwueme-Federal University Ndufu Alike, P.M.B. 1010, Abakaliki, Ebonyi State, Nigeria.

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**ABSTRACT**

The *Jatropha tanjorensis* leaves were collected, air-dried and pulverize. The pulverized sample was extract with solvents of varying polarities to obtain the crude extract. Repeated column and thin layer chromatographic separation of the crude extracts gave a compound that was characterized by IR, HRMS, <sup>1</sup>H and <sup>13</sup>C NMR spectral data and by comparison of the data with the one reported in the literature confirmed the compound to be taraxer-14-en-3-one. The taraxer-14-en-3-one compound can be considered as lead compound in the development of medicine for the anaemia, diabetes and cardiovascular infections.

PFC2025\_008

**Antihypertensive and Antilipidemic Effects of Ethanolic Leaf Extract of Sandpaper (*Fiscus exasperate*) on Streptozotocin-induced Diabetic Albino Rats**

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**ABSTRACT**

Sandpaper (*Fiscus exasperate*) tree is one of the medicinal plants that have served all through the ages as the mainstay in the treatment and preservation of human health. This study was undertaken to determine the hypoglycemic and dyslipidemia effects of ethanolic leaf extract of *Fiscus exasperate* in streptozotocin-induced diabetic albino rats. Its effects on the glucose concentration, weight and lipid profile of these rats were investigated. Thirty rats (150-160 g) were divided into six groups of five rats each. Groups 1 and 2 served as the normal and positive control respectively and administered 1 ml of distilled water only. Groups 2-6 were given 40 mg/Kg body weight of streptozotocin to induce diabetes. Groups 3, 4 and 5 were administered varying doses (50, 100 and 200 mg/Kg body weight respectively) of ethanolic leaf extract of *F. exasperate*. Group 6 was administered 200 mg/Kg body weight of standard drug (metformin). Blood glucose level and body weight of these diabetic rats were investigated. The study lasted for 14 days, and the rats were sacrificed using chloroform, dissected and their blood sample collected with needle and syringe through heart puncture, centrifuged to obtain serum in which lipid profile was also studied. The results showed that the extract-treated STZ-induced diabetic rats revealed a significant ( $P < 0.05$ ) decrease in blood glucose, VLDL, LDL, TC, TG levels and activity of alpha amylase while a significant ( $P < 0.05$ )

increase in their body weight, HDL level and activity of glucose-6-phosphate dehydrogenase were noticed. These observations suggested that ethanolic leaf extract of *F. exasperate* may have antihypertensive and antilipidemic properties.

**PFC2025\_009**

**A Review of Soursop (*Annona muricata*) And Roselle (*Hibiscus sabdariffa*) Using Organic Fertilizers Applications to Improve Phytochemical and Antioxidant Potential Olumayowa Iyanda<sup>1</sup>, Kehinde Onoda<sup>2</sup>, Iretiayo Adelaiye<sup>3</sup> and Ayomide Afolabi<sup>4</sup>**

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**ABSTRACT**

In order to address new health and environmental issues, it is becoming more and more crucial to combine functional food development with sustainable agronomic practices. In addition to increasing soil fertility, organic fertilization—using compost, animal manure, or both—has shown promise in enhancing the nutritional and medicinal qualities of crops. The impact of organic fertilizer application on the accumulation of secondary metabolites and antioxidant capacity of two underutilized but functionally rich crops—soursop (*Annona muricata*) and roselle (*Hibiscus sabdariffa*)—is examined in this review. The use of current research findings and existing literature, investigate the effects of organic inputs on physiological and biochemical pathways involved in the synthesis of significant phytochemicals such as flavonoids and phenolics. The research that was reviewed indicates that organic amendments can greatly boost tissues of plant antioxidant potential, and that applying compost and poultry manure together can have beneficial effects. These gains can be attributed to microbial activity, increased nutrient availability in the soil, and plant stress signalling pathways that initiate secondary metabolism. From the perspective of crop physiology, organic fertilizer application plays a crucial role in optimizing plant health and the production of bioactive compounds. To further help differentiate treatment effects and direct nutrient management strategies, multivariate techniques like Principal Component Analysis (PCA) are used. The results also add to the increasing amount of information that supports the use of organic farming methods when growing crops for use in nutraceuticals and functional foods. In order to develop crops rich in phyto-medicine, this review promotes a paradigm shift towards integrated organic systems. Additionally, it provides useful implications for researchers, policymakers, and smallholder farmers in promoting food-based wellness through innovations in agriculture that are in line with sustainable development goals.

**PFC2025\_010**

**Employing modified traditional processing method improves functional elements in *Zea mays* and *Sorghum bicolor* flours to reduce hidden hunger**

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**ABSTRACT**

Hypothetically, traditionally processed *Zea mays* (ZM) and *Sorghum bicolor* (SB) flours, staple food in most households, may contribute to hidden hunger in Nigeria. To compare essential trace elements levels

in the modified and traditionally processed *Zea mays* and *Sorghum bicolor* flours. 20 g each of ZM and SB grains were separately wet-cleaned, soaked in water for 72 hours, rinsed twice, and divided into two. For modified processing method, 10 g each of ZM and SB grains was sun-dried for 72 hours and grinded to become modified processed ZM and SB (ZMmp and SBmp) flours. For, traditional processing method, 10 g each of ZM and SB grains was wet-milled, sieved with water and left to settle, the sediments known as 'Ogi' was pressed and sun-dried for 72 hours to obtain traditionally processed ZM and SB (ZMtp and SBtp) flours. ZMmp, ZMtp, SBmp and SBtp flours were analysed for essential trace elements (ETEs) using atomic absorption spectrophotometry. Percentage increases in ETEs levels in the ZMmp flour versus ZMtp flour revealed Iron (188%), Copper (188%), Chromium (172%), Manganese (170%), Cobalt (170%), Zinc (156%), Selenium (16%) and Molybdenum (3%). ETEs levels in the SBmp versus SBtp showed Selenium (130%), Copper (56%), Zinc (30%), Chromium (25%), Cobalt (17%), Manganese (10%), Molybdenum (10%), and Iron (4%). Modified processing method preserved ETEs in *Zea mays* and *Sorghum bicolor* flours more than the traditional method. It could provide a practical approach to enhance functional foods, reduce hidden hunger and promote wellbeing.

**PFC2025\_011**

**In Silico And In Vitro Evaluation of Phenolics and Flavonoids from Aqueous Extract of *Gliricidium sepium* (GS) As Potential Inhibitors of Butyrylcholinesterase (BchE) AND Acetylcholinesterase (AchE), And Assessment of Neuroprotective Properties**

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**ABSTRACT**

*Gliricidium sepium* (GS) is known to possess antioxidant properties owing to the bioactive compounds in it. These bioactive compounds include flavonoids and the phenolics, which have been documented for their enzyme inhibitory activities. This study assessed the Neuroprotective potentials of aqueous extract of *Gliricidium sepium* leaves, by a computational approach. Leaves of *G. sepium* collected from Oye Ekiti, Ekiti State, were washed, air-dried, blended into fine powder and then extracted in aqueous medium. The extract was filtered, concentrated using rotary evaporator and freeze-dried. The dried extract was stored in an air-tight container. The characterization of the aqueous extract was done using HPLC. Inhibitory effects of GS aqueous leaves extract on Butyrylcholinesterase and Acetylcholinesterase were determined. The flavonoids and phenolics were used as ligands for the computational study. The 2D structures of the ligands were retrieved from NCBI PubChem online database. These ligands were converted into minimized 3D structure using the LigPrep wizard of Schrodinger Maestro (v12.8) 2021 release. The results showed a concentration dependent increase in the % inhibition of BchE and AchE and HPLC result revealed 9 flavonoids and 18 phenolics. All the flavonoids showed higher binding affinity to both BchE and AchE, with Quercetin (-12.905), Afzelin (-12.588), isoquercetrin (-11.632) and kaempferol (-11.129) kcal/mol having the highest binding affinity to AchE, while rutin (-16.341), Isoquercetrin (-11.410) and Quercetin (-10.189) kcal/mol showed the highest for BchE. The phenolics, ellagic acid showed the highest binding affinity for both BchE (-6.742 kcal/mol) and AchE (-11.265 kcal/mol) respectively. In conclusion, this study revealed the neuroprotective potentials of *G. sepium* aqueous leaves extract via the inhibition of acetylcholinesterase and butyrylcholinesterase and also demonstrated high binding affinities of the bioactive compounds to AchE and BchE, suggesting its possible use as potential source of natural therapeutic agent or nutraceutical in the management of neurodegenerative diseases.

PFC2025\_012

**Modulatory effect of Quercetin against Etoposide-induced Oxidative Damage in Endometrial tissue of Wistar Albino rats**

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**ABSTRACT**

Quercetin is a flavonoid compound widely present in plants and exhibits a variety of biological activities. Different studies have revealed wide range of cytotoxicity following chemotherapy. In this study, possible modulatory effect of quercetin against etoposide-induced oxidative damage, apoptosis and hormonal imbalance in endometrial tissue of rats were investigated. Wistar albino rats were randomly divided in to group I (control), group II, III, IV which received 1, 3, and 5 mg/kg etoposide respectively, and group V that received co-treatment of 5 mg/kg etoposide and 10 mg/kg quercetin for seven days via intraperitoneal injection. Estimations of biochemical parameters such as total antioxidant capacity (TAC), ROS, MDA, antioxidants biomarkers, Cyt C, caspase-3 and 9, were carried out using ELISA method. Gene expression of Nrf-2 and iNOS was also performed. The administration of etoposide causes significant increase in ROS and MDA levels with concomitant reduced antioxidant biomarkers confirming generation of oxidative stress. The results also revealed significant ( $p < 0.05$ ) decrease in hormonal levels across the groups treated with etoposide alone when compared to the control. A significant down-regulation of Nrf-2 was also observed. However, quercetin co-treated group significantly mitigated oxidative stress, restored antioxidant enzyme activities, normalized hormonal levels and apoptotic markers. These findings suggest that etoposide-induced oxidative damage in endometrial tissue is primarily driven by excessive reactive oxygen species (ROS) production and depletion of endogenous antioxidants. This study highlights the potential of quercetin as a co-therapeutic agent to mitigate chemotherapy-induced reproductive toxicity. Quercetin ability to restore antioxidant defense, and maintain hormonal integrity underscores its potential as an adjunct therapy to improve the tolerability of chemotherapeutic regimens while preserving reproductive health.

PFC2025\_013

**Computational Assessment of Phenolics and Flavonoids from Aqueous Extract of *Gliricidium Sepium* as Potential Inhibitors of Arginase and Angiotensin converting Enzyme 1, And Assessment of Anti-hypertensive Properties**

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**ABSTRACT**

*Gliricidium sepium* is a medicinal plant known to possess ethno-medicinal properties and also for its antioxidant properties owing to the bioactive compounds in it. These bioactive compounds include the flavonoids and the phenolics, which have been documented for their enzyme inhibitory activities. This study assessed the anti-hypertensive potentials of aqueous extract of *Gliricidium sepium* leaves, a computational approach. Leaves of *Gliricidium sepium* collected from Oye Ekiti, Ekiti State, were washed, air-dried, blended into fine powder and then extracted in aqueous medium. The extract was filtered, concentrated using rotary evaporator and freeze-dried. The dried extract was stored in an air-tight container. The characterization of the aqueous extract was done using HPLC. The flavonoids and phenolics were used

as ligands for the computational study. The 2D structures of the ligands were retrieved from NCBI PubChem online database. These ligands were converted into minimized 3D structure using the LigPrep wizard of Schrodinger Maestro (v12.8) 2021 release. The results revealed 9 flavonoids and 18 phenolics. Flavonoids, rutin and quercetin have docking scores of -8.183 kcal/mol and -6.044 kcal/mol respectively, while the phenolics 2,3,4-trihydroxybenzoic acid has -6.535 kcal/mol (for arginase). However, for ACE1, the flavonoids Kaempferitin, rutin and Isoquercetrin have docking scores of -12.229, -11.638 and -11.177 kcal/mol respectively, while the phenolics chlorogenic acid has -11.892 kcal/mol. The flavonoid and the phenolics, showed higher binding affinity to arginase than the standard drug Lisinopril (-4.915 kcal/mol), while they showed strong binding affinity to ACE1 in comparison to the standard drug Lisinopril (-13.591 kcal/mol). In conclusion, this study revealed some phenolics and flavonoids in the aqueous leaf extract of *G. sepium* that demonstrated high binding affinities to arginase and ACE1, suggesting a high potential as natural arginase and ACE1 inhibitors. This suggests possible use of *G. sepium* as a promising source of natural anti-hypertensive agent or nutraceutical in the management of hypertension.

## PFC2025\_014

### **Antibacterial Activity and Phytochemical Analysis of Walnut (*Juglans regia L*) on Some Selected Bacteria Pathogen**

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#### **ABSTRACT**

Walnuts (*Juglans regia L.*) are widely consumed natural fruit products, highly valued for their flavor and nutritional composition, which includes essential minerals, carbohydrates, phenolic compounds, vitamins, and polyunsaturated fatty acids. This study investigates the antimicrobial activities of walnut extracts against selected bacterial pathogens and evaluates their phytochemical composition both qualitatively and quantitatively. Ethanolic and hot water extractions were performed, and clinical isolates of both Gram-positive and Gram-negative bacteria were obtained from Don Bosco Health Center, Akure, Ondo State. Antibacterial susceptibility testing was conducted using the agar well diffusion method. Qualitative phytochemical screening revealed the presence of saponins, tannins, flavonoids, terpenoids, and cardiac glycosides, while steroids, alkaloids, anthraquinones, and phlobatannins were absent. Quantitative analysis indicated that cardiac glycosides were the most abundant phytochemicals, with values of 19.61 mg/g and 18.91 mg/g in the ethanol and hot water extracts, respectively. Flavonoids were the least abundant, with 0.46 mg/g and 0.40 mg/g recorded for ethanol and hot water extracts, respectively. Statistical analysis using ANOVA ( $p < 0.01$ ) showed that the ethanolic extract exhibited stronger antibacterial activity against both Gram-positive and Gram-negative bacteria compared to the hot water extract, which was only effective against *Escherichia coli* and *Proteus mirabilis*, producing inhibition zones of 4 mm and 10 mm, respectively. The results suggest that the phytochemical constituents of *J. regia* contribute significantly to its antimicrobial properties. Therefore, walnut extracts may serve as a promising natural source of bioactive compounds, with potential applications in developing alternatives to synthetic antibiotics. Further studies are recommended to explore its efficacy against a broader range of pathogens.

PFC2025\_015

**An Insight into Hypolipidemic and *In vivo* Antioxidants Effect of Cocoyam (*Xanthosoma sagittifolium* spp.) and Wheat Flour Composite Bread in Wistar Rats.**

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**ABSTRACT.**

The increasing prevalence of hyperlipidemia and oxidative stress-related diseases necessitates the exploration of dietary interventions. Current bread options often lack adequate nutritional benefits, particularly in terms of lipid lowering and antioxidant properties. This study investigates the potential of cocoyam and wheat flour composite bread as a functional food to address these health issues. Composite bread was produced using varying ratios of cocoyam flour (CYF) and wheat flour (WF): 100:0 (100% CYF), 50:50 (50% CYF:50% WF), 20:80 (20% CYF:80% WF), 10:90 (10% CYF:90% WF), and 0:100 (100% WF), with the addition of 2 g of cocoa powder (C) for flavoring. Forty male Wistar rats were divided into eight groups and fed different bread formulations, including the control group that was fed 100% WF bread, over a two-week period. After fourteen days, the rats were sacrificed by cervical dislocation, blood was collected and liver samples were excised and homogenized using phosphate buffer pH 7.4. It was obtained from the result that there were significant ( $p < 0.05$ ) decrease in the level of plasma ALT, AST and ALT of the rats fed with composite bread as compared to the control. The result of the lipid profile also revealed a significant ( $p < 0.05$ ) decrease in the value of decrease in the level of the plasma cholesterol, triglyceride and LDL-cholesterol as compared to the normal rats. However, the value of the plasma HDL-cholesterol showed a significant ( $p < 0.05$ ) increase in the rats fed 100% CYF + C as compared to the control. Furthermore, significant ( $p < 0.05$ ) increase was revealed in the superoxide dismutase, catalase and Glutathione peroxidase activities in the liver of the rats fed with 100% CYF bread + C showing higher antioxidant properties. It can be suggested from the result that cocoyam / wheat flour composite bread blends could serve as a good functional food recipe with an increase antioxidant potential.

PFC2025\_016

**Evaluation Of Nutritional and Potential Health Benefits of *Trichosanthes Cucumerina* L. (Snake Tomato)**

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**ABSTRACT**

*Trichosanthes cucumerina*, commonly known as snake gourd, belongs to the Cucurbitaceae family. This plant is indigenous to Southeast Asia and is widely cultivated for its edible fruits in Southwestern Nigeria. In recent years, there has been growing interest in the scientific community regarding the potential health benefits of *Trichosanthes cucumerina*. This study, therefore, aimed at evaluating the nutritional potential of *Trichosanthes cucumerina* to validate its contribution to health. Phytochemical constituents and contents, proximate composition, mineral nutrients and antioxidant activity of *Trichosanthes cucumerina* were analyzed and compared with that found in *Solanum lycopersicum* (tomato). The results indicated that

*Trichosanthes cucumerina* contains all the phytonutrients present in *Solanum lycopersicum*, except for glycosides which is absent in *Solanum lycopersicum*. *Trichosanthes cucumerina* recorded higher content of phenol, flavonoid, alkaloid, saponin, tannin and glycosides compared to the fruit of *Solanum lycopersicum*. *Trichosanthes cucumerina* contains reasonable amounts of proximate contents such as moisture, crude fibre, protein, fat, ash and lipids. Also, *Trichosanthes cucumerina* has high contents of lycopene and  $\beta$ -carotene although lower than those obtained in *Solanum lycopersicum*. There were variations in the mineral contents of *Trichosanthes cucumerina* compared to that obtained in *Solanum lycopersicum*. *Trichosanthes cucumerina* can serve as a substitute for *Solanum lycopersicum* due to its high nutrient composition and its potential roles in medicare.

## PFC2025\_017

### Assessing The Probiotic Potentials of Lactic Acid Bacteria Obtained from Fermented Cucumbers Ekundayo, E. A. and Eseka, A. P.

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#### ABSTRACT

Lactic acid bacteria (LAB) have been known for their antagonistic ability in that they inhibit the growth or activity of other microorganisms when present at the same site, hence, they are regarded as probiotic organisms. The exploration of these strains is beneficial not just in terms of fermentation but also to human health. Hence, this study investigated the probiotic potentials of the lactic acid bacteria isolated from fermented cucumbers. Lactic acid bacteria were isolated from locally fermented cucumbers and were identified phenotypically. The isolates were tested for some probiotics potentials such as their acid tolerance, non-haemolytic potential on blood agar, inhibitory potential to pathogenic microbes, using standard protocols. *Lactobacillus* strains were found to be tolerant at 6.5% saline concentration, non-haemolytic on blood agar and tested positive to the bile salt, proving they possessed probiotic properties. However, *Lactobacillus* strains isolated from fermented cucumbers had no inhibitory effect on the isolates obtained. The lactic acid bacteria obtained from fermented cucumber can be harnessed as probiotics.

## PFC2025\_018

### Graded Doses of *Rauvolfia vomitoria* Root Extract Alter Antioxidant and Inflammatory Biomarkers In Female Albino Rats Alli Smith Y.R1 and Owolabi O.V2

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#### ABSTRACT

*Rauvolfia vomitoria* (RV) is a plant used in the treatment of various diseases in folklore medicine. This study aims to investigate phytochemical analysis and effects of the ethanolic root extract of RV (ERERV) on some antioxidant parameters; glutathione (GSH), catalase (CAT), superoxide dismutase (SOD), ferric reducing antioxidant power (FRAP), [2,2-di(4-tert-octylphenyl)-1-picrylhydrazyl] (DPPH), malondialdehyde (MDA), 2,2'-azino-bis-(3-ethylbenzothiazoline-6-sulfonic acid (ABTS), some inflammatory biomarkers; Nuclear factor erythroid 2-related factor 2 (NrF2), Nuclear factor-kappa B (NF- $\kappa$ B) and acetylcholine esterase (AChE) activities in female albino rats. Twenty-five albino rats weighing between 150-180g were randomly distributed into five groups. Group 1 is the control group while groups 2, 3, 4 and 5 received 50, 100, 200 and 400mg/kg bodyweight of ERERV respectively. They were exposed to the extract orally for 21 days after which the animals were sacrificed after an overnight fast. Biochemical analyses were carried out on the blood sample and data were analyzed using one way analysis of variance

(ANOVA) followed by Tukey's post-hoc test. Values with  $p < 0.05$  were considered significant. Phytochemical analysis showed the presence of alkaloids, tannin, saponin, flavonoids, phenol, steroids and glycosides. Phenol concentration was the highest (91.46mg/100g) while glycosides was the least with a concentration of 1.79mg/100g. *In vivo* analysis showed decreases in GSH, CAT, SOD, FRAP, DPPH and Nrf2 activities, however increases were observed in the activities of MDA, ABTS, AChE and NFkB when compared with the control. In conclusion, the ethanolic root extract of RV should be taken with caution or totally discouraged in females as continuous exposure might induce oxidative stress.

## PFC2025\_019

### **Assessment of Glycemic Index and Antioxidant Effect of Orange Peel Enriched Ice Cream Formulated from Coconut Milk and Tiger nut Milk in Hypercholesterolemic Rats.**

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#### **ABSTRACT**

Oxidative stress is a key contributor to the development and progression of cardiovascular diseases. Hypercholesterolemia is a medical condition characterized by high levels of cholesterol in the blood. This research aim to create low glycemic ice creams targeted at the management of oxidative stress. The study investigated the effects of partially and completely replacing dairy ingredients with coconut milk (*Cocos nucifera*) and tigernut milk (*Cyperus esculentus*), along with the inclusion of orange (*Citrus sinensis*) peel, on the sensory quality, glycemic index, and antioxidant profile of the formulations. Ice cream samples were analyzed for their glycemic index, amylose and amylopectin composition, total phenol, and flavonoid contents. Following formulation, the ice creams were administered to hypercholesterolemic rats maintained on a high-fat diet for 21 days, after which oxidative stress markers malondialdehyde (MDA), reactive oxygen species (ROS) and atherogenic parameters were evaluated. Results showed that substitution with coconut and tigernut milk, particularly when combined with orange peel enrichment, produced ice creams with desirable sensory characteristics, significantly lower glycemic indices, and enhanced levels of phytochemicals. These formulations had a favorable amylose-to-amylopectin ratio, contributing to slower carbohydrate digestion. Rats fed the enriched ice creams demonstrated reduced MDA and ROS levels, along with improvements in atherogenic indicators. The findings emphasize the potential of orange peel-enriched, non-dairy ice cream as a functional food capable of modulating glycemic response and oxidative stress in diet-induced metabolic disorders.

## PFC2025\_020

### **Anti-toxic effect of *Abelmoschus esculentus* leaf diet on Monosodium glutamate- induced organ dysfunction and genotoxicity**

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#### **ABSTRACT**

The potential of *Abelmoschus esculentus* leaf in the reversal of Monosodium glutamate (MSG) induced

toxicity was assessed in this study. Eighteen (18) Wistar rats were equally divided into three (3) groups (n=6). Group A was the control (given distilled water) while groups B and C were exposed to MSG at 1000 mg/kg body weight for 60 days. Group C was fed a 20% *Abelmoschus esculentus* leaf diet (AELD) in the last 30 days of MSG exposure. On the 61<sup>st</sup> day, all rats were sacrificed with their liver, kidneys, heart and femurs harvested. Organ indices showed that MSG caused a significant reduction in liver weight to body ratio (from 4.45 to 3.99) and a significant increase in heart weight to body ratio (from 0.38 to 0.43). AELD, however, restored the weights of the liver and heart altered by MSG in group C, to similar values as those of the control animals (Liver: 4.31; Heart: 0.38). H&E staining and micronucleus assay technique were used to assess the histological and genotoxic features in the liver, kidneys and heart as well as the bone marrow respectively. MSG induced necrotic degenerative and cellular infiltration in the organs while it induced micronuclei formation in the bone marrow. AELD restored some of the cellular integrity of the tissues, reduced the frequency of micronuclei formation and induced macrophages in the bone marrow. This study suggests that *Abelmoschus esculentus* leaf is a potential anti-toxic agent in reversing MSG-induced anomalies in body organs.

## PFC2025\_021

### **Bioconversion of *Persea americana* seed waste into alpha-amylase using *Bacillus subtilis* enhanced fermentation**

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#### **ABSTRACT**

The global challenge of agricultural waste management calls for sustainable strategies to valorize underutilized by-products. *Persea americana* seeds, often discarded as waste during fruit processing, represent a potential low-cost resource for industrial applications. This study explores the bioconversion of *P. americana* seed flour into alpha-amylase; a valuable industrial enzyme, via submerged fermentation, using *Bacillus subtilis*. Proximate analyses were performed on *P. americana* seed flour and two reference substrates (tapioca and corn starch) to assess their nutritional composition. A 48-hour culture of *B. subtilis* was used to inoculate fermentation media containing either the test or control substrates. The fermentation process was monitored over 96 hours, with periodic measurements of pH and alpha-amylase activity. Results indicated that *P. americana* seed flour contained significantly ( $P < 0.05$ ) higher nutrient levels conducive to microbial growth compared to the reference substrates. A consistent decline in pH was observed across all media throughout fermentation, reflecting active microbial metabolism. Alpha-amylase activity increased progressively up to 48 hours; the peak period, after which a decline was observed between 72 and 96 hours. Notably, the enzyme activity in the *P. americana* seed medium was significantly ( $P < 0.05$ ) higher than in other substrates across the entire fermentation period. This study demonstrates that *Persea americana* seeds are a nutritionally rich and economically viable substrate for microbial alpha-amylase production, offering a promising approach for agro-waste valorization and enzyme biotechnology applications.

PFC2025\_022

**Proximate, Amino acid, Vitamin, Mineral Composition and carbohydrate-hydrolysing potential of Field Pumpkin (*Cucurbita pepo* Linn.) Fruit Peel**

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**ABSTRACT**

Field pumpkin (*Cucurbita pepo* L.) is a popular edible fruit with established health benefits. Despite this, the field pumpkin fruit peel is commonly considered waste, leading to its under-exploitation. This study investigated the nutritional profile of field pumpkin fruit peel by assessing its proximate, amino acid, vitamin, and mineral composition. The effect of field pumpkin fruit peel aqueous extract on  $\alpha$ -amylase and  $\alpha$ -glucosidase activity was also assessed *in vitro*. The results revealed that field pumpkin fruit peel was rich in carbohydrates (45.82%) and dietary fibre (32.01%), with promising protein content (7.17%). Amino acid analysis revealed that field pumpkin fruit peel majorly contains glutamic acid (3.36 g/100g), leucine (2.31 g/100g), arginine (1.28%), alanine (1.16 g/100g) and valine (1.06 g/100g), with tryptophan and cysteine having the least percentages (0.19g/100g). Vitamin analysis also revealed the presence of vitamin A (1.93 mg/100g), vitamin E (1.54 mg/100g), vitamin C (1.25 mg/100g), vitamin B6 (0.64 mg/100g), folic acid (0.27 mg/100g), vitamin D (0.11 mg/100g), vitamin K (0.10 mg/100g), and vitamin B1 (0.08 mg/100g). Elemental analysis also showed that field pumpkin fruit peel is a rich source of potassium (356.78 mg/100g), magnesium (210.55 mg/100g), zinc (98.26 mg/100g), and phosphorus (86.43 mg/100g). The fruit peel also contains calcium (45.90 mg/100g), sodium (20.10 mg/100g), iron (20.08 mg/100g) and selenium (0.09 mg/100g). Furthermore, field pumpkin fruit peel extract inhibited  $\alpha$ -amylase maximally at 100  $\mu$ g/ml (65.48%;  $IC_{50}$  = 1.02  $\mu$ g/ml), although not as strongly as acarbose (80.62%;  $IC_{50}$  = 0.12  $\mu$ g/ml). However, the fruit peel extract exhibited more potent  $\alpha$ -glucosidase inhibition (63.80%;  $IC_{50}$  = 0.40  $\mu$ g/ml) than acarbose (61.18%;  $IC_{50}$  = 0.24  $\mu$ g/ml). Conclusively, these results show that field pumpkin fruit peel possesses potential health benefits and may be a good source of nutraceuticals.

PFC2025\_023

**Compliance With Global Food Security Standards: Analytical Practices Used by Nigerian Laboratories for Detecting Contaminants in Export-oriented Functional Foods.**

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**ABSTRACT**

The expanding global market for functional foods presents significant export opportunities for Nigerian producers. However, accessing international markets necessitates strict adherence to global food security standards, particularly reducing contaminant levels. This research will investigate the analytical practices employed by Nigerian laboratories in detecting key chemical and microbial contaminants like heavy metals, mycotoxins, and microbial pathogens in functional food products ready for export. It aims to assess the extent to which current laboratory methodologies, instrumentation, and quality assurance protocols align with internationally recognized standards like NAFDAC and FDA guidelines. The study will explore the challenges faced by these laboratories in achieving and maintaining submission, such as issues related to

infrastructure, reagent availability, technical expertise, and accreditation. It will also identify gaps between existing Nigerian practices and global expectations. Structured questionnaires will be used for data collation and SPSS statistical software package (Version 28) shall be used to generate the data. Descriptive statistics will be used to summarize laboratory demographics, types of methods used, equipment availability, and proficiency testing participation. Inferential statistics like Chi-square tests, t-tests, or ANOVA, where suitable will be used to explore associations between laboratory characteristics. Finally, this study will contribute to understanding the preparedness of Nigeria's food testing infrastructure to support the safe and competitive export of its functional food products. It will also suggest recommendations for enhancing the analytical capacity, reliability of laboratory procedures, strengthen consumer confidence and facilitating international trade.

#### **PFC2025\_024**

### **Neuroprotective Effect of Aqueous Extract of Beans Pod on High Sucrose Diet - induced Hyperglycemia in *Drosophila melanogaster*** **B.T Aluko<sup>1\*</sup>, E.O Adewale<sup>2</sup>, A.A Adegun<sup>1</sup>**

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#### **ABSTRACT**

Metabolic and neurological dysfunctions associated with excessive sucrose consumption implicated by oxidative stress are detrimental to health. The aim of this study was to determine the neuroprotective effect of the aqueous extract of beans pod on high sucrose diet-induced hyperglycemia. Thirty-five (35) vials of (n=5, 60 flies per vial) were used in this study, they were categorized into seven groups, namely: Group (Control); group II (30% sucrose); group III (30% sucrose + 1.6mg/g Metformin); group IV (30% sucrose+0.25mg/g aqueous extract of beans pod); group V (30% sucrose+0.5mg/g aqueous extract of beans pod); group VI (30% sucrose+0.1mg/g aqueous extract of beans pod); group VII (1mg/g aqueous extract of beans pod). After 7 days of repeated treatment, the flies were homogenized and centrifuged. The resulting supernatant was stored in refrigerator prior to biochemical assays. The result showed that sucrose significantly increased monoamine oxidase (MAO) and acetylcholinesterase (AChE) activity, as well as nitric Oxide (NO) and glucose levels, indicating neurochemical alterations and metabolic imbalance. While Metformin co-administration with sucrose showed a trend toward reducing these parameters. Aqueous extract of beans pod at 0.5 mg/g significantly lowered MAO, AChE, NO, and glucose levels compared to the sucrose group, suggesting its neuroprotective and antihyperglycemic properties. This study proved that aqueous extract of beans pod, particularly at 0.5 mg/g, may counteract sucrose-induced neurochemical and metabolic disturbances, warranting further research into its therapeutic potential.

#### **PFC2025\_025**

### **Anti-renotoxic influences of Pumpkin (*Cucurbita pepo L*) seed supplemented diets on some Biochemical parameters in experimental rats**

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#### **ABSTRACT**

Pumpkin (*Cucurbita pepo L*) seed has been recommended over the years as dietary supplement in folklore medicine for the treatment of several diseases' conditions such as kidney and urinary disorders. This study evaluated the effect of dietary inclusion of pumpkin (*Cucurbita pepo L*) seed (raw and processed) on

nephrotoxicity occasioned by cisplatin in rats. Rats were randomly divided into seven groups; group I served as the control, group II served as cisplatin intoxicated group, group III–VII animals were pre-treated with methimazole (40 mg/kg body weight), 5% raw pumpkin seed inclusive diet, 10% raw pumpkin seed inclusive diet, 5% processed pumpkin seed inclusive diet and 10% processed pumpkin seed inclusive diet respectively, for 14 days, followed by a single injection of cisplatin. Results obtained revealed that cisplatin intoxication significantly increased ( $p < 0.05$ ) the levels of renal biomarkers, arginase activity, 8-hydroxy-2'-deoxy guanosine (8-OHdG), malondialdehyde (MDA) and reactive oxygen species (ROS) in the rat kidney compared to the control group. These adverse changes, due to cisplatin intoxication in rats were prevented by pre-treatment of rats with pumpkin seed supplemented diets. The nephroprotective effects of the pumpkin seed diets could be attributed to the inhibition of arginase II and improvement of antioxidant status. However, processed pumpkin seed appears to show more promise than the unprocessed.

**PFC2025\_026**

**Structure-Based Screening of Compounds from *Bridelia ferruginea* Against *Plasmodium falciparum* Dihydropteroate Synthase and Its Effect on *Drosophila Melanogaster* Life Span  
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**ABSTRACT**

Malaria, primarily caused by the *Plasmodium falciparum* parasite, is a significant public health concern in tropical and subtropical regions. The aim of this project is to employ virtual screening techniques to identify potential compounds derived from *Bridelia ferruginea* stem bark and their inhibitory activity against *Plasmodium falciparum* dihydropteroate synthase (PfDHPS). The study used computational docking to identify bioactive compounds with high binding affinity to PfDHPS. The stem bark was tested in *Drosophila melanogaster*, to assess their in vivo efficacy. Fruit fly of both sexes (1-3days old) were fed with 5g diet containing 50, 100 and 200mg/kg of *Bridelia ferruginea* stem bark for fourteen (14) days to assess the survival rate. Exposure of the flies to the plant was concentration dependent. Highest mortality rate was recorded on day 14 in the group fed with 200mg/kg of *Bridelia ferruginea*. Molecular docking simulations and survival assays in *Drosophila* confirmed the compounds' biological activity. The structure-based screening identified promising compounds; Gallocatechin and Tricin with binding scores of -7.6kcal/mol respectively, as the most active constituents and potential inhibitors of *Plasmodium falciparum* dihydropteroate synthase. Catechin, Quercetin, Apigenin, Antraquinone and Epigallocatechin have moderate binding affinities (scores ranging from -7.0 to -7.1 kcal/mol). These are still potentially significant but may require optimization or combination with other compounds for improved efficacy. The promising results from the molecular docking studies, combined with the observed safety in *Drosophila melanogaster*, suggest that compounds from *Bridelia ferruginea* could be viable candidates for the development of new antimalarial drugs. These findings suggest the importance of integrating computational and biological models in drug discovery processes.

PFC2025\_027

### Evaluation of the Anti-nutritional Composition and Microbial Load Of Fermented and Protein Fortified Maize and Millet

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#### ABSTRACT

The removal of anti-nutrients compounds from foods is essential in improving the nutritional quality of foods. This research investigated the effects of fortification of raw maize and millet with crayfish and soybeans as sources of protein on the anti-nutritional contents of the food materials. Protein fortified maize and millet were fermented using submerged fermentation for a period of five days. The proteins used in fortifying maize and millet were crayfish (30%), soybeans (30%) and combination of both protein sources in ratio 70:15:15 for cereals, crayfish and soybeans respectively. Isolation and identification of microorganism from fermented samples were carried out on daily basis using standard conventional techniques while the anti-nutrients were determined using standard methods. The organisms isolated include *Bacillus subtilis*, *Bacillus pumilus*, *Lactococcus lactis*, *Lactobacillus paracasei*, *Micrococcus luteus*, *Lactobacillus casei*, *Penicillium notatum*, *Rhizopus oryzae*, *Saccharomyces cerevisiae*, *Candida albicans*, *Alternaria alternate* and *Rhizopus stolonifer*. The total bacteria count of the fermented samples increased during the first three days (72 hours) of fermentation followed by subsequent reduction while the total fungal count (sfu.ml-) reduced continuously throughout the period of fermentation. Fortification with crayfish alone reduced the tannin and oxalate contents of the cereals, while soybean fortification led to a significant increase of the anti-nutrients in the samples. Fermentation led to the reduction of all the anti-nutrients determined in the fermented samples. Findings from this study revealed that fermentation and fortification of cereal-based food with crayfish is therefore recommended when desiring to reduce the anti-nutritional compounds in foods.

PFC2025\_028

### Hepatoprotective Effects of Ethanolic Extract of *Azadirachta indica* Leaves on Carbon Tetrachloride Induced Liver Damage in Wistar Rats

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#### ABSTRACT

Currently, there is increasing attention towards flavonoids and phenolic compounds of plant origin because of their association with decrease in the incidence of hepatotoxicity and different types of diseases. The present study investigates the protective effect of *Azadirachta indica* (*A. indica*) ethanolic extracts against carbon tetrachloride (CCl<sub>4</sub>)-induced hepatotoxicity in rats. Control rats (group I) received rat chow and water, group II received CCl<sub>4</sub> in olive oil (1 ml/kg, i.p.) to induce hepatotoxicity, groups III, IV and V were treated with leaf extract of *A. indica* at 100 mg/kg, 200 mg/kg and 400 mg/kg body weight respectively for 21 days after CCl<sub>4</sub> administration. CCl<sub>4</sub> hepatotoxicity, characterized by significant ( $P < 0.05$ ) increase in the levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP), hepatic degeneration, and inflammation was attenuated by *A. indica* ethanolic extracts. The serum lipid parameters which include high density lipoprotein (HDL) and low-density lipoprotein (LDL) were

significantly ( $P < 0.05$ ) decreased, and increased respectively by CCl<sub>4</sub>. Ethanolic extracts of *A. indica* significantly prevented the decrease in the level of HDL and the increase in LDL in a dose-dependent manner ( $P < 0.05$ ). Lipid peroxidation was significantly ( $P < 0.05$ ) reduced while the reduced glutathione (GSH) level and the activities of hepatic antioxidant enzymes (catalase, superoxide dismutase) were significantly elevated by *A. indica* extract in the CCl<sub>4</sub>-treated rats. Our findings indicate that *A. indica* extract has a significant protective effect against CCl<sub>4</sub>-induced hepatotoxicity in rats which may be due to its antioxidant properties.

## PFC2025\_029

### **Effect of Bitter Leaf (*Vernonia amygdalina*) and Siam Weed (*Chromolaena odorata*) on Parasitemia Level, sperm parameters, Hormonal Profiles and Liver Functions in *Plasmodium berghei*-induced Malarial Mice**

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#### **ABSTRACT**

Malaria is a great health problem in sub-Saharan Africa. Interest in herbal alternatives for its treatment is rising due to the effects of antimalarial drugs on male fertility. This study focused on the effect of bitter leaf and Siam weed extracts (BLE and SWE) on sperm quality and related biomolecules in *Plasmodium berghei*-infected mice. The study used mature male mice inoculated with strain NK65 *P. berghei* (Chloroquine-sensitive). The mice were grouped into 9 ( $n = 8$ ), including the normal control group. Thereafter, the parasitemia level and the mice's temperature were assessed. Groups 4 to 9 were treated with BLE and SWE (100, 200, and 400 mg/kg) for five days, respectively, while group 3 was treated with 10 mg/kg chloroquine. Sperm and hormonal parameters were assessed, and the extracts' phytoconstituents were characterised. The results revealed that both BLE and SWE reduced the plasmodium load. Still, they did not affect hormone levels, except for a substantial decrease in the follicle-stimulating hormone of the group treated with 400 mg/kg of bitter leaf. BLE ( $p < 0.05$ ) improved sperm quality while SWE exerted a dose-dependent negative effect. Both extracts had protective effects on liver function. In addition, eighteen and thirteen bioactive compounds were characterised in SWE and BLE, respectively. This study's findings revealed that 200 mg/kg of BLE can effectively treat malaria with no adverse effect on sperm quality and related biochemical parameters.

## PFC2025\_030

### **Comparative Study of Nutritional Composition of Unfortified and Fortified Fermented *Prosopis africana* Seeds with Garlic and Ginger**

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#### **ABSTRACT**

Protein malnutrition is a significant challenge in many African countries. This contributes to inadequate nutritional security, resulting in alternative approaches to enhance plant-based foods' protein and mineral

content and improve overall dietary health. *Prosopis africana* is one of the less known perennials leguminous plants that play a key role in West African cuisine. Fermented *Prosopis africana* seeds are said to be a rich source of protein, fatty acids, minerals, and another vital nutrient. This study therefore aimed to examine the nutritional composition of fermented *Prosopis africana* seeds fortified with garlic and ginger. One (1 kg) of raw *Prosopis africana* seeds and 500g of *Allium sativum* and *Zingiber officinale* were obtained, composited in different ratios (100: 0, 90:10, 80:20, and 70:30) and fermented for 5 days. It was evaluated for microbial, proximate and mineral composition, antioxidant properties, and vitamin content. Among the formulations, sample G showed the highest protein, fiber, and ash content, while sample F exhibited the highest carbohydrate content and antioxidant properties. Zinc is the most abundant mineral found in all samples. Sample A has a major quantity; calcium, manganese, and copper were found in minute quantities. *Bacillus* and *Mucor* species were predominant, alongside *Micrococcus*, *Lactobacillus*, and *Aspergillus niger*. These results demonstrate that fortifying *okpei* with ginger and garlic enhanced its nutritional profile, making it a healthier alternative to traditional seasoning salts and animal protein.

## PFC2025\_31

### **Beneficial Effect of Hesperidin and Exercise on the Histology and Biochemical Parameters of Surgically Induced Endometriosis in a Rabbit Model**

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#### **ABSTRACT**

Background: Endometriosis is a gynaecological disorder marked by forming endometrial tissue (gland and stroma) outside the uterine cavity. Macrophages, erythrocytes, and apoptotic endometrial tissue, when transplanted into the peritoneal cavity, are exposed to free radicals and oxidative stress, which play a vital role in endometriosis. This study focused on unraveling the combinatorial effect of treadmill exercise with hesperidin (HESP, a citrus flavonoid) on histoarchitecture and biochemical [reactive oxygen species (ROS), nitric oxide (NO), total thiol (T-SH), glutathione (GSH), TBARS levels, catalase, glutathione peroxidase (GPx), superoxide dismutase (SOD), glutathione-s-transferase (GST), and monoamine oxidase activities] molecules in endometrial tissue of female rabbits. The rabbits underwent surgery by resectioning one uterine horn, isolating the endometrium, and fixing the tissue segment to the pelvic peritoneum, and they were grouped into 5 (n = 6). Group 1: normal control (NC), Group 2: untreated endometriotic rabbits (ENDO), Group 3: HESP-treated endometriotic rabbits (ENDO + HESP), Group 4: exercised endometriotic rabbits (ENDO + EXER), Group 5: exercised endometriotic rabbits administered with HESP (ENDO + HESP + EXER). Compared to NC, the result revealed reduced antioxidant enzyme activities and non-antioxidant molecules in untreated endometriotic rabbits. However, there was a significant increase in antioxidant status in exercised endometriotic rabbits treated with hesperidin. This finding revealed that combining physical exercise with the consumption of hesperidin-rich fruits can be explored to alleviate oxidative stress, a major risk factor in endometriosis.

PFC2025\_032

**Proximate, Phytochemical and Minerals Composition of Nutrient –Dense Food Supplement****<sup>1</sup>Igbaro, J. O and <sup>2</sup>Ezekiel, O. D.,**<sup>1</sup>Department of Food Science, University of Medical Ondo, Nigeria<sup>2</sup>Department of Nutrition and Dietetics, Wesley University Ondo**ABSTRACT**

The production of nutrient dense food is an attempt to increase the micronutrient as well reduces the weight loss that is as associated with succession of some diseases. The aim of this study was to produce nutrient dense food from sorghum, peanut, tigernut, incorporated with crayfish and black pepper. They were processed into flour and mixed together at different proportion as produced by optimal mixture of response surface methodology (RSM). Four blends were evaluated for proximate, phytochemical and minerals content while commercial cereal serves as control. The data obtained were subjected to analysis of variance (ANOVA). Means were compared and separated using Duncan's multiple range test at  $p < 0.05$  using social science statistical software package. The result revealed a significant ( $p < 0.05$ ) differences in moisture content (6.85 - 7.17%), ash content (3.29 – 5.03%), crude fibre (7.41- 8.57%) and crude protein (17.53- 19.51%). The blends are rich in calcium, potassium, sodium, magnesium that is significantly different at ( $p < 0.05$ ). The phytochemicals result is significantly different in tannin, oxalate and flavonoid but insignificant for phytate and saponin, it can be concluded that based on the analysis results, nutrient dense food could be use as dietary intervention for people living with HIV having sourced the raw material locally.

PFC2025\_033

**Toward Cleaner Labels: Natural Preservation of Tomato Paste with *CINNAMOMUM VERUM* and *ZINGIBER OFFICINALE*****Adebanke M. Ajagunna, Olorunjuwon O. Bello and Isaac A. Adesina**

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**ABSTRACT**

The increasing demand for clean-label food products has intensified the search for natural alternatives to synthetic preservatives. This study investigates the biopreservative potential of *Cinnamomum verum* (cinnamon) and *Zingiber officinale* (ginger) on the microbial, nutritional, and sensory quality of tomato (*Solanum lycopersicum*) paste. Fresh tomatoes, cinnamon bark, and ginger rhizomes sourced from twelve locations in Ondo City, Nigeria, were used to formulate thirteen treatment samples. Microbial analyses were conducted weekly over eight weeks to monitor total viable bacterial counts (TVBCs), total staphylococcal counts (TSCs), and total fungal counts (TFCs), using standard agar plating techniques. Proximate composition, lycopene content, pH, and total titratable acidity were also assessed. Sensory attributes were evaluated using a 9-point hedonic scale, and data were statistically analyzed using SPSS v23. One hundred and eighty-six (186) bacterial isolates were obtained in the study and these were characterized into eight genera but nine species: *Bacillus cereus*, *Bacillus subtilis*, *Citrobacter freundii*, *Enterobacter aerogenes*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*, were the isolates obtained from the paste. *S. aureus* had the highest occurrence (19.89%) and *C. freundii* the lowest (5.37%). One hundred and twenty-seven (127) fungal isolates were isolated and these were characterized into three genera but six species: *Rhizopus stolonifer*, *Rhodotorula rubra*, *Rhodotorula flava*, *Saccharomyces cerevisiae*, and *Saccharomyces lactis*. *S. cerevisiae* was the most common (25.98%) and *R. stolonifer* the least (10.24%). Cinnamon and ginger treatments significantly enhanced the microbial stability and shelf life of tomato paste. Cinnamon, particularly at higher concentrations, was more effective in reducing microbial loads, preserving lycopene content, and maintaining acidity. Sensory evaluation revealed improved aroma, taste, and overall acceptability in treated samples compared to the control. These findings support the application of *C. verum* and *Z. officinale* as

effective natural preservatives. Their use in tomato paste production promotes safer, more sustainable food processing practices in alignment with clean-label standards and consumer preferences.

#### PFC2025\_034

##### **Phenolic Constituents, Antioxidative and Neuroprotective Properties of Tomato (*Solanum lycopersicum*) Leaf in Mercury Chloride Induced Toxicity in *Drosophila melanogaster***

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#### **ABSTRACT**

Mercury can infiltrate the human system due to its bioaccumulation in the environment, especially along the food chain. The central nervous system is highly susceptible to the deleterious effects of mercury toxicity because of its ability to deplete the brain antioxidant system. Tomato leaf is a green vegetable that is rich in bioactive constituents with antioxidant potential. Therefore, this study evaluates the neuroprotective potential of tomato leaf in mercury chloride (HgCl<sub>2</sub>)-induced neurotoxicity in *Drosophila melanogaster*. HPLC quantification of the polyphenolic compounds were determined. The treated groups were fed with diet supplemented with 1 and 2% tomato leaf for 7 days. Neurobehavioural assessment of the flies were carried out and biochemical assays measured the levels and activities of antioxidants coupled with key enzymes related to neurodegeneration in flies tissue homogenate. HPLC quantification of phenolics and flavonoids in tomato leaf indicated the presence of copious amounts of P-coumaric acid, vanillic acid, syringic acid, chlorogenic acid, naringenin, kaempferol, isorhamnetin, myricetin and rutin. HgCl<sub>2</sub> caused significantly (P<0.05) reduced survival and locomotor rates with significant (P<0.05) negative impairments of the biochemical parameters evaluated. However, this observed negative impairment was reversed upon treatment with tomato leaf supplemented diet. Hence, tomato leaf could be considered as an efficient therapy for neurodegeneration and alleviation of oxidative stress.

#### PFC2025\_035

##### **Exercise-gallic acid restored cognitive Neurochemicals and abated oxidative stress in diabetic rats treated with acarbose**

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#### **ABSTRACT**

Diabetes mellitus (DM) induces neuronal impairment in diabetic patients. Previous research on diabetes established the biochemical pathways related to DM and cognitive impairment. This study evaluates the influence of swimming exercise (SWEX) on cognitive neurochemical indices in streptozotocin (STZ)-induced diabetic rats co-administered with ACA (acarbose) and GA (gallic acid). In contrast, swimming was adopted as a form of physical exercise. The experimental rats were randomly grouped into eight groups as follows: Normal control (NC), NC + SWEX, STZ + SWEX, STZ+ ACA-25+ GA-25, STZ+ ACA+ GA-25 + SWEX, STZ+ ACA+ GA-50, and STZ+ ACA+ GA-50+ SWEX. The neurochemical analysis in the homogenised brain tissues includes; acetylcholinesterase (AChE), butyrylcholinesterase (BChE), adenosine

deaminase (ADA), NTPdase, 5'-nucleotidase, superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), thiobarbituric reactive species (TBARS). The results showed that SWEX, ACA, and GA repressed cholinergic activities (AChE and BChE), purinergic (NTPdase in the presence of ATP and ADP, 5'-nucleotidase and ADA) enzymes, and TBARS levels. Still, improved SOD, CAT, and GPx activities compared to the untreated diabetic rats. The combination of SWEX, ACA, and GA had the highest ameliorative effect. In conclusion, combined administration of controlled exercise (swimming), drugs (Acarbose), and antioxidants (gallic acid) mitigated altered neurochemicals in the brains of treated diabetic rats. Hence, it is recommended that diabetes patients should be placed on regular exercise and antioxidant-rich diets combined with antidiabetic drugs.

**PFC2025\_036**

**In Silico Design of Novel *Artocarpus altilis*-Derived Compounds targeting the c-Myc/Max Heterodimer**

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**ABSTRACT**

The transcription factor c-Myc plays a pivotal role in regulating cell proliferation, growth, apoptosis, metabolism, and differentiation; however, its overexpression is strongly linked to cancer. Due to its intrinsically disordered structure, c-Myc has been inherently challenging to target therapeutically. To exert its oncogenic effects, c-Myc must form a heterodimer with its binding partner Max, enabling DNA binding and transcriptional activation of target genes. Despite decades of research, developing effective c-Myc inhibitors remains challenging due to issues such as low potency and poor pharmacokinetics. Here, we investigate natural compounds derived from *Artocarpus altilis* as potential c-Myc inhibitors using computational methods. From screening 81 bioactive compounds, four candidates demonstrated stronger binding affinities to c-Myc than the reference drug Alisertib: Ellagic acid, Artonin M, Cycloaltisin 7, and Brousoflavonol F. Molecular dynamics simulations showed Brousoflavonol F had exceptional stability and the most favorable MM-PBSA binding energy. Pharmacokinetic analysis suggested promising drug properties, though some toxicity risks were noted. These findings highlight *Artocarpus altilis*-derived compounds, particularly Brousoflavonol F, as promising c-Myc inhibitors. This study provides a foundation for experimental validation and optimization, offering new therapeutic potential against c-Myc-driven cancers.

PFC2025\_037

**Diabetes encephalopathic, neurochemicals, and inflammatory (IL-10 and TNF- $\alpha$ ) cytokines' regulatory effects of hesperidin plus exercise on the neuronal tissue of diabetic rats treated with acarbose**

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**ABSTRACT**

Diabetic encephalopathy (DME) is a condition that affects the nervous system in diabetic patients. This study is designed to assess the regulatory effect of hesperidin (HSP, 25 mg/ml) with exercise (EXE) on neurobehavioral, neurochemicals [acetylcholinesterase (AChE), butyrylcholinesterase (BChE), angiotensin-I converting enzyme (ACE), arginase, ATPDase, 5-nucleotidase, adenosine deaminase (ADA), lactate dehydrogenase (LDH) enzymes, antioxidants (SOD and GSH) and oxidative stress [TBARS, ROS] and inflammatory [Tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) and Interleukin-10 (IL-10)] makers in diabetic rats treated with acarbose (ACA, 25 mg/ml). Freshly prepared streptozotocin (STZ) was administered via the intraperitoneal route to establish diabetes mellitus (DM), which was confirmed by measuring blood glucose levels. The results indicated a reduction in TNF- $\alpha$ , AChE, BChE, ACE, arginase, ATPDase, 5'-nucleotidase, ADA, and LDH activities, and TBARS and ROS levels relative to the control group. Meanwhile, an increase in IL-10 and antioxidants (SOD and GSH) were recorded in the treated DM rats. The Groups treated with HSP, ACA, and EXE separately ameliorated cognitive indices and restored encephalopathy, coupled with inflammatory cytokines. However, the treatment with a combination of ACB+HPD+ECE has the best improvement when linking DME to inflammation. The idea of subjecting the rats to treatments at the expense of exercise showed a great impression in the result, which led to recommending these three combinations as therapy.

PFC2025\_038

**Investigating the mineral composition, physicochemical, functional and microbial properties of optimised ready-to-use *combo* natural spices**

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**ABSTRACT**

Natural spices are rich in mineral elements beneficial to human health and needed to be encouraged in regular meal preparations. Eight selected Nigerian spices were prepared in two brands of ready-to-use optimised *combo* mixtures each of combinations of five different spice powders coded as OAS (ginger, alligator pepper, cloves, garlic, and cumin) and OBS (ginger, cumin, fenugreek, scent and curry leaves) using Response Surface Methodology. Herbal drinks, EAD and EBD were extracted from each brand, respectively. The samples were investigated for physicochemical, functional, mineral, and microbial properties using the established methods. Significant differences ( $p < 0.05$ ) existed among the samples in all the determined properties. Moisture content ranged from (8.05-9.38%); fat (12.45-14.10%); crude fibre (4.56-4.93%); pH (5.18-5.77); and TTA (0.13-0.2%). Low moisture and the slight acid pH would support

the shelf life of the products. The ranges of loose and tapped bulk densities (0.33-0.39 and 0.63-7 g/cm<sup>3</sup>), water and oil absorption capacities (1.8-1.94 and 0.6-0.76 g/g), respectively; dispersability (48-62.57%), and wettability (10.1-32.56 sec) of the spice powders will enhance homogeneity in mixing with other ingredients during meal preparations. Calcium (83.54 mg/100 g) was significantly the most abundant mineral element and occurred in OBS which was also the highest in Fe, Mg, K, and Na. Sample OAS was the highest in Cu and Zn suggesting its antioxidant potential and health benefit. Generally, the occurrence of the determined mineral elements was lower in drinks than the spice powders. Notwithstanding, the range of Na/K ratio (0.10-0.27 mg/100 g) in the entire samples meets the standard value of <1 as potential antihypertensive food ingredients. A positive low count of TVB, yeast, and mould (1.0x10<sup>3</sup>-9.0x10<sup>3</sup> CFU/g) in respect of the standard safe value (10<sup>5</sup>-10<sup>6</sup> CFU/g) and no growth of faecal indicator bacteria indicate antimicrobial ability and safety of the products. A ready-to-use *combo* pack will ease process handling and improve the utilisation and sustainability of the spices.

## PFC2025\_039

### **Comparative Evaluation Of Antihyperlipidemic And Hepatoprotective Effects Of Fermented And Unfermented *Parkia biglobosa* Seeds-supplemented Diet In Triton X-100 Exposed Wistar Rats**

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#### **ABSTRACT**

Hyperlipidemia is a leading contributor to cardiovascular disease and liver dysfunction. Although commonly treated with statins, these drugs can cause adverse side effects, prompting interest in natural alternatives. This study evaluated the effects of diets supplemented with fermented and unfermented *Parkia biglobosa* seeds (PBSD) on hyperlipidemia and liver health in rats exposed to Triton X-100. Ninety-six male Wistar rats were divided into 12 groups, including a control group, a negative control (NC), and groups fed diets containing varying percentages (10–50%) of fermented or unfermented PBSD for 21 days. Triton X-100 was then administered to all groups except the control. Nutritional and phytochemical compositions of the seeds were assessed alongside serum lipid profile, liver enzymes, antioxidant markers, and liver morphology. Fermented seeds had higher lipid and protein content, while unfermented seeds had more ash and antinutrients. Both seeds contain Quercetin, Kaempferol, rutin and chlorogenic acid prominently amongst others, though in higher concentrations in fermented seeds. Diets with 40% PBSD significantly reduced LDL-C and increased HDL-C, with unfermented seeds showing slightly better lipid-lowering effects. Serum aspartate amino transferase and alkaline phosphatase activities were reduced significantly in PBSD-fed groups, particularly 40% PBSD. Activities of superoxide dismutase and catalase, concentrations of reduced glutathione and malondialdehyde reduced significantly compared to NC. Liver morphology assessment revealed reversed tissue damage for PBSD-fed groups. The study concludes both forms of *P. biglobosa* seeds are effective in mitigating hyperlipidemia and liver dysfunction, recommending further research to reduce antinutrient content in unfermented seeds.

**PFC2025\_040****Antioxidant Potential of Ethanolic Extract of *Hibiscus Sabdariffa* and *Syzygium aromaticum* in Healthy Wistar Rats**

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**ABSTRACT**

*Hibiscus sabdariffa* and *Syzygium aromaticum* are medicinal plants with wide use in traditional medicine and tea; however, the increasing use for traditional medicine applications raises safety concerns. Thus, this study investigated the antioxidant potential of ethanolic extract of *Hibiscus sabdariffa* and *Syzygium aromaticum* in healthy Wistar rats. Healthy thirty-six Wistar rats were assigned into six equal groups of six rats each. Group I (sham control) received distilled water only; Group II received 200 mg/kg, Group III received 400 mg/kg of *H. sabdariffa*, Group IV-V received 200 mg/kg, 400 mg/kg of *S. aromaticum* respectively, while Group VI received 400mg/kg of the combined extracts orally for 28 days. This study determined the superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione reductase (GR), glutathione S-transferase (GST), reduced glutathione (GSH) and malondialdehyde potential in the liver and kidney of healthy Wistar rats. Treatment led to a dose-dependent enhancement of antioxidant enzyme activities, including SOD, catalase CAT, GPx, GR, GST, and GSH in both organs, compared to the control group. The group receiving the combined extract exhibited the highest increase in antioxidant enzymes, implying a synergistic antioxidant effect. Additionally, all treatment groups demonstrated a marked reduction in malondialdehyde levels. Hence, the results suggest the potential of ethanolic extracts of *H. sabdariffa* and *S. aromaticum*, especially in combination, to strengthen endogenous antioxidant defenses to support the baseline redox balance defense in healthy system.

**PFC2025\_041****Antinutritional and Nutritional Composition of Parboiled *Parkia bigloba* Seed Coat**

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**ABSTRACT**

This study sought to investigate the nutritional and antinutritional composition of parboiled of *Parkia biglobosa* seed coat. The results show that the parboiling removes some antinutritional factors such as phytate, oxalate, and tannin, while enhancing the bioavailability of nutrients like crude fiber, crude protein, ash, carbohydrate and minerals, making it a potential nutritional resource. These finding suggest that the seed coat can be beneficial and can be utilized as a valuable feed supplement or as food supplement.

Keywords: *Parkia biglobosa*, Parboiling, nutritional composition, anti-nutritional factors, seed coat.

PFC2025\_042

**Awareness and Consumption Patterns of Soursop (*Annona muricata*) and Sweetsop (*Annona squamosa*) Among Staff and Student of University of Ibadan**

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**ABSTRACT**

Soursop and sweetsop are regarded as functional foods due to their phyto-medicinal properties. However, many people remain unaware of these fruits and their dietary significance. The study assessed the nutritional knowledge, awareness, and consumption patterns of soursop and sweetsop among staff and students at the University of Ibadan. Nine faculties at the University of Ibadan were randomly selected, and 205 respondents, including both staff and students, were chosen using a convenience sampling technique. A well-structured questionnaire was utilized to gather information on demographic characteristics, nutritional knowledge, consumption patterns of soursop and sweetsop, perceptions and attitudes, as well as general feedback. Data collected were subjected to descriptive (mean, frequency and standard deviation) and inferential (Multiple regression) statistical analysis. Nutritional knowledge and medicinal properties model performance showed high R<sup>2</sup> value of 0.638, explaining 64% of the variation in knowledge. It predicted beliefs in sweetsop's health benefits ( $\beta = 0.655$ ,  $p < 0.001$ ), and sources of nutritional benefits information ( $\beta = 0.104$ ,  $p = 0.028$ ). Soursop and sweetsop consumption patterns among staff and students result show strong correlation ( $R = 0.781$ ), with 61% of the variation in consumption habits perceptions and significant model ( $F = 38.278$ ,  $p < 0.001$ ). The University of Ibadan community's perception of soursop and sweetsop is influenced by knowledge and consumption patterns, with positive beliefs and trusted sources enhancing perceptions, but complexities exist. The study recommends improving nutrition education, promoting healthier fruit consumption, and enhancing access to quality fruits while emphasizing reliable information channels for better health outcomes.

PFC2025\_043

**Antioxidative and Antianaemic Potentials of Aqueous Leaf Extract of Lowveld Bead String (*Alchornea laxiflora*) In Phenylhydrazine-induced Anaemic Albino Rats and Its Phytochemical Constituents**

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**ABSTRACT**

Anaemia, a public health concern, is characterized by a decrease in red blood cell count, hemoglobin, and packed cell volume. Phenylhydrazine, a toxic chemical, is commonly used to induce anaemia in experimental models. This study investigated the antioxidative and antianaemic effects of aqueous leaf extract of *Alchornea laxiflora* in phenylhydrazine-induced anaemic albino rats. Qualitative phytochemical screening and HPLC analysis of the extract were carried out. Thirty female albino rats weighing between 166-169 g were randomly divided into six (6) groups of five animals each. Groups 1 and 2 served as negative and positive control respectively and treated with 1 mL of distilled water only. Groups 2 to 6 were induced with anaemia by intraperitoneal injection of 36  $\mu\text{L}/\text{Kg}$  body weight of phenylhydrazine (PHZ).

Groups 3 to 5 were treated with 500, 1000 and 1500 mg/Kg body weight of aqueous leaf extract of *A. laxiflora* respectively while group 6 was treated with 2 mg/Kg body weight of folic acid. The experiment lasted for 14 days after which the rats were sacrificed and their blood collected for hematological parameters. Antioxidative effects of the extract was also investigated. The results showed that the aqueous leaf extract of *Alchornea laxiflora* is rich in phytochemicals. The extract demonstrated antioxidative properties, as evidenced in its reductive effects on oxidative stress. It also revealed antianaemic effect where it significantly improved hematological parameters such as packed cell volume (PCV), haemoglobin (HB), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular volume (MCV), and red blood cell (RBC). Therefore, this study confirmed the presence of various phytochemicals in the aqueous leaf extract of *Alchornea laxiflora*. The extract demonstrated antioxidative and antianaemic properties. The extract's protective effects against anaemia are likely attributed to its phytochemical constituents.

#### PFC2025\_044

##### ***In vitro* assessment of antioxidant and enzyme-regulatory activities of *Gladiolus psittacinus* bulb extract in diabetic neuropathy**

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#### ABSTRACT

*Gladiolus psittacinus* commonly known as Maid of the Mist is a bulbous plant widely used in traditional medicine for managing oxidative stress and metabolic disorders such as diabetes and mental disorder. This study evaluated the antioxidant and enzyme-modulatory potential of its aqueous bulb extract through *in vitro* analyses. Phytochemical assays revealed high total phenolic ( $50.33 \pm 0.02$  mg GAE/g) and flavonoid ( $43.22 \pm 0.03$  mg QE/g) contents. The extract exhibited strong, concentration-dependent free radical scavenging activity in DPPH\*, ABTS\*, OH\*, and FRAP assays. Enzyme assays further showed significant inhibitory effects on  $\alpha$ -amylase,  $\alpha$ -glucosidase, AChE and enhancing  $\text{Na}^+/\text{K}^+$  ATPase activity biomarker linked to diabetic neuropathy. HPLC-DAD profiling confirmed the presence of key bioactive compounds, including quercetin, kaempferol, nicotiflorin, and  $\beta$ -sitosterol. These findings support the potential use of *G. psittacinus* bulb extract as a natural therapeutic agent for oxidative stress and neuropathic complications associated with diabetes.

#### PFC2025\_045

##### **Government Policies And Consumption Of Healthy And Functional Foods In Nigeria.**

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#### ABSTRACT

This study explores the critical role of government policies and initiatives in promoting the consumption of healthy and functional foods, a key strategy for combating the global rise in diet-related non-communicable diseases. Governments worldwide employ a multifaceted approach—including fiscal incentives, food labelling regulations, reformulation mandates, public procurement standards, and nutrition education—to

shape healthier food environments and influence consumer dietary choices. This research adopts a descriptive and analytical policy research design, utilizing qualitative methodology through systematic literature reviews and policy document analysis. Data will be drawn from both primary and secondary sources, with descriptive and inferential statistics employed where applicable. Focusing on Nigeria, the study examines the contributions of regulatory agencies such as NAFDAC and SON, highlighting how national strategies, regulatory frameworks, and public health campaigns collectively support the growth of the functional food sector. Findings are expected to underscore the indispensable role of evidence-informed, coherent government interventions in steering populations toward improved nutrition and public health outcomes.

**PFC2025\_046**

**Kola Nut Trade in Nigeria (2014–2024): Trends, Challenges, and Future Prospects**  
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**ABSTRACT**

Kola nut (*Cola nitida* and *Cola acuminata*) is a perennial tropical tree crop of great cultural and economic significance in West Africa, particularly in Nigeria. Mainly grown in southern and western states such as Oyo, Ogun, Osun, and Ekiti, kola nut farming benefits many smallholder farmers, local traders, and regional merchants. It is integral to traditional ceremonies, social events, and spiritual practices among various ethnic groups. Between 2014 and 2024, the kola nut trade in Nigeria has experienced significant changes, driven by market forces and growing consumer awareness of health and wellness. Recent scientific interest in the antioxidant, antimicrobial, and neuroprotective properties of kola nut has positioned it as a promising functional food ingredient. However, commercialization remains limited due to structural challenges such as declining yields from aging trees, lack of improved planting materials, minimal mechanization, and exposure to climate variability. Market analysis reveals inconsistent pricing trends driven by seasonal supply fluctuations, inadequate storage infrastructure, and limited value addition. The trade remains largely informal, characterized by disorganized supply chains and minimal integration into Nigeria's formal export system. Despite these constraints, the global rise in demand for functional foods and nutraceuticals presents a strategic opportunity to reposition the kola nut as a value-added commodity. Although traditional uses remain predominant in domestic consumption, emerging innovations in kola-based beverages, extracts, and supplements indicate promising new avenues for commercial development. This paper contends that harnessing the full potential of the kola nut trade requires targeted policy interventions, investment in agro-processing, strengthened research-to-market linkages, and robust market institutions. Addressing these critical gaps could facilitate the transformation of kola nut from a culturally symbolic crop into a commercially viable contributor to Nigeria's non-oil export diversification and rural development goals.

PFC2025\_047

**Nutritional quality of different accessions of Roselle calyces (*Hibiscus sabdariffa* L.)****<sup>1</sup>\*Omenna, E. C., <sup>2</sup>Oduntan, A. O., <sup>1</sup>Olanipekun, O. T., <sup>1</sup>Ashaye, O.A and <sup>1</sup>Adetumbi, J.A.**<sup>1</sup>Institute of Agricultural Research and Training, Obafemi Awolowo University  
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Ibadan, Oyo State. Nigeria\* Corresponding Author; [emmanuelomenna@gmail.com](mailto:emmanuelomenna@gmail.com); [+2348039334092](tel:+2348039334092)**ABSTRACT**

The importance of Roselle in food, wines and beverage industries cannot be underestimated. Freshly harvested calyces of Roselle are used to produce pro-health drinks. Fresh and dried Roselle calyces is used to produce different food-products due to its nutritional potentials. However, there is limited information about the Roselle accessions/varieties and their nutritive compositions. A study was conducted to determine the mineral and antioxidant properties of thirteen accessions of Roselle calyces. Macro- and micro-nutrient analyses as well as antioxidant analysis were carried out following the standard protocols. Roselle calyces were also developed into tea product and each product was tagged and evaluated differently. Sensory study was conducted using 21-panels according to 9-Point- Hedonic Scale (1-dislike extremely, 9-like extremely). The results of macro-nutrients showed that R<sub>1</sub>V<sub>10</sub> (2.18%) variety contained significantly higher amount of potassium followed by R<sub>1</sub>R<sub>5</sub> (2.07%) variety and then R<sub>1</sub>V<sub>1</sub> (2.00%) variety. Similarly, R<sub>1</sub>V<sub>1</sub> variety had the highest amount of phosphorus followed by R<sub>1</sub>V<sub>12</sub> and then R<sub>1</sub>V<sub>11</sub> variety. Micro-nutrient evaluations revealed that iron content was significantly higher in R<sub>1</sub>V<sub>12</sub> (600mg/kg) variety followed by R<sub>1</sub>R<sub>5</sub> (515mg/kg) and then R<sub>1</sub>V<sub>6</sub> (482mg/kg) variety. While manganese was significantly higher in R<sub>1</sub>V<sub>7</sub> (569mg/kg) variety followed by R<sub>1</sub>V<sub>11</sub> (412mg/kg) and R<sub>1</sub>V<sub>8</sub> (400mg/kg) varieties. In addition, ash and moisture contents were significantly higher in R<sub>1</sub>V<sub>4</sub> (11.00%) and R<sub>1</sub>V<sub>5</sub> (10.38%) respectively. On the other hand, some Roselle products were significantly higher in flavonoid and anthocyanin contents than Control in the order: R<sub>1</sub>P<sub>4</sub> > R<sub>1</sub>P<sub>8</sub> > R<sub>2</sub>P<sub>5</sub> > R<sub>1</sub>P<sub>10</sub> > Control. Similarly, only one Roselle product (R<sub>1</sub>P<sub>4</sub>) was significantly higher in total antioxidant content than Control. The same trend of value was obtained in titratable acidity whereby only Roselle tea R<sub>1</sub>P<sub>3</sub> (2.01mg/100ml) was significantly higher (P > 0.05) than the Control sample (1.66mg/100ml). All Roselle tea products were significantly lower than Control in terms of total phenolic compounds and reducing power. Sensory study revealed that product Roselle tea- R<sub>1</sub>P<sub>3</sub> was mostly preferred and had overall acceptability followed by Control. Conclusively, most accessions of the Roselle calyces were rich in minerals and antioxidants and their products were acceptable to consumers.

PFC2025\_048

**Nutritional and Medicinal Values of Black Plum, *Vitex doniana* Sweet  
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Corresponding Author: [lizkunle3js@gmail.com](mailto:lizkunle3js@gmail.com)**ABSTRACT**

*Vitex doniana* Sweet, commonly known as Black Plum or African Olive, is a tree crop belonging to the Lamiaceae family in the genus *Vitex*. It is grown in the savannahs and lowland forests of tropical and sub-tropical Africa. It is one of the underutilized trees of great economic importance in various parts of Africa, particularly in Nigeria. Nutritionally, it is used as source of raw materials for production of beverages and vegetable foods. In traditional medicine, it is used for therapeutic management of various disease conditions like malaria, diabetes, rheumatism e.t.c. The present review provides a systematic analysis and summary of existing literature on the traditional uses, nutrient profiles, bioactivities, phytochemical composition, and antinutritional constituents of *V. doniana*. This was achieved using scientific databases and relevant

keywords to identify articles from studies conducted over the last three decades. *V. doniana* leaves and fruit pulps has rich nutritional values in relation to proximate compositions and is rich in vitamin C but contain at moderate levels, vitamins A, B, D, E and K. Literature review showed that it contains secondary metabolites responsible for its medicinal values in the management of disease conditions like diabetes, malaria, oxidative stress e.t.c with less toxicity. Hence, the maximum utilization of the various parts of this plant, especially the fruits, will enhance better livelihoods for humans through its value-added products, such as juice and jam production for commercial purposes, and its incorporation into pharmaceutical products will aid in the control and eradication of various health issues.

#### **PFC2025\_049**

##### **Bioactive Compounds in Cocoa, Cashew, Coffee, Kola and Tea**

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##### **ABSTRACT**

Cocoa, Coffee, Cashew, Kola and Tea are plant crops known to contain large amounts of secondary metabolites which are rich sources of bioactive compounds. These bioactive compounds are phytochemical constituents of great interest. They include among others, alkaloids, flavonoids, terpenoids, phenolics and essential oils with diverse therapeutic and pharmacological activities. This review highlights the diverse arrays of bioactive compounds present in cocoa, cashew, coffee, kolanut, and tea. These plants are rich in polyphenols, alkaloids, and other phytochemicals that contribute to their potential health benefits. The bioactive compounds in these plants have been shown to possess antioxidant, anti-inflammatory, and antimicrobial properties, which may help prevent or manage various diseases. Understanding the bioactive composition and potential health benefits of these plants can inform their use in food, pharmaceuticals, and cosmetic applications. This study which aims to provide a comprehensive overview of the bioactive compounds present in these plant crops and their potential applications shows that cocoa, coffee, cashew, kola and tea are well endowed with caffeine. Among others, they also contain flavonoids, chlorogenic acids, tocopherols, theophylline and gallic acids respectively. Most of these bioactive properties are responsible for their health benefits to man and animals.

#### **PFC2025\_050**

##### **Application of Functional oil from *Garcinia kola* serves as potent inhibitor of dementia of the cerebral cortex and attention deficit hyperactivity disease via NF- $\kappa$ B/TNF- $\alpha$ pathway on exposure to 7, 12-dimethylbenz (a) athracene in rat model**

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##### **ABSTRACT**

The development of neurodegenerative diseases such as dementia and attention deficit hyperactivity underscore urgent and innovative treatment. This study investigated the effect of *Garcinia kola* oil (GKO) against dementia of the cerebral cortex and attention deficit hyperactivity disease (ADHD) in a rat model. Fifty female-Wistar-rats were randomly grouped into five (n=10). Group I (control) received olive oil.

Group II was exposed to 50 mg/kg 7, 12-dimethylbenz (a) athracene (DMBA) only. Group III was exposed to 50 mg/kg DMBA and treated with 20 mg/kg doxorubicin (DOXO). Group IV was administered with 50 mg/kg DMBA and treated with 200 mg/kg GKO. Group V was treated with 200 mg/kg GKO only. The route of exposure used in this study was intravenous. The 50 mg/kg DMBA was administered twice at interval of each month and the exposure lasted for 3 months, while 20 mg/kg DOXO was administered repeatedly for 2 weeks. Metabolizing neurotransmitter enzymes including acetylcholinesterase (AChE), butyrylcholinesterase (BuChE), monoamine oxidase-A and B (MAO-A and MAO-B) were analyzed using spectrophotometer. Neurotransmitters (Glutamate, Gamma amino butyric acid (GABA) and Dopamine) were analyzed using developmental paper chromatography. Nuclear factor kappa- B (NF-kB), tumor necrotic factor- alpha (TNF- $\alpha$ ) and GABA-receptor-1 were determined using RT-qPCR analyzer. Symptoms of ADHD (Locomotion, depression, anxiety, coordination and memory) were also determined using Elevated plus maze, Y maze, Wire hanger, Rearing and T-Maze tests. Exposure to DMBA elicited brain tumor associated with dementia characterized by alterations of GABAergic, glutamatergic and dopaminergic neurotransmission. Neurotransmitter enzymes, malonaldehyde (MDA) and attention deficit were hyper-regulated, followed by reduced locomotion. Dementia and ADHD were remarkably inhibited by GKO with increased bioavailability of brain nitric oxide (NO) level. The hallmark gene of neuroinflammation was depleted with increased levels of TNF- $\alpha$  and GABAR-1. Furthermore, treatment with GKO remarkably reduced anxiety and depression whereas; coordination and memory were improved. Cellular degeneration of cerebral cortex and hypothalamus were significantly ( $p < 0.05$ ) abridged. This study suggests that GKO serves as a potent inhibitor of dementia of the cerebral cortex and ADHD associated with brain tumors.

## PFC2025\_051

### **Exposure to Chemicals and Adoption Levels of Safety Practices in Relation to Neurological Symptoms Among Workers of Plastic Industries in Anambra State, Nigeria**

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#### **ABSTRACT**

This study assessed the awareness of exposure to chemicals and levels of adoption of safety practices among workers of plastic industries. A cross-sectional study was conducted using a 3-stage random sampling technique to select Local government (6), plastic industries (6) and 425 participants in the study. Interviews were conducted using a validated semi-structured interviewer-administered questionnaires. Data were analyzed using descriptive statistics and chi-square level of significance was set at  $p < 0.05$ . Respondents mean age was  $31.3 \pm 7.04$  years, 72.2% were males while 83.1% had secondary education. Majority, 72.9% of the workers were not aware of the constituent of chemicals they work with, 22.8% have attended training on chemical hazards while 35.1% were exposed to chemical constituents from plastics. Headache/migraine was the most frequently reported ill health (32.5%) and 71.1% had low level of awareness about chemical hazards in the plastic industry. Workers' age, gender, educational status and work experience were significantly associated with the awareness level of chemical hazards associated with plastic industries. Majority, (63.3%) of the workers were provided with the personal protective equipment (PPE) for their use, only 10% of the workers utilized PPE regularly. Severally, 39.5% of the workers demonstrated poor safety practices and a significant association existed between level of awareness of workers on the chemical hazards and their safety practices. Most of the Workers in plastic industries had low level of awareness on chemical hazards and several of them had poor safety practices in the workplace. Periodic training of

workers on safety practices and chemical constituents as well as pre and post medical examination on plastic workers is essential for safety from occupational disease.

#### PFC2025\_052

***Mantis religiosa* egg-cake salvages ocular-vasoconstriction injury by inhibiting aldose-reductase-mediated cataractogenesis and TNF- $\alpha$ /NF- $\kappa$ B dependent inflammation caused by mixture of flavoring enhancers in an *in-vivo* model**

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#### ABSTRACT

We investigated the effect of protein-rich cake using praying mantis egg on ocular vasoconstriction injury. A-90-Wstar-male-rats were arbitrarily distributed into nine (n=10) groups. Group I was given distilled water. Group II and III were exposed to 80 mg/kg NaCl and 75 mg/kg MSG, respectively. Group IV and V were administered 80 mg/kg NaCl +75 mg/kg MSG and 80 mg/kg NaCl + 3 mg/kg Amylopidin, respectively. Group VI and VII were treated 80 mg/kg NaCl +10% P MEC and 75 mg/kg MSG +10% P MEC, respectively. Group VIII and IX were treated 80 mg/kg NaCl + 75 mg/kg MSG + 10% P MEC and 10% P MEC only for 28 days. Metabolic and molecular markers connected to oculoopathy were measured by spectrophotometer and RT-PCR analyzer, respectively. Exposure to mixture of NaCl and MSG caused ocular vasoconstriction injury by increasing the activities of aldose-reductase, arginase, PDE-5<sup>1</sup> and enzymes of ATP hydrolysis with consistent up-regulation of cholinergic, dopaminergic and adenosinergic enzymes followed by vascular congestion, hemorrhagic lesion and fibrosis of the photoreceptor layer. The ocular dysfunction was correlated to NO loss and abundant of inflammatory-mediators. The eye dysfunctions were corrected by dietary protein-rich-cake (%P MEC) by a factor of 4. Altogether, the bioactive agents of 10% P MEC have therapeutic potential by attenuating metabolic and molecular markers associated with cataractogenesis on exposure to mixture of flavoring agents in an *in-vivo* model.

#### PFC2025\_053

**Functional Bread Formulated with Tiger Nut and Moringa Modulates Blood Pressure, Weight Gain, BMI, and Sexual Behavior in Hypertensive Rats**

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#### ABSTRACT

This study assessed the physiological effects of functional breads enriched with tiger nut flour (TNF) and moringa leaf powder (Mo) on cardiovascular, metabolic, and reproductive indices in Wistar rats. Hypertension was induced through a high-fat diet (HFD) and L-NAME, an inhibitor of nitric oxide synthase. The experimental groups received breads prepared with different levels of all-purpose flour (APF) substituted by TNF and Mo, while controls included a basal diet, HFD+L-NAME, lisinopril, and commercial white bread. Rats fed with HFD+L-NAME showed significantly elevated systolic and diastolic

blood pressure, excessive percentage weight gain (27%), and higher body mass index (BMI) (0.9 g/cm<sup>2</sup>), along with impaired sexual behavior characterized by reduced mount and intromission numbers and prolonged latencies. In contrast, the consumption of TNF- and Mo-enriched breads, especially at 50% substitution levels and in combined formulations (APF+TNF+Mo), significantly lowered blood pressure and reduced weight gain, leading to improved BMI values of 0.75 g/cm<sup>2</sup>. Additionally, enriched breads improved sexual performance, demonstrated by increased mount and intromission numbers and decreased latencies (50 secs), indicating an alleviation of erectile dysfunction-like symptoms. Overall, functional breads formulated with TNF and Mo exhibited cardio-protective, metabolic, and reproductive health benefits, suggesting they are promising dietary interventions for managing diet-induced hypertension and related complications.

**PFC2025\_054**

**Lipid Profile and Haematology Status of  $\alpha$ -Carrageenan Induced Rats Treated with Functional *Ogiri* Produced from Mutated *Bacillus subtilis* Fermented with *Citrullus vulgaris* seed  
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**ABSTRACT**

Inflammation is a fundamental physiological response for host defense and tissue repair implicated in various metabolic diseases. Non-steroidal anti-inflammatory drugs (NSAIDs) such as indomethacin are effective in managing inflammation but limited by adverse effects including gastrointestinal ulceration, renal impairment, etc. These limitations underscore the pressing need for safer alternatives that can both mitigate inflammation and maintain a healthy haematology and lipid profile. The fermentation of *C. vulgaris* seeds using mutant *Bacillus subtilis* to produce functional *ogiri* has been reported to enhance the bioavailability and potency of bioactive compounds such as phytochemicals. This study aimed to evaluate the anti-inflammatory, lipid-modulating and haematology effects of  $\alpha$ -carrageenan induced inflamed Wistar rat treated with functional *ogiri*. Inflamed male Wistar rats were induced with  $\alpha$ -carrageenan and treated orally for 14 days. The rats were divided into five groups of treatment: Group 1 (normal/ negative control), Group 2 (carrageenan-induced, untreated positive control), Group 3 (indomethacin), Group 4 (MCS25) and Group 5 (MCS35) were two different mutated *Bacillus subtilis* strains fermented with *C. vulgaris* to produce functional *ogiri* samples. Pro-inflammatory cytokines (TNF- $\alpha$ , IL-1, IL-6), lipid profile (LDL, HDL, VLDL, CRT and total triglycerides) and Haematology were investigated. Sample MCS35 exhibited highest anti-inflammatory effects, with cytokine levels and favorable lipid-modulating effects. Functional *ogiri* samples showed similar restoration of blood damaged during inflammation. MCS35 exhibited anti-inflammatory, cardioprotective effects and restoration of blood damaged during inflammation, potential of mutagenesis-enhanced plant-based therapy.

PFC2025\_055

**Sensory Evaluation and Ameliorative Property of Clove (*Syzygium aromaticum*) Bud-fortified Cookies on Scopolamine-induced Neuronal Dysfunction in Male Wistar Rats**

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**ABSTRACT**

Neuronal dysfunction among populace has been reported to be on increase in the recent time, and people's perception towards use of drug or herb has become of great concern despite their poor state of health. This study aimed at fortifying commonly consumed snack with medicinal spices as delivery vehicle for therapeutic purpose. *Syzygium aromaticum* bud-fortified cookies (SABFC) was produced and the sensory evaluation was conducted, thereafter, forty-eight (48) male Wistar rats (170 g – 215 g) were divided in to six groups and were induced except group 1 which served as control, group 2 was not treated, group 3 was treated with Donepezil (5 mg/kg), a standard drug, group 4 was fed with unfortified cookies, while groups 5 and 6 were fed with 0.5 % and 1 % SABFC respectively. The experiment lasted for 21 days followed by the administration of scopolamine (SCOP) 3 mg/kg via intra-peritoneal. The rats were sacrificed, the brain was excised, and homogenized in cold 0.1 M phosphate buffer pH 7.4, thereafter, the cholinergic enzymes [Acetylcholinesterase (AChE) and Butyrylcholinesterase (BChE)] and antioxidant enzymes [superoxide dismutase (SOD) and catalase (CAT)] activities were determined, as well as the oxidative stress marker [Thio-barbituric acid reacting species (TBARS)]. The result revealed a significant increase ( $p > 0.05$ ) in AChE, BChE activity and TBARS level of untreated group with reduced SOD and CAT activity when compared with the control. However, there was a significant ( $p < 0.05$ ) decrease in cholinergic enzymes activity and TBARS level, with increased antioxidant enzyme activity in Donepezil treated as well as 0.5 % and 1 % SABFC treated groups which revealed neuron repair properties of the fortified cookies. The study demonstrated neuroprotective properties of *Syzygium aromaticum* bud-fortified cookies in treatment of neuronal dysfunction which could be a good approach for treatment of the disease.

PFC2025\_056

**Carbohydrate Quality and Glycemic Modulation of Functional Crackers: Implications for Hypertension, Erectile Function, and Metabolic Health**

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**ABSTRACT**

The glycemic index (GI) of foods plays a pivotal role in vascular and reproductive health by influencing oxidative stress and nitric oxide (NO) dynamics. This study investigated the carbohydrate quality of composite crackers formulated with sorghum, tiger nut, and unripe plantain and its relationship with physiological outcomes in HFD + L-NAME-treated Wistar rats. Conventional crackers (commercial and 100% APF) displayed low amylose (20–22%), high amylopectin (~78–79%), and elevated GI (78–85), resulting in hyperglycemia, oxidative stress, and NO depletion. In contrast, composite crackers showed higher amylose (26–29%), improved amylose:amylopectin ratios (0.36–0.41), reduced starch digestibility, and lower GI values (38–53). These structural carbohydrate differences translated into attenuated

postprandial glycemia, reduced ROS generation, and enhanced NO bioavailability. Rats consuming low-GI composite crackers exhibited reduced systolic and diastolic pressures, improved lipid profiles, and enhanced sexual behaviour relative to controls. The 50TN + 25UPF + 25Sg blend demonstrated superior effects, balancing resistant starch, fiber, and phytochemicals. Mechanistically, reduced glycemic load prevented glucose-induced ROS overproduction, preserving antioxidant enzyme efficiency (SOD, GPx, catalase) and maintaining endothelial NO. These findings highlight the importance of starch structure and glycemic modulation in functional food design, showing that carbohydrate reformulation of crackers offers a sustainable strategy for controlling hypertension, preserving erectile function, and improving metabolic health.

#### **PFC2025\_057**

### **Antimicrobial and Preservative Potential of Natural Honey Against *Escherichia coli* Isolated from Spoiled Foods**

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#### **ABSTRACT**

The rising resistance of pathogens to antibiotics and the health concerns surrounding synthetic food preservatives have prompted interest in natural alternatives. This study evaluated the antimicrobial and food preservation properties of honey against *Escherichia coli* isolated from spoiled meat and tomato samples. Microbial cultures were obtained using standard media, and isolates were identified through biochemical tests. Antibacterial activity was assessed using the agar well diffusion method across honey concentrations (100%, 75%, 50%, 25%). Results showed that 100% honey exhibited the highest zone of inhibition (27.5 mm), particularly when combined with ampicillin and amoxicillin. Although standard antibiotics like cotrimoxazole and metronidazole produced slightly higher inhibition zones (up to 33.5 mm), honey still demonstrated a significant inhibitory effect. In food preservation tests, fresh apple and meat samples treated with 100% honey resisted spoilage for up to five days, compared to untreated controls which spoiled within two days. This suggests that honey can effectively delay microbial decay and preserve food quality. These findings highlight honey's potential as a safe, natural preservative and antimicrobial agent, especially in low-resource environments. Its integration into food safety strategies could reduce reliance on synthetic preservatives and contribute to public health.

#### **PFC2025\_058**

### **Effect of Composite Crackers on Antioxidant Status and Enzymes Linked to Vascular Health**

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#### **ABSTRACT**

Oxidative stress is a major driver of endothelial dysfunction, hypertension, and erectile impairment. This study evaluated antioxidant status and enzyme modulation in Wistar rats fed composite crackers made from sorghum, tiger nut, and unripe plantain under high-fat diet (HFD) plus L-NAME challenge. Rats consuming commercial crackers exhibited elevated malondialdehyde (MDA), reactive oxygen species (ROS), and heightened activities of angiotensin-converting enzyme (ACE), phosphodiesterase-5 (PDE-5), and arginase, alongside suppressed antioxidant defenses including superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx), and glutathione (GSH). In contrast, composite crackers enhanced antioxidant enzyme activities, lowered lipid peroxidation and ROS, and downregulated ACE, PDE-5, and arginase. The

triple blend (50% tiger nut, 25% unripe plantain, 25% sorghum) produced the most pronounced benefits, consistent with its rich phytochemical profile. By reducing ROS and strengthening endogenous antioxidant defenses, the formulations improved antioxidant status. These findings highlight composite crackers as functional snacks capable of targeting oxidative and enzymatic pathways to support vascular and reproductive health.

**PFC2025\_059**

**Functional Composite Crackers Attenuate Hypertension and Improve Sexual Behaviour via Nitric Oxide Preservation in Rats**

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**ABSTRACT**

Hypertension and erectile dysfunction are mechanistically linked through endothelial impairment and disrupted nitric oxide (NO) signaling. This study evaluated the effects of composite crackers made with sorghum, tiger nut, and unripe plantain on blood pressure, sexual behavior, and NO bioavailability in Wistar rats exposed to high-fat diet (HFD) and L-NAME-induced vascular stress. Rats consuming commercial or 100% all-purpose flour (APF) crackers showed elevated systolic and diastolic pressures, longer mount and intromission latencies, and reduced NO levels compared with basal controls. Conversely, composite crackers enriched with tiger nut and unripe plantain—significantly lowered blood pressure, improved erectile parameters, enhanced NO production, and reduced oxidative stress. The triple composite formulation (50% tiger nut, 25% unripe plantain, 25% sorghum) produced the most pronounced effects, attributable to its rich phenolic, flavonoid, and vitamin C content. Mechanistic insights suggest that antioxidant phytochemicals protected NO from oxidative degradation, while tiger nut-derived arginine supported endogenous NO synthesis, collectively sustaining vasodilation and erectile function. These results highlight the therapeutic potential of functional crackers in mitigating hypertension-related reproductive dysfunctions by preserving NO signaling. Composite flours therefore represent a practical strategy for reformulating snacks into functional foods that support vascular and sexual health while reducing degenerative disease risks.

**PFC2025\_060**

**Comparative analysis of phytochemical constituents and spermicidal efficacy of lime (*Citrus aurantiifolia*) through *in vitro* sperm studies**

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**ABSTRACT**

Lime (*Citrus aurantiifolia*) is widely consumed and recognized for its potential health benefits. Previous studies have indicated that lime may possess spermicidal properties, which could influence male reproductive health. This study aims to investigate the phytochemical composition and spermicidal efficacy of lime juice through *in vitro* sperm analysis, with a focus on its impact on sperm concentration, motility, morphology, and overall sperm quality. Lime juice extract was analyzed for phytochemical constituents such as phenols, flavonoids, saponins, and terpenoids, while alkaloids, tannins, and steroids were not detected. The pH of lime juice was measured over time, and its effects on sperm parameters (concentration, motility, morphology, and progressive movement) were evaluated. Phytochemical screening revealed high

levels of phenols, with moderate amounts of flavonoids, saponins, and terpenoids. The pH of the lime juice ranged from 2.85 to 2.96. Lime juice significantly reduced sperm concentration ( $127.5 \times 10^6/\text{mL}$  compared to  $249 \times 10^6/\text{mL}$  in the control), motile count ( $63 \times 10^6/\text{mL}$  compared to  $182 \times 10^6/\text{mL}$  in the control), and percentage motility (38% compared to 72% in the control), while increasing the incidence of head, neck, and tail defects in sperm cells. Lime juice exhibited notable spermicidal properties, leading to a marked decrease in sperm quality and a significant rise in sperm abnormalities, particularly affecting concentration, motility, and morphology. The study demonstrates that lime juice has a pronounced negative impact on sperm functionality, highlighting its potential as a natural spermicidal agent. These findings raise concerns about the implications of lime consumption on male reproductive health.

## PFC2025\_061

### Drying temperature affect the antihypertensive potential of *Hibiscus sabdariffa* in rats induced with the L-NAME.

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#### ABSTRACT

The antihypertensive potential of *Hibiscus sabdariffa* calyx dried, at various temperature was investigated. Calyx was dried at ( $-58^\circ\text{C}$ ,  $30^\circ\text{C}$ ,  $40^\circ\text{C}$ , and  $50^\circ\text{C}$ ), and subsequently extracted with water (1:4 % w/v). Hypertension was induced in rat via intra-gastric administration of N-nitro L-arginine methyl-ester (L-NAME), at a dose of 40 mg/kg body weight dose of N-nitro L-arginine methyl-ester (L-NAME), *H. sabdariffa* extract were then orally administered to the rat at dosage of (250, 500, and 1000 mg/kg). The antihypertensive effect of the extracts was evaluated using standard validated methods. L-NAME induction significantly ( $p < 0.05$ ) increased total cholesterol, triglyceride, and low-density lipoprotein (LDL) levels, while significantly decreasing high-density lipoprotein (HDL). Furthermore L-NAME significantly ( $p < 0.05$ ) increased lipid peroxidation LPO/malondialdehyde (MDA), and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) levels and significantly decreased glutathione peroxidase (GPx), and superoxide dismutase (SOD) activities. Diastolic and Systolic blood pressure were also significantly ( $p < 0.05$ ) elevated as were angiotensin converting enzyme (ACE) and arginase activities and glucose level. Consequently, nitric oxide activity were significantly decreased. Treatment with *H. sabdariffa* extract significantly ( $p < 0.05$ ) reversed these observed trends in the hypertensive rats. These findings indicate that the antihypertensive properties of the extract from the calyx of *H. sabdariffa*, which varies with the drying temperatures of the calyx, suggests its potential as a therapeutic agent for the management of hypertensive conditions.

## PFC2025\_062

### Evaluation of the *In Vivo* Antidiabetic and Antihypertensive Activities of Different Ratios of Ethanolic Extracts of *Chromolaena odorata* and *Vernonia amygdalina* Leaves

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#### ABSTRACT

Herbal medicine is widely used as part of primary health care in many developing countries due to its accessibility, low cost, and perceived effectiveness. *Chromolaena odorata* (CO) and *Vernonia amygdalina*

(VA) are indigenous to Nigeria and have long been employed in the management of diabetes mellitus and hypertension. This study evaluated the possible synergistic effects of CO and VA ethanolic leaf extracts on hypertension and diabetes. Ethanolic extracts of CO and VA were combined in different ratios (100:0, 75:25, 50:50, 25:75, 0:100) and administered at various concentrations. Ninety-one adults male Wistar rats were randomized into thirteen groups (n=7 per group) and treated for 21 consecutive days. Hypertension was induced by oral administration of N $\omega$ -nitro-L-arginine methyl ester (L-NAME, 40 mg/kg) for 14 days. Antihypertensive efficacy was assessed by monitoring systolic blood pressure (>150 mmHg considered hypertensive), biochemical parameters (lipid profile, renal and hepatic markers), oxidative stress indices (SOD, CAT, GSH), and histological analysis of the pancreas. Acute toxicity testing (LD<sub>50</sub>) was carried out with 25 rats. The extracts were safe at doses up to 5000 mg/kg, with 500 mg/kg identified as the effective non-toxic dose. At lower concentrations (0.5 mg/mL), significant (p<0.05) reductions in biochemical and oxidative stress markers were observed across treatment groups. However, activity declined at higher concentrations (2.5 mg/mL). Rats treated with CO (100%) showed the most significant reductions in urea, creatinine, bilirubin, and angiotensin-converting enzyme activity compared to VA or combination groups. This study concludes that *Chromolaena odorata* exhibits superior phytochemical, antioxidant, and antihypertensive activities compared to *Vernonia amygdalina*. The traditional practice of combining both plants may not enhance efficacy in hypertension and diabetes management. Instead, 100% CO extract is recommended for its potent antihypertensive and antioxidant properties.

### PFC2025\_063

#### Phytochemical Profile and *In Vitro* Antidiabetic and Antioxidant Potentials of Ethanolic Extracts of *Chromolaena odorata* and *Vernonia amygdalina* in Different Ratios

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#### ABSTRACT

Herbal remedies remain an integral part of primary health care in developing countries due to their affordability and accessibility. *Chromolaena odorata* (CO) and *Vernonia amygdalina* (VA), widely used in Nigeria for the management of diabetes and hypertension, were investigated for their phytochemical composition, antioxidant capacity, and *in vitro* antidiabetic activity. Ethanolic extracts of CO and VA leaves were combined in ratios of 100:0, 75:25, 50:50, 25:75, and 0:100. Antioxidant activities were assessed using nitric oxide radical scavenging, ferrous ion chelation, DPPH, and ABTS assays. Phytochemical screening was performed, while *in vitro* antidiabetic potential was evaluated by  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitory assays. Phytochemical analysis revealed that terpenoids, phlobatannins, anthraquinones, and quinones were absent in the 75:25, 50:50, and 25:75 blends. The 100% CO extract showed significantly (p<0.05) higher levels of total phenolics, flavonoids, saponins, alkaloids, and superior antioxidant activity (FRAP, DPPH, ABTS, NO scavenging) compared to 100% VA. The 75:25 CO:VA blend also exhibited enhanced antioxidant activity, with moderate phytochemical content. Notably, the 50:50 CO:VA blend demonstrated the strongest inhibition of  $\alpha$ -amylase and  $\alpha$ -glucosidase, with the lowest IC<sub>50</sub> values, suggesting superior antidiabetic potency over the individual extracts. This study demonstrates that while some CO-VA blends may enhance specific antioxidant and antidiabetic activities, *Chromolaena odorata* alone exhibits the most consistent phytochemical richness and biological activity. Thus, the traditional practice of combining CO and VA may not always confer therapeutic advantage, and the use of 100% CO extract appears more effective for diabetes management.

PFC2025\_064

**Formulation of fortified cookies with indigenous medicinal plants: an assessment of nutritional, antioxidant and antidiabetic potentials**

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**ABSTRACT**

Diabetes is rising globally and in Nigeria, with costly treatments and side effects limiting access. Functional foods from indigenous plants offer affordable, bioactive alternatives. This study developed fortified cookies with selected plants and assess their nutritional, antioxidant, and antidiabetic potential. Composite cookies were prepared separately from blends of Abere seed-wheat flour, Utazi leaf-wheat flour, and Bitter leaf-wheat flour. Cookies were formulated using these blends and analyzed for proximate composition, physical attributes, antinutrients, and phytochemical contents. *In vitro* assays were performed to evaluate carbohydrate-digesting enzyme inhibition ( $\alpha$ -amylase and  $\alpha$ -glucosidase) and antioxidant activities (DPPH, ABTS, FRAP, reducing power, total antioxidant capacity, and Fe<sup>2+</sup> chelation). Sensory evaluation was conducted to assess acceptability. Fortified cookies demonstrated significant ( $p < 0.05$ ) inhibition of  $\alpha$ -amylase and  $\alpha$ -glucosidase activities compared to control, with Bitter leaf and Abere seed composites showing the highest enzyme inhibition, likely due to their polyphenolic content. Antioxidant assays showed enhanced radical scavenging and metal chelating activities in all fortified samples, particularly in Abere seed and Utazi leaf cookies. Proximate analysis indicated improved nutritional quality with increased fiber and bioactive compounds. Sensory evaluation showed acceptable organoleptic properties in the formulated cookies. The study confirms that the cookies fortified (particularly Abere seed and Bitter leaf) possess enhanced nutritional, antioxidant, and antidiabetic properties and can offer a promising dietary strategy for diabetes management.

PFC2025\_065

**Lime Fruit Juice Exerts Spermicidal Effect Through Cellular Membrane Disruption and Hormonal Alteration**

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**ABSTRACT**

Sperm cellular integrity and hormonal balance are critical determinants of male fertility. Disruption of these factors can significantly impair sperm functionality and contribute to infertility. Various environmental, lifestyle, and dietary factors influence sperm health, with fruits often highlighted for their antioxidant and protective properties against oxidative stress. However, the bioactive compounds and acidic nature of certain fruits may have unintended effects on reproductive systems. Lime (*Citrus aurantiifolia*), a commonly consumed citrus fruit, is particularly rich in flavonoids, phenolics, and organic acids, raising questions about its potential impact on male fertility. This study investigates the effect of lime (*Citrus aurantiifolia*) fruit juice (LFJ) on sperm cellular membrane integrity and hormonal status. LFJ was extracted (100%) and serially diluted into 75%, 50% and 25% with water. Forty male rats were divided into five groups: a control group and four experimental groups administered LFJ orally at the different dilutions of the juice (25 - 100%) for 21 days. Semen and blood samples were subsequently obtained and analyzed for

sperm quality parameters (sperm concentration count, sperm motile count, sperm percentage motility, sperm total count, sperm progressive assessment and sperm morphology) as well as reproductive biomarkers; testosterone (TEST), luteinizing hormone (LH) and follicle stimulating hormone (FSH). The results demonstrated significant ( $p < 0.05$ ) reduction in sperm motility, morphology, and concentration in the rats placed on varying dilutions of LFJ, with 100% lime juice exhibiting the highest spermicidal effect. Furthermore, TEST levels decreased ( $p < 0.05$ ) significantly with increasing lime fruit juice concentration, while LH and FSH levels were significantly ( $p < 0.05$ ) increased with increasing LFJ concentration. Findings from this study suggest that consumption of LFJ in high concentrations may compromise sperm cellular integrity and hormonal balance, highlighting its potential implications for male fertility.

#### PFC2025\_066

### **Effects of Functional *Ogiri* Produced from *Citrullus vulgaris* Seeds Fermented with Mutant *Bacillus subtilis* on Antioxidant Enzymes and Toxicology in the Cardiac Tissue of $\alpha$ -Carrageenan Induced Rats**

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#### **ABSTRACT**

Cardiovascular diseases remain a leading global health burden, often driven by oxidative stress. Antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) play critical roles in protecting against cellular damage but are often suppressed during inflammation. Anti-inflammatory drugs such as indomethacin are commonly used to manage oxidative stress but are accompanied by side effects and complications. Advanced microbial fermentation especially using mutant *Bacillus subtilis* strains has been studied to potentially enhance these benefits without compromised side effects. This study aimed to assess the effects of functional *ogiri* on antioxidant enzyme activities in the cardiac tissue of carrageenan-induced rats. Inflamed male Wistar rats were induced with  $\alpha$ -carrageenan and treated orally for 14 days. The rats were divided into five groups of treatment: Group 1 (normal/ negative control), Group 2 (carrageenan-induced, untreated positive control), Group 3 (indomethacin), Group 4 (MCS25) and Group 5 (MCS35) were two different mutated *Bacillus subtilis* strains fermented with *C. vulgaris* to produce functional *ogiri* samples. Pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ , IL-6), antioxidant enzymes (SOD, CAT, GPx, GST), and liver/kidney markers (ALT, AST, ALP, albumin and uric acid) were assessed. Sample MCS35 significantly reduced oxidative stress, improved liver and kidney functions. It lowered SOD and uric acid levels and showed elevated GPx and GST, indicating enhanced antioxidant and detoxification responses. Sample MCS35 showed good amelioration, hepatoprotective, and renoprotective potential effects in managing oxidative stress related disorders.

#### PFC2025\_067

### **Modulatory effect of Ashanto pepper (*Piper guineense*) seed-fortified bread on cholinergic system and antioxidant enzymes activity in Scopolamine-induced amnesic rats**

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#### **ABSTRACT**

This study investigates the cognitive-enhancing property of Ashanti pepper-fortified bread in Wistar rats. Forty-eight (48) male Wistar rats were randomly divided into six groups (n = 8). Group 1: normal control; Group 2: scopolamine-induced amnesic rats; Group 3: scopolamine-induced amnesic rats treated with 5 mg/kg Donepezil; Group 4: scopolamine-induced amnesic rats treated with no inclusion (bread alone); Group 5: scopolamine-induced amnesic rats treated with 0.5% Ashanti pepper inclusion bread and Group 6: scopolamine-induced amnesic rat treated with 1% Ashanti pepper inclusion bread. The treatment lasted for 21 days. Cognitive dysfunction was induced via intraperitoneal injection of scopolamine (3 mg/kg). The rats were sacrificed and the brain was excised, homogenized in cold phosphate buffer pH 7.4 and stored at -4°C for biochemical analysis. The acetylcholinesterase (AChE) activity, butyrylcholinesterase (BChE) activity, thio-barbituric acid reactive species (TBARS) level, catalase and superoxide dismutase (SOD) activities of the brain tissues homogenate was assessed. The results demonstrated that administration of scopolamine significantly ( $p < 0.05$ ) increase cholinesterase (AChE and BChE) activity and TBARS level, with simultaneous decrease in SOD and catalase activities. However, treatment with Ashanti pepper-fortified bread resulted in decrease in BChE and AChE activities, suggesting a protective effect against cognitive dysfunction. Also, Ashanti pepper-fortified bread significantly lowered TBARS level and enhanced SOD and catalase activity, an indication of improved antioxidant status. Findings from this study revealed antioxidant effect of Ashanti pepper-fortified bread and modulation of cholinergic neurotransmission, which could be part of underlying biochemical mechanisms the Ashanti pepper-fortified bread as protective role. Hence, Ashanti pepper-fortified bread could be considered as a natural and dietary regimen in the management of cognitive dysfunction.

#### PFC2025\_068

### **Concurrent High-Fat and High-Sucrose Diet Exacerbates Blood Pressure Dysregulation, Worsens Dyslipidemia, Impairs Nitric Oxide Pathways, and Increases Oxidative Stress in Wistar Rats** **Ayokunle O. Ademosun\*, Ganiyu Oboh, Olukolade O. Oluyori, Raymond O. Faniomi and Tosin A. Adewale**

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#### **ABSTRACT**

The global escalation of metabolic disorders, hypertension, and cardiovascular diseases parallels the rising intake of fat- and sugar-rich diets. This study investigated the independent and combined effects of high-fat and high-sucrose intake (15%, 30%, and 45%) on vascular function, lipid metabolism, and oxidative stress in Wistar rats. Animals were fed various dietary regimens for 21 days, after which systolic and diastolic blood pressure, nitric oxide (NO) levels, and the activities of angiotensin-converting enzyme (ACE), arginase, and phosphodiesterase-5 (PDE-5) were assessed. High-fat and high-sucrose diets, when administered separately, significantly elevated body weight and blood pressure, inhibited NO production, and increased ACE, arginase, and PDE-5 activities in a dose-dependent manner. These alterations were accompanied by higher total cholesterol, LDL-C, and triglyceride levels, alongside reduced HDL-C. Importantly, the combined administration of high-fat and high-sucrose diets markedly amplified these detrimental effects, indicating a synergistic interaction. Moreover, rats receiving the combined diet exhibited pronounced oxidative stress, further compounding vascular dysfunction. In summary, concurrent intake of high-fat and high-sucrose diets exerts a greater negative impact on vascular health than either nutrient alone, by elevating blood pressure, impairing NO signaling, disrupting lipid homeostasis, and promoting oxidative stress.

PFC2025\_069

**Phytochemical, Antioxidant, and Molecular Profiling of Fenugreek (*Trigonella foenum-graecum*) Seed Extract**

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**ABSTRACT**

Fenugreek (*Trigonella foenum-graecum*) has a great beneficial health effect; it has been used in traditional medicine by many cultures. It has also been found to be rich in bioactive secondary metabolites such as phenolics, flavonoids, alkaloids, saponins, carbohydrates, vitamins, volatile oils which has been connected to its protective properties for various health conditions such as diabetes. The numerous beneficial health effects of fenugreek led us to examine the phytochemical constituents, antioxidant activities, and potential molecular targets of its ethanolic seed extract. Qualitative phytochemical screening was conducted to identify key bioactive compounds, while antioxidant activities were evaluated using 2, 2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity (DPPH), Ferric Reducing Antioxidant Power (FRAP), nitric oxide scavenging, and lipid peroxidation assays. Volatile constituents were analyzed using Gas Chromatography with Flame Ionization Detection (GC-FID), and selected compounds were subjected to *in silico* molecular docking against HIV-1 protease (PDB ID: 5KR2). Phytochemical screening revealed the presence of tannins, phenols, flavonoids, saponins, alkaloids, phlorotannins, and cardiac glycosides. The extract showed concentration-dependent antioxidant activity, with IC<sub>50</sub> values of 44.01 µg/mL (DPPH) and 145.99 µg/mL (nitric oxide), and exhibited a higher ferric reducing power compared to ascorbic acid. Lipid peroxidation was inhibited by 58.78% at higher extract concentration and the GC-FID analysis identified 17 major phytochemicals. Drug-likeness evaluation confirmed compliance with Lipinski's rule, while docking simulations revealed strong binding affinities of isovitexin, vitexin, smilagenin, gitogenin, carpine, and quercetin which surpasses the standard drug, acetohexamide, via hydrogen bonding and hydrophobic interactions. These findings reveal the potential of *T. foenum-graecum* seed extract as a rich source of bioactive compounds with potent antioxidant and potential antiviral properties, further supporting its promise and suitability for nutraceutical and therapeutic applications.

PFC2025\_070

**Phytochemical-Antioxidant Relationship and Testicular Lipid Peroxidation in Carotenoid-Rich Fruits**

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**ABSTRACT**

Carotenoid-rich fruits such as carrot (*Daucus carota*), tomato (*Solanum lycopersicum*), and watermelon (*Citrullus lanatus*) are important dietary sources of provitamin A and diverse phytochemicals that contribute to vitamin A biosynthesis, which is vital for growth, immune function, and vision. This study investigated their phytochemical composition, antioxidant properties, and potential testicular toxicity indices. Tomato showed the highest total phenolic ( $8.50 \pm 0.51$  mg GAE/L), flavonoid ( $4.39 \pm 0.09$  mg QUE/L), and alkaloid ( $18.16 \pm 1.58\%$ ) contents, while watermelon exhibited superior iron chelating capacity ( $51.50 \pm 1.82\%$ ) and DPPH radical scavenging activity ( $63.87 \pm 3.87\%$ ). Carrot demonstrated moderate antioxidant activity but the lowest ferric reducing antioxidant power ( $0.22 \pm 0.03$  mg AAE/g). Vitamin C levels ranged from  $3.76 \pm 0.38$  µg/mL (watermelon) to  $4.67 \pm 0.20$  µg/mL (tomato). pH analysis

revealed that tomato ( $3.72 \pm 0.04$ ) and watermelon ( $3.70 \pm 0.05$ ) were more acidic than carrot ( $3.80 \pm 0.03$ ). Testicular lipid peroxidation assays indicated differential effects, with carrot ( $87.45 \pm 1.91$ ) providing the strongest protection against oxidative stress compared to tomato ( $141.31 \pm 7.10$ ) and watermelon ( $120.85 \pm 2.73$ ), relative to induced ( $196.72 \pm 41.23$ ) and basal ( $100.00 \pm 33.31$ ) controls. Overall, carotenoid-rich fruits possess significant antioxidant benefits, though their phytochemical variations modulate biological outcomes. Carrot, in particular, displayed the most protective effect against testicular oxidative damage, underscoring its potential role in male reproductive health.

#### PFC2025\_071

### A Comparative Analysis on the Biochemical and Antimicrobial Analysis of Essential and Fixed Oils from *Piper nigrum* L. Seeds & *Cymbopogon citratus* (D.C) Stapf. Leaves

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#### ABSTRACT

Medicinal plants, one of nature's greatest resources, have been used in human lifestyles and healthcare systems since the dawn of time. They have been recognized as vital sources of bioactive compounds used in traditional medicine and modern pharmacology. There are claims that the extracted oils from *Piper nigrum* (PN) and *Cymbopogon citratus* (CC) possess some of these health benefits, but there is a dearth of scientific evidence to support the comparative biochemical and antimicrobial profiling between essential and fixed oils of these plants, which was the focus of this investigation. The seeds of *Piper nigrum* L. (PN) and leaves of *Cymbopogon citratus* (D.C) STAPF. (CC) were air-dried, powdered, and subjected to both hydrodistillation and cold maceration procedures to obtain the essential oils (EOPN, EOCC) and fixed oils (FOPN, FOCC), respectively. These were further subjected to phytochemical, physicochemical parameters screening, analytical methods like TLC, GC-MS and FTIR in an attempt to characterize and identify possible bioactive compounds, as well as antimicrobial screening using standard procedures. Results reveal that both plants are phytochemical-rich plants, with striking physicochemical properties. The EOs exhibited the highest activity for the acid and iodine values, while the FOs had peak activity for the saponification and ester values. FT-IR showed broad absorption bands confirming the presence of multifunctional molecular structures in the oils, while the GC-MS analysis revealed bioactive compounds with anti-inflammatory, insecticidal, antioxidant, antibacterial, and anticancer properties, among others. The antimicrobial profile revealed that EOPN had the best activity against *Pseudomonas aeruginosa*, while EOCC, EOPN, and FOCC had strong inhibition against *Streptococci pneumonia* in the order of decreasing zones of inhibition as EOCC > EOPN > FOCC. The results support the potential uses of *Piper nigrum* and *Cymbopogon citratus*' essential oils, which exhibited better activity in pharmaceutical formulations, food preservation, and natural therapeutic products like insecticidal, herbicidal, and antimicrobial strategies.

#### PFC2025\_072

### Unveiling The Physicochemical and Molecular Properties of the Essential and Fixed Oils from *Xylopi aethiopia* (Dunal) A. Rich Seeds

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#### ABSTRACT

Medicinal plants (MPs) have played a central role in healthcare practices throughout history, forming a crucial foundation for both traditional remedies and the discovery of modern therapeutic agents. *Xylopi aethiopia* (Dunal) A. Rich seeds are especially prized for their medicinal properties, used routinely in the

management of common ailments. Despite its extensive ethnomedicinal reputation, there remains a scarcity of scientific data regarding the physicochemical and molecular properties of its seed oils, which complicates efforts toward standardization and broader pharmaceutical application. The study aims to characterize the physicochemical and molecular properties of both essential and fixed oils extracted from *Xylopiya aethiopica* seeds, with the ultimate goal of assessing their potential utility in the development of novel industrial products. The seeds of *Xylopiya aethiopica* (XAP) were air-dried, powdered, and subjected to both hydrodistillation and cold maceration procedures to obtain the essential (EOXA) and fixed oils (FOXA), respectively. These were further subjected to phytochemical, physicochemical parameters screening, analytical methods like TLC, GC–MS and FTIR in an attempt to characterize and identify possible bioactive compounds, as well as antimicrobial screening using standard procedures. The results of the physicochemical properties of EOXA had the best activity with the iodine value, as 30.03 mg KOH/g, while the FOXA performed best with the acid, saponification, and ester values, which are 3.85 mg KOH/g, 221.79 mg KOH/g, and 197.95 respectively. FTIR exhibited a broad and intense absorption band at 1607.72  $\text{cm}^{-1}$ , medium and a sharp, weak band at 1397.70  $\text{cm}^{-1}$  and 1010.07  $\text{cm}^{-1}$ , respectively. GC-MS analysis revealed potent insecticidal, anticancer, and antioxidant bioactive compounds, amongst others. Importantly, antimicrobial susceptibility assays revealed significant inhibitory effects against selected bacterial strains, underscoring the strong antimicrobial potential of EOXA and FOXA. Collectively, these findings offer robust scientific validation of the traditional uses of XAP and highlight the promising applications of its seed oils in drug development, cosmetic formulation, and functional food production.

**PFC2025\_073**

**Biochemical Profiling and Antimicrobial Activity of Essential and Fixed Oils of *Monodora myristica* (Gaertn.) Dunal SEEDS**

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**ABSTRACT**

The majority of Africans rely on medicinal plants (MPs) to meet their healthcare needs, and this is crucial for providing healthcare in developing countries, as they have long been recognized as a primary source of therapeutic medications. *Monodora myristica* (Gaertn.) Dunal seeds ( $\text{Mm}_s$ ) are prized for their aromatic and therapeutic qualities; however, there is a dearth of information on the investigations on their essential oils (EOMm) and fixed oils (FOMm) in parallel. In this study, both oil types extracted from the same batch of seeds were thoroughly profiled for their biochemical and antimicrobial activities. The seeds of *Monodora myristica* (Gaertn.) Dunal ( $\text{Mm}_s$ ) were air-dried, powdered, and subjected to both hydrodistillation and cold maceration procedures to obtain the essential oils (EOMm) and fixed oils (FOMm), respectively. These were further subjected to phytochemical, physicochemical parameters screening, analytical methods like TLC, GC–MS and FTIR in an attempt to characterize and identify possible bioactive compounds, as well as antimicrobial screening using standard procedures. The results of the physicochemical properties of EOMm had the best activity with the acid and iodine values, as 6.42 mg KOH/g & 30.54 g I<sub>2</sub>/100g, respectively, while the FOMm performed better with saponification and ester value, which are 193.42 mg KOH/g & 170.15 mg KOH/g, respectively. FTIR exhibited a broad and intense absorption band at 3307.56  $\text{cm}^{-1}$ , & a sharp, weak band at 1634.8  $\text{cm}^{-1}$ . Among the identified components in GC-MS analysis, the EOMm had the most abundant compounds compared to FOMm, while the antimicrobial profile showed that the FOMm showed broader activity against both Gram+ve & Gram-ve bacteria (8.00–11.25 mm), while the EOMm showed the strongest inhibitory effect against *S. pneumoniae* (25.04mm). all put together, this might be a lead into new insights on the complementary therapeutic potential of Mms oils, which supports their development for pharmaceutical and nutraceutical applications.

PFC2025\_074

**An Evaluation of the Bioactive Components of Ethyl Acetate and Methanol Fractions of  
*Bryophyllum Pinnatum* (Lam) Leaves**

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**ABSTRACT**

Medicinal plants with a vast array of magic molecules called bioactive compounds have been the cornerstone of traditional medicine in preventing and managing a wealth of health conditions. Despite the well-documented traditional uses of *Bryophyllum Pinnatum* (Lam), BP, also known as the 'leaf of life', there is a paucity of information on the bioactive compounds with anticancer properties found in the leaves. With the increasing interest in the use of medicinal plants as adjuncts in cancer therapy, there is a need to explore the potential use of BP in herbal medicine. The leaves of *Bryophyllum pinnatum* were harvested, washed, air-dried, pulverized, and soaked in 100% methanol to obtain a crude methanol extract (MCEBP). The crude extract was then fractionated using N-hexane, chloroform, ethyl acetate, and methanol through Vacuum Liquid Chromatography (VLC) techniques, resulting in solvent fractions, HFBP, CFBP, EAFBP, and MFBP, respectively. *In vitro* analysis was conducted on both the crude and solvent fractions (HFBP, CFBP, EAFBP, and MFBP) to assess their antioxidant and cytotoxic profiles. The most potent solvent fraction was found to be EAFBP. However, MFBP, the methanol fraction of the crude extract of BP, also exhibited significant synergistic potency, which could not be matched with EAFBP. Chromatographic assays using Gas chromatography mass spectrometry (GC-MS) and High-Performance Liquid Chromatography (HPLC) on EAFBP and MFBP revealed some potent anticancer bioactive compounds, indicating their potential in treating tumors, inflammation, cancer, and oxidative stress. The GC-MS and HPLC analysis suggest that the ethyl acetate fraction (EAFBP), which showed peak activity in most of the preliminary *in vitro* assays, is the most potent compared to the methanol fraction (MFBP) and justifies the use of the plant in folklore medicine. These anticancer agents identified in the plant can be harnessed in the development of a novel drug in cancer therapy.

PFC2025\_075

**A Comparative Study on the Antioxidant Properties of Neem (*Azadirachta indica*) Leaf Based Beverage**

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**ABSTRACT**

The increasing incidence of oxidative stress-related diseases highlights the need for developing functional foods abundant in natural antioxidants. This study explored the antioxidant capabilities of beverages made from neem (*Azadirachta indica*) leaves, concentrating on the impact of different infusion times (5, 10, and 15 minutes) and the addition of citrus fruits- lemon (*Citrus limon*) and lime (*Citrus aurantifolia*). The prepared beverages were analyzed for total phenolic and flavonoid content, DPPH and ABTS radical scavenging activity, Fe<sup>2+</sup> chelation efficiency, hydroxyl radical inhibition, and suppression of lipid peroxidation in mouse spleen homogenates. Findings revealed that longer infusion times improved antioxidant properties considerably, with the 15-minute infusions providing the highest levels of phenolic

(up to  $56.30 \pm 1.26$  mg GAE/g) and flavonoid (up to  $26.05 \pm 0.65$  mg QUE/g) compounds. Addition of citrus especially with lemon, significantly boosted antioxidant activity in a concentration-dependent manner. The neem-lemon beverage infused for 15 minutes exhibited exceptional effectiveness across all assays, notably achieving the highest DPPH ( $60.27 \pm 6.42\%$ ) and ABTS ( $2.35 \pm 0.16$  mmol TEAC) scavenging rates, Fe<sup>2+</sup> chelation ( $78.21 \pm 7.81\%$ ), and hydroxyl radical inhibition ( $63.17 \pm 5.31\%$ ). It also significantly lowered malondialdehyde (MDA) levels in assays involving Fe<sup>2+</sup>-induced lipid peroxidation. These results highlight the potential of neem-citrus beverages, particularly the neem-lemon combinations, as potent antioxidant functional drinks. Refining infusion times and formulation techniques could improve their acceptance and health benefits, facilitating their role in preventive nutrition.

## PFC2025\_076

### **Epigallocatechin-3-gallate (EGCG): a Promising Nutritional Agent from Green Tea (*Camellia sinensis*) Leaves, Serves as a Potential Bioactive Compound for Diabetes - a Comprehensive Review** **Mary Ugunnushe Eigbobo<sup>1</sup>, Ohilebo Abdulateef Abass<sup>1</sup>, Shaibu Nasiru<sup>1</sup>, Idiakheua Onosolesena Dennis<sup>2</sup>, Danesi Habibah<sup>3</sup>, Omage Kingsley<sup>4</sup>, Azeke Marshall Arebojie<sup>1</sup>**

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#### **ABSTRACT**

Epigallocatechin-3-gallate (EGCG), the most abundant catechin in green tea (*Camellia sinensis*) leaves, is a bioactive polyphenol extensively studied for its health benefits, particularly in diabetes management. EGCG exerts its antidiabetic benefits through inhibition of carbohydrate-digesting enzymes ( $\alpha$ -amylase and  $\alpha$ -glucosidase), modulation of critical insulin signaling pathways such as PI3K/Akt and AMPK, and enhancement of glucose uptake *via* GLUT4 translocation. Its potent antioxidant and anti-inflammatory activities are mediated by activation of the Nrf2 pathway and suppression of NF- $\kappa$ B signaling, along with epigenetic regulation involving DNA methylation and histone modification. EGCG protects pancreatic  $\beta$ -cells from oxidative stress and apoptosis, promotes  $\beta$ -cell proliferation, and ameliorates diabetic complications including nephropathy and cardiomyopathy. Despite its therapeutic potential, EGCG's clinical application is hindered by poor stability, low bioavailability, and rapid metabolic clearance; however, advanced delivery technologies and structural modifications show promise in overcoming these challenges. Preclinical and clinical studies affirm EGCG's efficacy in improving glycemic control, insulin sensitivity, and inflammation in diabetic models and patients. This review highlights EGCG as a promising nutritional agent in prevention and treatment of diabetes, explores the chemistry, biosynthesis, dietary sources, pharmacokinetics, and therapeutic mechanisms underlying EGCG's antidiabetic effects.

PFC2025\_077

## Survey Of Botanicals Used In The Management Of Hypercholesterolemia In Ado – Odo Ota, Ogun State, Nigeria

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### ABSTRACT

A new working and leisure standards have been adopted by most of the populace in low- and medium-income countries, including Nigeria. In view of this, significant changes in the quality and quantity of food consumed especially with the proliferation of fast-food outlets posed serious attendant risk to their health from unhealthy nutrition. One of such risks is hypercholesterolemia. The indigenous people of Ado - Odo Ota community are blessed with rich vegetation and are known for their vast knowledge in the use of plants for the treatment and management of several ailments. However, this knowledge of hypercholesterolemia has not been fully harnessed. This study therefore surveyed and recorded plants used in the management of hypercholesterolemia in Ado Odo Ota, Ogun State southwest Nigeria. Ethnobotanical information were obtained using semi structured questionnaire and oral interview from 156 respondents living in Ado Odo Ota and conversant with plant uses. Data were analyzed with descriptive statistics and expressed in tables and figures. A total of 50 medicinal plants, belonging to 33 families were identified. The family Malvaceae, Rutaceae and Solanaceae represented by four species each were identified as the leading families. The dominant life forms of all plants reported was herbaceous form while the preferred method of utilization was decoction. Among the various plant parts used, leaf is the most sourced. *Triumfetta cordifolia*, *Sida acuta*, *Phyllanthus amarus*, *Phyllanthus muellerianus*, *Zingiber officinale*, *Justica secunda* were the most frequently used plants. The surveyed plants used in the management of hypercholesterolemia in Ado Odo Ota revealed the indigenous practice and reliance of the people on plants. This can also serve as scientific baseline information for future pharmacological studies and development of plant-based drugs

PFC2025\_078

## Skoochies: A Psychoactive Cocktail Beverage – Review

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### ABSTRACT

Skoochies, a slang term for a homemade psychoactive drink, has become a pressing public health issue, especially among Nigerian youth. This unregulated concoction commonly mixes codeine-based cough syrups, cannabis extracts, alcohol, tramadol, and sometimes benzodiazepines, leading to unpredictable and potentially deadly effects. This review compiles existing scientific literature to examine the frequency, preparation, pharmacology, and health risks associated with Skoochies. A systematic search of the Web of Science database (2005–2025) uncovered 68 pertinent peer-reviewed studies. Results indicate that Skoochies primarily exerts its psychoactive effects through combined central nervous system (CNS) depression, facilitated by opioid, GABAergic, and dopaminergic pathways. Each ingredient poses unique risks: cannabis can lead to psychotropic symptoms and long-term cognitive decline; codeine and tramadol may cause sedation, respiratory depression, and addiction; ethanol worsens CNS depression and liver toxicity; while benzodiazepines increase overdose risk. Experimental studies reveal that Skoochies can cause oxidative stress, reproductive harm, and organ damage. Socioeconomic and cultural influences, such

as low cost, easy access, and media promotion, fuel its use, particularly in disadvantaged communities. Regulatory deficiencies, low public awareness, and a lack of research further hinder efforts to prevent the disease. Despite its growing prevalence, there is still limited scientific information about Skoochies, especially concerning its toxicokinetics, long-lasting psychiatric effects, and effective treatment strategies. This review highlights the critical need for interdisciplinary research and public health measures to address the growing use of Skoochies and their associated risks.

**PFC2025\_079**

**Cardio-Renal Protection and Blood Pressure Reduction by Unripe Plantain–Tiger Nut–Fenugreek Sourdough Breads via Nitric Oxide Preservation and Antioxidant Modulation in Hypertensive Rats**

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**ABSTRACT**

Hypertension remains a major cardiovascular risk factor, with endothelial dysfunction, nitric oxide (NO) depletion, and heightened renin–angiotensin signaling as central mechanisms. This study evaluated the potential of sourdough breads enriched with unripe plantain, tiger nut, and fenugreek seed flours in modulating blood pressure and vascular health in L-NAME + high-fat diet (HFD)-induced hypertensive rats. Systolic and diastolic blood pressure were markedly elevated in hypertensive controls but were significantly reduced by all enriched bread formulations, with 60.6% UP + 30% TN + 9.4% FG and 55.9% UP + 39.2% TN + 5% FG producing effects comparable to lisinopril. These reductions were strongly linked to enhanced NO levels in the kidney and heart, which had been depleted by L-NAME. Furthermore, enriched breads suppressed the overactivation of phosphodiesterase-5 (PDE-5), angiotensin-converting enzyme (ACE), and arginase in both tissues, thereby preserving vascular tone and endothelial signaling. The breads also attenuated oxidative stress, as evidenced by decreased reactive oxygen species (ROS) and malondialdehyde (MDA) alongside restored superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx), and reduced glutathione (GSH) activities. Together, these biochemical changes indicate that the functional breads improved redox balance, protected tissue integrity, and enhanced NO bioavailability. Collectively, the results demonstrate that unripe plantain–tiger nut–fenugreek sourdough breads exert powerful antihypertensive and cardio-renal protective effects, positioning them as promising dietary strategies for managing hypertension through simultaneous modulation of vascular enzymes, nitric oxide metabolism, and antioxidant defense systems.

**PFC2025\_080****Restoration of Erectile Function in Hypertensive Rats through Nitric Oxide Bioavailability and Enzymatic Modulation by Functional Sourdough Breads Enriched with Unripe Plantain, Tiger Nut, and Fenugreek**Mary T. Ademosun,<sup>1\*</sup> Olufunmilayo S. Omoba<sup>1</sup> Ganiyu Oboh<sup>2</sup> and Adedamola I. Akinyede<sup>3</sup><sup>1</sup>Department of Food Science and Technology, Federal University of Technology, Akure, Nigeria.<sup>2</sup>Department of Biochemistry, Federal University of Technology, Akure, Nigeria.Corresponding author: [tosinademosun@gmail.com](mailto:tosinademosun@gmail.com)**ABSTRACT**

Erectile dysfunction (ED) frequently accompanies hypertension, primarily through impaired nitric oxide (NO) signaling, heightened phosphodiesterase-5 (PDE-5) activity, and oxidative stress. This study investigated the effects of sourdough breads enriched with unripe plantain, tiger nut, and fenugreek seed flours on sexual performance and penile biochemistry in L-NAME + high-fat diet (HFD)-induced hypertensive rats. Hypertensive rats displayed profound sexual dysfunction, characterized by reduced mount and intromission numbers and prolonged mount and intromission latencies, alongside diminished penile NO levels. Supplementation with enriched sourdough formulations markedly improved all sexual behavior indices, with the 60.6% UP + 30% TN + 9.4% FG and 55.9% UP + 39.2% TN + 5% FG blends restoring erectile function to levels comparable to lisinopril. These behavioral improvements corresponded with increased NO bioavailability in penile tissue and suppression of arginase, ACE, and PDE-5 activities, thereby sustaining smooth muscle relaxation and erectile response. Additionally, the breads mitigated oxidative stress by lowering reactive oxygen species (ROS) and lipid peroxidation (MDA) while enhancing antioxidant defenses (SOD, catalase, GPx, and GSH). The synergistic regulation of penile NO metabolism, enzymatic pathways, and antioxidant systems underscores the capacity of these functional breads to reverse endothelial dysfunction and restore erectile function. These findings highlight the promise of unripe plantain–tiger nut–fenugreek sourdough breads as dietary interventions for managing hypertension-associated erectile dysfunction through integrated behavioral and biochemical improvements.

**PFC2025\_081****Translational Design of a Vagus Nerve Stimulator for Post-Ischemic Recovery: From Low-Cost Engineering to Preclinical Application**Olamide Wilson Fasakin<sup>\*1,2</sup>, Ganiyu Oboh<sup>1</sup>, Ayokunle Olubode Ademosun<sup>1</sup><sup>1</sup>Department of Biochemistry, School of Life Sciences,<sup>2</sup>Department of Biomedical Technology, School of Basic Medical Sciences, Federal University of Technology, P.M.B. 704, 340001 Akure, Nigeria.\*Corresponding author: [adoolamide@gmail.com](mailto:adoolamide@gmail.com)**ABSTRACT**

This study describes the design and preclinical testing of a low-cost vagus nerve stimulator (VNS) designed to enhance recovery after stroke. Recognizing the economic and health burden of ischemic stroke, the project combines biomedical engineering with preclinical testing to create a practical neuromodulation platform. The device was constructed using modular circuits that include a pulse generator, microcontroller, voltage regulator, and safety feedback mechanisms to deliver biphasic, charge-balanced electrical stimulation. Bench tests confirmed accurate frequency control (20-30 Hz), pulse width precision (200-500  $\mu$ s), and stable current within the therapeutic range (0.3-1.0 mA), while maintaining power efficiency for long-term use. Preclinical trials were conducted on rodent models of middle cerebral artery occlusion (MCAO). Animals receiving VNS showed significant improvements in neurological deficit scores compared to sham-stimulated controls ( $p < 0.05$ ). Additionally, biochemical tests revealed decreased levels

of inflammatory cytokines (NF- $\kappa$ B and TNF- $\alpha$ ) and oxidative stress, indicating enhanced neuroprotection and plasticity. Importantly, the stimulation was well tolerated, with no noticeable adverse effects on cardiac or respiratory functions. This study highlights the therapeutic potential of an affordable VNS, emphasizing its ability to boost body repair processes through modulation of inflammation and synaptic reorganization. The combination of solid engineering and preclinical testing creates a scalable model for clinical translation, particularly in resource-limited settings. Although limitations include the need for long-term safety studies and refining stimulation protocols, the results strongly support VNS as an additional therapy for stroke recovery. Future research should involve larger animal models and investigate combined approaches with rehabilitative exercises and dietary supplements.

## PFC2025\_082

### Assessment of Nutritional value, Amylose, Amylopectin and Phytochemical Constituents of Ginger-Based Unripe Plantain (*Musa paradisiaca* spp.) Wheat Flour Composite Biscuits.

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#### ABSTRACT

The rise in chronic diet-related diseases has been propelling the demand for developing functional snacking food from underutilized bio resources. Unripe plantain flour offers a promising alternative to wheat in biscuit production, tackling the health concerns of common refined wheat biscuits that are rich in digestible carbohydrates and low in nutrients. The unripe plantain/wheat flour biscuit was produced in this proportion: 0% UPF:100% WF (100% WF biscuit), 100% UPF: 0% WF (100% UPF biscuit) and 50% UPF:50% WF (50% UPF + 50% WF biscuit); ginger, orange peel, egg albumin was added and dates (*Phoenix dactylifera*) also was added to sweeten the biscuit. This study evaluates the sensory properties, proximate, mineral, amylose, amylopectin, soluble starch, sugar, and phytochemical constituents of the composite biscuits. The results of the sensory evaluation revealed a significant ( $p < 0.05$ ) decrease in taste, an increase in texture but no ( $p > 0.05$ ) significant increase in its aroma of the composite biscuit as compared to the control (100% WF biscuit). The result of proximate analysis revealed a significant increase in ash, protein and fibre contents of composite biscuit as compared to the control. Moreover, the mineral composition revealed a significant ( $p < 0.05$ ) increase in the value of K ( $480 \pm 0.01 - 660 \pm 0.04$  mg/100mg), Fe ( $5.44 \pm 0.01 - 83.46 \pm 0.12$  mg/100g), Mg ( $54.53 \pm 0.04 - 101.29 \pm 0.06$  mg/100g) and Ca ( $75.25 \pm 0.01 - 96.44 \pm 0.88$  mg/100g) of the composite biscuits as compared to the control. The amylose and amylopectin also showed a tremendous significant ( $p < 0.05$ ) increase in the composite biscuits as compared to control. This study showed that composite biscuit produced from an unripe plantain / wheat flour blend has high protein, ash, fibre, potassium, magnesium, calcium, amylose and amylopectin with a low level of sugar contents, thus, making it a health promoting option and better recipe for individual with nutritional challenges.

PFC2025\_083

**Anti-inflammatory Potentials of Marmalade Orange Peel-enriched Yoghurt In *Plasmodium* Infected Mice**

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**ABSTRACT**

*Citrus aurantium*, commonly known as bitter orange, is a major nutraceutical supplement extensively researched in the nutraceutical sector. Malaria weakens immune cells, compromising both inflammatory and immune system reactions. In this study, Swiss albino mice (20–25 g) were split into seven groups of eight animals each. Mice infected with the *Plasmodium berghei* NK-65 strain sourced from the Institute of Advanced Medical Research and Training (IAMRAT) at University College Hospital, Ibadan were observed for weight and behavioral changes. Following infection, the mice received yoghurt fortified with 0%, 0.25%, 0.5%, or 1.0% *Citrus* peel, and chloroquine was administered orally for seven days. Myeloperoxidase, nuclear factor kappa-B (NF-κB), reactive oxygen species (ROS), and Catalase activity levels were measured. Mice treated with 0.5% and 1.0% *Citrus*-enriched yoghurt showed significantly lower parasitemia, myeloperoxidase, nuclear factor kappa-B (NF-κB), reactive oxygen species (ROS), levels along with an increased catalase activity. The study revealed that *Citrus* peel-fortified yoghurt shows its antioxidant and anti-inflammatory potency and immune response in *Plasmodium berghei* infected mice.

PFC2025\_084

**Effects of *Rhizopus Oryzae* solid-state fermentation on nutritional composition, minerals content, anti-nutrient and antioxidant potential in rice bran**

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**ABSTRACT**

Rice bran is an underutilized byproduct of rice milling, limited in food applications due to antinutritional compounds and poor nutrient bioavailability. This study investigated the effect of *Rhizopus oryzae*-mediated solid-state fermentation on the proximate composition, mineral content, anti-nutrient profile and antioxidant properties of rice bran. Fermentation led to a reduction in moisture (21.7%) and fat (8.6%) but enhanced ash (11.3%) and protein contents (22.9%). However, carbohydrates levels declined slightly (1.75%). Mineral analysis revealed increased macronutrients (sodium and magnesium) contents, with significant ( $p < 0.05$ ) reduction in the phytate (38.1%) level. However, saponins and alkaloids contents were increased. Additionally, the solid-state fermentation also significantly ( $p < 0.05$ ) increased the total phenol and flavonoid content of the rice bran with concomitant improvement in the antioxidant properties. Overall, *Rhizopus oryzae*-mediated solid-state fermentation significantly improved the nutritional profile and mineral content of rice bran while modifying its antinutrient and antioxidant properties, suggesting its potential as a functional ingredient in food and feed formulations.

PFC2025\_085

**Blood Glucose and Blood Pressure Lowering Effect of Yogurt Coloured with Sandpaper Leave and Cashew Stem Bark Extracted Dye in Streptozotocin/High Fat Induced Type-2 Diabetes in Rats**

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**ABSTRACT**

Diabetes is a global pandemic typified by impaired carbohydrate metabolism. Yogurt is one of commonly consumed beverages and it is a nutrient-dense food which is often coloured/ flavoured using synthetic colorant. The research aims at produced a functionalised yogurt coloured using dye isolated from sandpaper leave and cashew stem bark and their effect on fasting blood glucose and haemodynamic parameters in streptozotocin/high fat induced type-2-diaetes in rats. Twenty-five adult Wistar rats were randomly divided into five groups: the control (C), untreated diabetic rats (group 2), diabetic rats treated with metformin (250 mg/bodyweight) (group 3), and diabetic rats placed on yogurt coloured with 1% dye extract form sandpaper leaves and cashew stem bark respectively designated as groups 4-5. The experiment lasted for 14 days. However, the fasting blood glucose (FBG), haemodynamic parameter, activity of  $\alpha$ -amylase,  $\alpha$ -glucosidase, angiotensin-1 converting enzyme (ACE), arginase, lipid peroxidation, and antioxidant status in rat's pancreas and heart were evaluated. The FBG level, haemodynamic parameters, activity of  $\alpha$ -amylase,  $\alpha$ -glucosidase, ACE, and arginase were all reduced significantly ( $p < .05$ ) in normal rats and in diabetic rat placed on yogurt coloured with 1% dye extract form sandpaper leaves and cashew stem bark respectively when compared with untreated diabetic rats. Similarly, activity of superoxide dismutase and catalase was significantly ( $p < .05$ ) elevated in yogurt-treated diabetic rats when compared with an untreated diabetic rat. Also, elevated malondialdehyde equivalent compounds in untreated diabetic rats were significantly reduced in diabetic rats fed with yogurt coloured with 1% dye extract form sandpaper leaves and cashew stem bark respectively. Nevertheless, sandpaper leaves and cashew dye coloured yogurt exhibited FBG, haemodynamic parameters lowering ability, reduced activity of  $\alpha$ -amylase,  $\alpha$ -glucosidase, ACE, and improved diabetic rat's antioxidant status. Comparatively, cashew dye coloured yogurt exhibited better effects than sandpaper leaves dye coloured yogurt in treated diabetic rats.

PFC2025\_086

**Developed beverage from Roselle -Tiger nut blend inhibits critical enzymes associated with hypertension in Wistar rats**

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**ABSTRACT**

When the force of blood on the artery walls is continuously too great, it is referred to as hypertension, or high blood pressure. It happens when blood pressure measurements are greater than what is considered normal, which is typically 120/80 mm Hg (World Health Organization, 2024). Beverages and dietary

interventions are critical vehicles used to supply essential nutrients (both macro and micronutrients) and bioactive compounds needed by the body for optimum function and survival (Obode et al., 2024). This study developed and characterized a novel beverage from a blend of *Hibiscus sabdariffa* (Roselle) and *Cyperus esculentus* (Tiger nut) and evaluated its inhibitory effects on critical enzymes associated with hypertension using albino Wistar rats. The beverage formulation was optimized based on physicochemical properties, phytochemical content, and sensory evaluation. Twenty-five albino Wistar rats were grouped into five groups representing normal control (G1), negative control (G2), positive control (G3), treatment groups G4(2mg/ml) and G5(4mg/ml); were used for this study. Hypertension was induced using cyclosporine and enzyme inhibition assays were conducted to assess the impact of the developed beverage on angiotensin-converting enzyme (ACE) and oxidative stress (Agunloye et al., 2019). Results show that the negative control group had a mean ACE concentration of  $5.20 \pm 0.25$   $\mu\text{mol}/\text{min}/\text{mg}$  protein compared with that of the normal control ( $2.28 \pm 0.17$   $\mu\text{mol}/\text{min}/\text{mg}$  protein). Treatment with the developed product reduced the expression of ACE to  $1.93 \pm 0.26$  and  $1.73 \pm 0.40$   $\mu\text{mol}/\text{min}/\text{mg}$  protein for 2mg/ml and 4mg/ml respectively. This observed effect is significantly comparable to that of the positive control of 2.37mmHg (standard drug). Lipid peroxidation was significantly reduced from  $11.74 \pm 0.83$  to  $6.85 \pm 0.74$  mmol MDA/mg protein following treatment with 2mg/ml of the developed product. This observed effect could be attributed to the presence of polyphenol, flavonoid, arginine and oleic acid content of the developed product. These findings suggest that this functional beverage holds promise as a natural antihypertensive agent and could serve as a complementary dietary approach for managing hypertension. Further studies, including detailed phytochemical profile, micronutrient composition, and clinical validation, are warranted to document its therapeutic potential.

#### PFC2025\_087

##### **Evaluation of Immunodulatory Properties of *Citrus Aurantium* Peel -Enriched Yoghurt in the Splenic Tissue of *Plasmodium berghei* Infected Mice**

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#### **ABSTRACT**

Citrus aurantium peel-enriched yoghurt is a nutraceutical supplement and food additive in ancient medicine which has been ignored over time due to its enormous benefits. Malaria remains a significant global health challenge, particularly in endemic regions, where it disproportionately affects vulnerable populations such as the children and pregnant women. Thirty-six mice weighing 20-25g were divided into six groups and were treated with *Citrus aurantium* peels at different percentage (0.5% and 1.0%) inclusions. The mice were infected with NK-65 strain of *Plasmodium-berghei*. The effect of citrus aurantium peel enriched yoghurt was investigated on oxidative stress (malondialdehyde), antioxidant (total thiol), immune-modulatory mediators (lactate dehydrogenase, immunoglobulin-G, C-reactive protein) in *Plasmodium-berghei* infected mice. The oxidative stress, antioxidant and immune-modulatory markers were assayed in the splenic tissue. The infected mice treated with citrus peel enriched yoghurt (0.5% and 1.0%) exhibited a marked reduction in their parasitemia level, MDA, CRP, and LDH levels in the splenic tissue of the infected mice. Furthermore, an elevated level of IgG and total thiol were observed in the group treated with citrus aurantium enriched yoghurt modulated immune response and enhanced antioxidant system in the infected mice.

PFC2025\_088

**Effect of Cheese Fortified with Marmalade Mesocarp on Haematological and Inflammatory Mediators in *Plasmodium berghei*-infected Mice**

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**ABSTRACT**

*Citrus* mesocarp fortified cheese, a dietary supplement and food additive in folklore is one of the most under studied plant in global nutraceutical sector. Malaria is one of the most infectious diseases worldwide that disrupts the function of principal cells in the immune system, triggers inflammatory and immune response. Thirty-six albino mice, weighing 20-25g, were distributed into 6 groups; the normal control group, the untreated infected group, the group administered standard drug and the groups which were treated with citrus aurantium a varying inclusion (0%, 0.5%, 1%) respectively. The mice were infected with *Plasmodium berghei* (NK65 strain). The effect of *citrus* mesocarp-supplemented cheese was investigated on antioxidant [glutathione peroxidase (GPx), glutathione-s-transferase (GST),], anti-inflammatory [myeloperoxidase (MPO)] and the haematological parameters (total white blood volume, red blood cell, packed cell volume) in *Plasmodium berghei* infected mice. The antioxidant and inflammatory markers were assayed in the penile tissue. The mice temperature and weight changes were observed. Infected mice treated with the dietary supplementation of marmalade orange fortified cheese with percentage inclusion (0.5% and 1%) showed significantly decreased in parasitemia levels compared with the infected untreated mice. The results demonstrated an elevated level of red blood cell count and packed cell volume in the groups administered with *citrus* mesocarp-supplemented cheese when compared to the infected untreated mice. Further results showed elevation in the glutathione peroxidase (GPx) and glutathione-s-transferase (GST) levels and a notable suppression in inflammatory marker (MPO). This study reveals that *citrus* mesocarp-fortified cheese mitigated inflammation, oxidative stress and enhance antioxidant defenses.

PFC2025\_089

**Effect Of Cheese Fortified with Marmalade Orange Mesocarp on Some Inflammatory Mediators In *Plasmodium berghei*- Infected Mice**

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**ABSTRACT**

Malaria remains a major global health concern, characterized by intense inflammation and oxidative stress. This study explored the potential of a novel functional food cheese fortified with marmalade orange mesocarp to mitigate these effects. Swiss albino mice were experimentally infected with *Plasmodium berghei* and divided into six treatment groups: normal control, infected control, chloroquine-treated, and groups receiving fortified cheese at 0%, 0.5%, or 1% mesocarp inclusion. The parasitemia levels, body temperature, oxidative stress markers (catalase and reactive oxygen species), and key inflammatory mediators (C-reactive protein and tumor necrosis factor-alpha) were evaluated. The results demonstrated that consumption of the fortified cheese significantly reduced parasitemia, restored body temperature to near-normal levels, and lowered reactive oxygen species compared to the infected control. Furthermore, the fortified groups, especially at 1% inclusion, exhibited a marked reduction in both C-reactive protein and tumor necrosis factor-alpha, indicating potent anti-inflammatory activity. These beneficial effects are likely due to the high concentration of flavonoids and other antioxidants present in the citrus mesocarp, which

appear to enhance the body's antioxidant defenses and modulate the immune response. In conclusion, this study suggests that citrus mesocarp-fortified cheese is a promising, cost-effective functional food that could serve as a valuable supplementary strategy to combat malaria-induced inflammation and oxidative stress.

## PFC2025\_090

### **Organoleptic Attributes, Nutritional Qualities and Glycemic Index of Bread Made From Vitamin A - Enriched Cassava and Wheat Flour Composites**

**Ilade Odunayo Josephine<sup>1</sup>, Amoo, Isiaka Adekunle<sup>1</sup>, Ganiyu Oboh<sup>2</sup>, Stephen Adeniyi Adefegha<sup>2</sup>, Richard Ajani<sup>3</sup>**

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#### **ABSTRACT**

Breads are produced from wheat and are highly consumed staple food worldwide. The high glycemic index of wheat bread is one of the major causes of diabetes globally. This study investigated the sensory, nutritional qualities and glycemic indices of bread produced from pro-vitamin A-enriched cassava and wheat flour composite. Each bread samples were produced by mixing pro-vitamin A-enriched cassava flour (PVAECF) with wheat flour (WF) in the following ratio: (control) 100% WF; 20% PVAECF: 80% WF; 40% PVAECF: 60% WF; 60% PVAECF: 40% WF 80% PVAECF: 20% and 100% PVAECF. The organoleptic properties reveal no significant difference ( $p < .05$ ) in taste, colour, aroma and overall acceptability compared to the (control) 100% WF<sub>b</sub>, thereby making PVAECF ideal substitute flour in bakery and confectionaries. The fiber (0.23- 2.06 g/100g), ash (2.36-2.99 g/100g) and the energy content (261.73-268.25 kcal/100 g) of the bread samples increases with increasing cassava content. The bread samples are rich in vitamin A (5.29-278.13 $\mu$ g/100g RAE), Ascorbic acid (2.64-25.73 $\mu$ g/g), and minerals. Potassium (48.11-93.17mg/kg) was the most abundant in all the bread samples. The data revealed that 100% PVAECF<sub>b</sub> had the highest Na (53.56 $\pm$ 0.05 mg/kg), Ca (44.20 $\pm$ 0.00 mg/kg), Fe (1.27 $\pm$ 0.05 mg/kg) and Zn (2.54  $\pm$ 0.22 mg/kg) contents respectively. The cyanogenic potential levels (0.02-1.11 mg/kg) of all the bread samples pose no threat to human health as the values were quite within the safe acceptable limit of World Health Organization. The results show significant increase in amylose content, decreasing sugar/starch ratio and decreasing eGI values with increasing PVAECF inclusion compared to the control. 100% PVAECF<sub>b</sub> may be suitable as a functional bread owing to its high fibre, vitamins, minerals contents and low glycemic index of (<55%). The data obtained from this study could serve as useful information for dieticians especially in the management of diabetes and in the choice of use in the food industry.

## PFC2025\_091

### **Antinutritional Composition, Antioxidative and Antihyperglycemic Effects of Pro-Vitamin A-enriched Cassava/Wheat Composite Bread on Streptozotocin-Induced Diabetic Rats**

**Ilade Odunayo Josephine<sup>1</sup>, Amoo Isiaka Adekunle<sup>1</sup>, Ganiyu Oboh<sup>2</sup>, Stephen Adeniyi Adefegha<sup>2</sup>, Richard Ajani<sup>3</sup>**

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#### **ABSTRACT**

The global rapid prevalence of type 2 diabetes mellitus despite previous interventions has necessitated the need to shift from glucose centric approach towards healthy beta cells concept. Current studies have demonstrated the important role of oxidative stress, vitamin A deficiency in pancreatic  $\beta$ -cells dysfunction

and poor glucose metabolism. This study investigated the in vitro and in vivo antioxidative, protective and hypoglycemic effects of bread produced from pro-vitamin A-enriched cassava and wheat flour composite bread on Streptozotocin (STZ) induced type 2 diabetic rats. Each bread samples were produced by mixing pro-vitamin A-enriched cassava flour (Vit-AECF) with wheat flour (WF) in the following ratio: (control) 0:100, 20:80, 40:60, 60:40, 80:20, and 100:0. The rats were subjected to overnight fasting prior induction of diabetes with 60 mg/kg body weight Streptozotocin (STZ). Animals with blood glucose  $\geq 250$  mg/dl were considered diabetic and used in this study. Group I= normal control, Group II = diabetes control and not treated, group III, IV and V were treated with Metformin, 40% Vit-AECB and 60% Vit-AECB respectively for 14 days. The bread samples contain beneficial phytochemicals and the antinutritional composition of the bread's samples were low and may not warrant any toxic concern. The low Phytate/Zinc, phytate/calcium, Phytate/iron and [Ca][Phytate]/Zn molar ratios indicate **good** bioavailability of the minerals. The Invitro, antioxidant activity of the bread samples against ABTS, DPPH, NO and OH- free radicals ranged from (3.04-9.94 mM TE/100g), (36.40-60.63%), (37.71-58.69%) and (56.78-71.09%) respectively. The antioxidant activity of the formulated bread samples was significantly ( $p < 0.05$ ) higher against DPPH compared to the control. The total Phenol, total Flavonoids, FRAP and Fe<sup>2+</sup> Chelation (%) which ranged from (19.96-38.21 mg GAE g<sup>-1</sup>), (0.25-4.88mg QE g<sup>-1</sup>), (5.10- 6.82 mg AAE g<sup>-1</sup>) and (13.82 - 52.18 %) of bread aqueous extract respectively, increases with Vit-AECF inclusion. Animals treated with Metformin and 60% Vit-A ECB sample show similar and higher CAT, GPx, GST, GSH activities and lower TBARs level with significant difference ( $p < 0.01$ ) compared to negative control than those treated with 40% Vit-A ECB. Highest SOD activity was expressed in group treated with Metformin, however, the 60% Vit-AECB showed better normalizing effect on FBGL, serum insulin level and HOMA-IR score compared to Metformin and 40% Vit-AECB. The results from this study indicate that the developed Vit.AECF/WF composite bread is potential medicinal bread whose effectiveness increases with Vit.AECF inclusion and could serve as a dietary intervention in the management and prevention of type-2 diabetes and hypertension.

## PFC2025\_092

### Assessment of Nutritional Qualities, Functional Properties, Cyanogenic Potential and Carotenoids Retention in Pro-Vitamin A-enriched Cassava/Wheat Composite Flour

Ilade Odunayo Josephine<sup>1</sup>, Amoo, Isiaka Adekunle<sup>1</sup>, Ganiyu Oboh<sup>2</sup>, Stephen Adeniyi Adefegha<sup>2</sup>, Richard Ajani<sup>3</sup>

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#### ABSTRACT

Cassava flour is produced and incorporated into wide varieties of food products such as confectionaries, menu plan and animal feeds. Recent studies are beginning to unravel the roles of vitamin A in blood glucose control, insulin production and integrity of the beta cells of the pancreas. This study investigated the nutritional qualities, antinutritional factor, ascorbic acid and carotenoid retention in pro-vitamin A-enriched cassava and wheat flour composite. Matured yellow pro-vitamin A-enriched cassava tubers (*IBA154810*) was obtained from International Institute of Tropical Agriculture (IITA) and processed into high quality flour. Each flour blends were produced by mixing pro-vitamin A-enriched cassava flour (PVAECF) with wheat flour (WF) in the following ratio: A (control) =100% WF, B = 20% PVAECF: 80% WF, C = 40% PVAECF: 60% WF, D = 60% PVAECF: 40% WF, E = 80% PVAECF: 20% WF, F = 100% PVAECF. The water absorption capacity, oil absorption capacity, bulk density, foaming capacity and foaming stability of the flour samples ranged from (136.40  $\pm$  0.10 -161.66  $\pm$  0.15) %, (125.40<sup>f</sup>  $\pm$  0.10-153.66<sup>b</sup>  $\pm$  0.58)g/ml, (0.75<sup>a</sup>  $\pm$  0.00-0.81<sup>a</sup>  $\pm$  0.00) %, (15.67<sup>f</sup>  $\pm$  0.03-38.26<sup>a</sup>  $\pm$  0.02) %, (3.98  $\pm$  0.04-19.57  $\pm$  0.05) % , (67.57<sup>e</sup>  $\pm$  1.15-85.68<sup>a</sup>  $\pm$  0.01) °C for sample A-F respectively, The low hydrogen cyanide content (0.08-2.23mg/kg) could guarantee a sustainable production plan by reducing time and labour spent on detoxification during

processing and prevention of cyanide contamination in the environment. The composite flour samples are rich in minerals. 100% PVAECF had the highest crude fiber, ash, K, Ca, and Mg content but lowest fat and protein contents compared to WF. Similarly, the total  $\beta$ -carotenoids and ascorbic acid content increases with the cassava flour inclusion and ranged between (0.76-12.56 $\mu$ g/g) and (0.09-0.48 $\mu$ g/g) respectively. The data generated from this study showed that the PVAECF/WF composite flour samples had higher nutritional qualities compared to the commercial 100% wheat flour. The incorporation of the formulated PVAECF/WF flour blends into various baking products and diet formulations will help reduce vitamin A deficiency, prevention and management of cardiovascular diseases, and promotion of healthy population. The data generated will provide a basis for public enlightenment programmes to create awareness on the feasibility of production and commercialization of the composite flour using the newly released biofortified cassava variant (IBA154810) which will consequently target the promotion and encouragement of small and medium scale industries thereby improving the economy of Nigeria.

### PFC2025\_093

#### **Selenium Biofortified Scent Leaves (*Ocimum gratissimum* L.) Enriched Cookies Exhibited Antihyperglycemic Properties and Abated Downregulations of Insulin / CNC-Nrf2 Gene Expressions in STZ- Induced Diabetic Rats**

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#### **ABSTRACT**

This experiment investigated the effect of Selenium biofortified *Ocimum gratissimum* on blood glucose, antioxidant status of pancreas in streptozotocin induced diabetic rats as well as Nrf2 and insulin levels at the molecular level in pancreas of streptozotocin induced diabetic rats. *Ocimum gratissimum* was cultivated and fortified with Selenium via Selenium fortified fertilizer. The Selenium concentration in *Ocimum gratissimum* leaves was analyzed via Atomic Adsorption Spectrometry and phytochemicals via High Performance Liquid Chromatography. The Selenium biofortified *Ocimum gratissimum* was included into diets of wistar rats. The wistar rats were divided into seven groups: control (basal diet), Streptozotocin induced (basal diet), Streptozotocin + Acarbose (basal diet), Streptozotocin (fed 2.5% inclusion scent leaves), Streptozotocin (fed 5% inclusion scent leaves), Streptozotocin (fed 2.5% inclusion Selenium scent leaves) and Streptozotocin (fed 5% inclusion Selenium scent leaves). The rats were fed the respective diets for fourteen days according to groups and sacrificed on the fifteenth day. Selenium biofortification was observed to increase the concentration of Selenium in scent leaves as well as the concentration of some of the phytochemicals present. Inclusion of the Se- biofortified scent leaves in diet of wistar rats countered hyperglycemia in blood of the diabetic rats and increased the activities of Glutathione Peroxidase, Superoxide Dismutase and Catalase in pancreas on rats. Increase in mRNA expressions of INS1 and Nrf2 in pancreas of diabetic rats were also observed. This study shows that Selenium biofortified *Ocimum gratissimum* possesses antiglycemic properties, coupled with its ability to abate down regulation of insulin.

PFC2025\_094

**Effects of *Saccharomyces cerevisia* Solid State Fermentation on Nutritional Composition, Minerals Content, Anti-nutrient and Antioxidant Potential of Rice Bran**

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**ABSTRACT**

Rice bran is the primary by-product of rice grain processing and is produced in large quantities worldwide. It is rich in valuable nutrients and bioactive compounds, many of which possess important health-promoting properties. Despite its rich nutrient profile, the direct application of rice bran in food and feed is limited due to its high levels of anti-nutritional factors and susceptibility to oxidative rancidity. Thus, this study aimed to investigate the effect of *Saccharomyces cerevisiae* solid-state fermentation on the nutritional composition, mineral content, anti-nutritional factors, and antioxidant potential of rice bran. Rice bran was subjected to solid-state fermentation with *S. cerevisiae* for 7 days and analyzed for proximate composition, mineral profile, anti-nutrients, and antioxidant activities. Results showed a significant ( $p < 0.05$ ) increase in protein, fiber, and ash contents in fermented samples compared to the non-fermented control. Anti-nutritional factors were markedly reduced, as phytic acid decreased by 51.9% and tannins by 50.0%, favoring bioavailability of essential minerals, such as iron, zinc, and calcium. Antioxidant evaluation revealed that fermentation enhanced total phenol and flavonoid contents ( $p < 0.05$ ) significantly increased ferric reducing antioxidant power (FRAP) by 49.7% and DPPH radical scavenging activity by 82.6%. Thus, solid-state fermentation with *Saccharomyces cerevisiae* represents an efficient technique to enhance the nutritional composition, mineral availability, and antioxidant potential of rice bran while reducing anti-nutritional factors, making it more suitable for food and feed applications.

PFC2025\_095

**Bio-insecticidal Activity of *Hyptis suaveolens* Leaf-based Bait on *Periplaneta americana*: In-vivo and In-silico Evaluations**

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**ABSTRACT**

*Hyptis suaveolens* reportedly possesses insecticidal activity. Insecticidal activity of *H. suaveolens* leaf-based bait (HSLB) on *Periplaneta americana* (*Pa*) was investigated using *in-vivo* and *in-silico* analyses. Forty-five cockroaches grouped into 5 (n=9), were exposed to the following treatments: Group A (control, feed without insecticide), Group B (standard bait, 0.05% Fipronil), while Groups C, D, and E were exposed to HSLB at 10%, 20%, and 40% leaf inclusion respectively. Mortality rates (10h and 24h) and brain acetylcholinesterase (AChE) activity were evaluated. Also, *H. suaveolens* leaf compounds were docked against *Pa*ATP synthase and *Pa*COX. Mortality rate of cockroaches increased with concentration and exposure time. AChE activity significantly increased in the HSLB-exposed cockroaches. *H. suaveolens* leaf compounds (rutin, hesperidin, quercetin, and rosmarinic acid) had higher inhibitory activities against *Pa*ATP synthase and *Pa*COX than the control inhibitors. Conclusively, *H. suaveolens* can be an effective ingredient for making bio-insecticide baits for management of cockroach infestation.

PFC2025\_096

**Dietary *Aframomum* Seeds Improve Sperm Quality and Testicular Health in a Neurological Dysfunction Model of Male Infertility**

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**ABSTRACT**

Male infertility, often worsened by neurological disorders and oxidative stress, remains a major health concern. This study evaluated the effects of *Aframomum melegueta* (AFM) and *Aframomum danielli* (AFD) seed-supplemented diets on sperm quality and testicular health in scopolamine-induced male rats. Adult rats were assigned to control, scopolamine-induced, donepezil-treated, and four treatment groups receiving 4% or 8% AFM or AFD diets. Sperm parameters, testosterone, oxidative stress markers, antioxidant enzymes, and inflammatory cytokines were assessed. Scopolamine markedly impaired sperm concentration, motility, and morphology, lowered testosterone, elevated oxidative stress, and disrupted cytokine balance. Supplementation with AFM and AFD, particularly at 8%, significantly improved sperm concentration, motility, morphology, testosterone levels, antioxidant defences, and anti-inflammatory responses. Compared with AFD, AFM exhibited stronger fertility-enhancing potential. These findings suggest AFM and AFD as promising natural dietary interventions for mitigating male infertility linked to neurological dysfunction. This study underscores the value of dietary phytochemicals as affordable, safe strategies for preserving male reproductive health.

PFC2025\_097

**Neuroprotective Effects Of Dietary Inclusions of Alligator Pepper (*Aframomum melegueta*) and Bastard Melegueta (*Aframomum danielli*) Seeds on Scopolamine-induced Amnesia in Rats**

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**ABSTRACT**

Neurodegenerative disorders remain a major global health burden, often associated with cognitive decline, oxidative stress, and neuroinflammation. This study investigated the neuroprotective potential of *Aframomum melegueta* (AFM) and *Aframomum danielli* (AFD) seed-supplemented diets in scopolamine-induced cognitive impairment in male rats. Animals were pretreated with 4% or 8% AFM or AFD diets prior to scopolamine administration. Behavioural assessments of learning and memory were conducted alongside biochemical evaluations of cholinergic enzyme activity, oxidative stress markers, antioxidant defences, and inflammatory cytokines. Scopolamine administration significantly impaired memory performance, elevated acetylcholinesterase activity, increased oxidative stress, and disrupted cytokine balance. Dietary AFM and AFD supplementation improved cognitive function, restored antioxidant enzyme activities, reduced oxidative stress, and normalized pro- and anti-inflammatory cytokine levels. Between the two seeds, AFM demonstrated comparatively stronger neuroprotective effects. These findings highlight *Aframomum* seeds as promising functional foods with therapeutic potential for mitigating memory deficits associated with neurodegenerative conditions.

PFC2025\_098

**Dietary *Aframomum melegueta* and *Aframomum danielli* Seeds Mitigate Erectile Dysfunction in the Corpus Cavernosum of Scopolamine-Treated Rats**

**Esther A. Olawuyi, Odunayo M. Agunloye, and Ganiyu Oboh**

**ABSTRACT**

Neurogenic erectile dysfunction (ED), strongly linked to impaired neurotransmission, oxidative imbalance, and hormonal disruption, represents a critical gap in current therapeutic management. This study evaluated the erectogenic effects of *Aframomum melegueta* (AFM) and *Aframomum danielli* (AFD) seed-supplemented diets in scopolamine-induced erectile dysfunction (SID) in male rats. Animals were pretreated with 4% or 8% AFM or AFD diets prior to scopolamine administration. Sexual behaviour, nitric oxide and testosterone levels, enzyme activities, and oxidative stress markers were evaluated. SID rats exhibited poor sexual performance, elevated PDE-5, AChE, and arginase activities, alongside reduced nitric oxide, testosterone, and thiols with increased reactive oxygen species. Dietary AFM and AFD, particularly at 8%, significantly improved erectile function, normalized enzyme activities, restored testosterone, and enhanced antioxidant defences. AFM showed greater erectogenic efficacy than AFD. These findings suggest *Aframomum* seeds as promising natural interventions for neurogenic ED through multifaceted benefits.

PFC2025\_099

**Effects of African Star Apple (*Chrysophyllum albidum*) Components on Neuroprotective and Carbohydrate metabolizing Enzymes**

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**ABSTRACT**

*Chrysophyllum albidum* (Linn.), commonly referred to as African star fruit, is used in traditional medicine to treat a variety of illnesses. Freshly collected fruits were separated into pulp, seeds and peel and were air dried. The colorimetric method and high-performance liquid chromatography (HPLC) method were used to assess the pulp, peel, and seed components of *Chrysophyllum albidum* as well as their individual phytochemical constituents' capacity to scavenge radicals *in vitro*. *Chrysophyllum albidum* components. Using quercetin as a reference and ascorbic acid as the ferric reducing antioxidant property (FRAP) standard, the pulp extract from *Chrysophyllum albidum* outperformed the other fruit components in terms of scavenging DPPH (EC<sub>50</sub> = 0.311 mg/mL), OH (EC<sub>50</sub> = 0.046 mg/mL), and chelated iron (EC<sub>50</sub> = 0.038 mg/mL). Similar to the other components studied, the fruit peel had a higher FRAP (0.024 mgAAE/g) and was more effective at scavenging NO radicals (EC<sub>50</sub> = 0.156 mg/mL). Comparing *Chrysophyllum albidum* seeds to pulp, there was no appreciable change in the chelation of iron (EC<sub>50</sub> = 0.038 mg/mL). Lipid peroxidation caused by sodium nitruoprusside showed that the pulp (EC<sub>50</sub> = 0.048 mg/mL) best reduced lipid peroxidation in the pancreas, whereas the quercetin control (EC<sub>50</sub> = 0.055 mg/mL) inhibited lipid peroxidation in the brain more effectively than the plant's constituent parts. The three components of *Chrysophyllum albidum* with gallic acid control were used to examine the activities of the enzymes that metabolize carbohydrates ( $\alpha$ -amylase and  $\alpha$ -glucosidase). The findings showed that three substances

strongly inhibited the activities of  $\alpha$ -amylase and  $\alpha$ -glucosidase more than other components of the *Chrysophyllum albidum* examined, with  $IC_{50}$  values of 0.056 mg/mL and 0.034 mg/mL, respectively, with the pulp. Additionally, using donepezil as a control, the neuro-enzymes monoamine oxidase (MAO) and acetylcholinesterase (AChE) activity were assessed using *Chrysophyllum albidum* components. Furthermore, the pulp considerably reduced AChE and MAO activities better than the other fruit components examined ( $IC_{50} = 0.096$  mg/mL and  $IC_{50} = 0.519$  mg/mL), according to the data. The phytochemical arrays created by HPLC findings describe the bioactive components of the pulp of *Chrysophyllum albidum*. These results demonstrated the pharmacological potential of *Chrysophyllum albidum* components, given their growing use in food formulations and as a treatment for certain oxidative stress-related illnesses, including type II diabetes mellitus and some neurodegenerative diseases.

## PFC2025\_0100

### Effects of Various Fractions of *Chasmanthera Dependens* (Hochst) on Some Antioxidative and Neuro-chemical Parameters Using *In Vitro* Models

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#### ABSTRACT

This study investigated the antioxidant and enzyme inhibitory potential of *Chasmanthera dependens* extracts (methanol, dichloromethane, ethyl acetate, and butanol), focusing on mechanisms relevant to oxidative stress and neurodegenerative diseases. The effects of the extracts were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, nitric oxide (NO) scavenging, lipid peroxidation inhibition, and enzyme inhibition assays targeting acetylcholinesterase (AChE) and monoamine oxidase (MAO) activities. The DCM extract of *Chasmanthera dependens* exhibited significantly stronger ( $p \leq 0.05$ ) DPPH scavenging activity ( $EC_{50} = 0.138$  mg/mL) compared to the other extracts [methanol ( $EC_{50} = 0.139$  mg/mL), ethyl acetate ( $EC_{50} = 0.149$  mg/mL), and butanol ( $EC_{50} = 0.141$  mg/mL)]. However, there was no significant difference in DPPH scavenging between the methanol and ethyl acetate extracts. The methanol extract demonstrated superior NO scavenging (0.083 mg/mL) and lipid peroxidation inhibition (0.146 mg/mL), outperforming the quercetin control and other extracts. The butanol and DCM extracts showed comparatively weaker NO scavenging and lipid peroxidation inhibition, with no significant difference between them. In enzyme inhibition assays, the ethyl acetate extract showed the highest AChE inhibitory activity ( $EC_{50} = 0.039$  mg/mL), surpassing other extracts [DCM ( $EC_{50} = 0.041$  mg/mL), methanol ( $EC_{50} = 0.041$  mg/mL), and butanol ( $EC_{50} = 0.041$  mg/mL)]. There was no significant difference among the DCM, methanol and butanol extracts. The methanol extract also exhibited potent MAO inhibition ( $EC_{50} = 0.119$  mg/mL), significantly stronger than the control ( $EC_{50} = 0.233$  mg/mL) and other extracts. The ethyl acetate and butanol fractions exhibited moderate MAO inhibition, while the DCM extract had the least activity, with differences between butanol and ethyl acetate not statistically significant. These findings highlight the therapeutic potential of *Chasmanthera dependens*, particularly its methanol extract, as a natural antioxidant and neuroprotective agent. The results suggest that the extract's bioactivity may be attributed to its high phenolic and flavonoid content, which contribute to its radical scavenging and enzyme inhibitory properties. Further studies are recommended to isolate the active compounds and evaluate their efficacy in *in-vivo* and clinical models for neurodegenerative disease management.

PFC2025\_101

**Production and Evaluation of Composite Tea from a blend of *Camellia sinensis* and *Eugenia uniflora* (The Pitanga): - A Search for Tea Materials, Improving Human Health**

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**ABSTRACT**

Sample of tea (*Camellia sinensis*) obtained from Mambilla, Nigeria highland, was blended with the pitanga (*Eugenia uniflora*), a known flourishing shrub in the lowland area of Nigeria. The ratio of the blends was Camellia (C) / Eugenia (E) 50:50, 60:40, 70:30, 80:20 and 90:10 while whole Camellia and Eugenia served as control samples. Chemical analyses of blends were done followed by organoleptic assessment and microbial analysis employing standard procedures. The chemical analyses showed a lower value of 9.78 % ash for Eugenia than Camellia which was 11.67 %. The ash content of all the tea blends was significantly different at one percent alpha level. All the blends were also found to vary significantly in alkalinity of ash, water soluble ash, acid insoluble ash and total ash. No significant difference was observed in the moisture content of both the controls and the formulated tea blends. The zero (Nil) fungal count recorded in the whole *camellia sinensis* and the *Eugenia uniflora* was as a result of adequate drying of the leaves. Sensory analyses carried out indicated that at five percent alpha level, there were no significant differences in the colour attributes for all the blends but difference exists for taste, flavor, mouthfeel and overall acceptability. In all the blends, 50:50 blend of the integrated components, was highly rated followed by whole camellia, whole Eugenia, 70:30, 80:20, and 90:10 (rated at par) and 60:40 had least rating. Over all, composite blend of 50:50 was preferred.

PFC2025\_102

**The Effect of Fermentation on the Nutritional, Mineral, Anti-nutrient, and Antioxidant Properties of Some Selected Oil Seeds**

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**ABSTRACT**

This study investigated the effect of fermentation on the nutritional composition, anti-nutritional factors, phytochemical constituents, and antioxidant properties of four tropical oil seeds: African oil bean (*Pentaclethra macrophylla*), locust bean (*Parkia biglobosa*), fluted pumpkin seed (*Telfairia occidentalis*), and melon seed (*Citrullus vulgaris*). Standard analytical procedures were employed to determine proximate composition, mineral content, anti-nutritional factors, total phenolic and flavonoid content, and antioxidant activities using ferric reducing antioxidant power (FRAP), DPPH, ABTS, Fe<sup>2+</sup> chelation, hydroxyl radical scavenging, and lipid peroxidation inhibition assays. Fermentation induced significant compositional and functional changes across the seeds, though responses were seed-specific. In African oil bean and locust bean seeds, fermentation markedly increased phenolic and flavonoid contents, enhanced mineral bioavailability, and improved antioxidant activities across all assays. Fluted pumpkin seed showed moderate improvements, while melon seed exhibited declines in phenolic and flavonoid content, with corresponding reductions in antioxidant capacity. Fermentation also reduced key anti-nutritional factors such as phytates and alkaloids in some seeds, thereby improving their nutritional potential. Overall, the findings confirm that fermentation is an effective bioprocessing method for enhancing the nutritional and functional qualities of selected indigenous seeds, with African oil bean and locust bean demonstrating the greatest potential as functional foods. The study underscores the importance of seed-specific responses to fermentation and highlights the need for optimized processing conditions to maximize nutritional benefits.

PFC2025\_103

**Effect of Polyherbal Teas Administration on Parasitemia Levels, Inflammatory Cytokines and Hematological Parameters in *plasmodium berghie* infected mice**

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**ABSTRACT**

Malaria is a life-threatening disease and it is responsible for the death of thousands globally. Over the years this parasite has developed resistance against quite a number of synthetic drugs, hence the need of a switch to natural products. This study assessed the effect of formulated polyherbal teas on parasitemia levels, inflammatory cytokines and hematological parameters in *plasmodium berghie* (NK65 strain) infected mice. Fifty four (54) adult male mice were randomly divided into nine (9) groups (n=6); group I (non-infected), group II (infected with no treatment), group III (infected + chloroquine), group IV (infected + *Anacardium occidentale*/*Moringa oleifera*/*Cymbopogon citrtus* polyherbal formulation (low dose), group V (infected + *Anacardium occidentale*/*Moringa oleifera*/*Cymbopogon citrtus* polyherbal formulation (high dose), group VI (infected + *Moringa oleifera*/*Cymbopogon citrtus*/*Mangifera indica* polyherbal formulation (low dose), group VII (infected + *Moringa oleifera*/*Cymbopogon citrtus*/*Mangifera indica* polyherbal formulation (high dose), group VIII (infected + *Anacardium occidentale*/*Moringa oleifera*/*Cymbopogon citrtus*/*Mangifera indica* polyherbal formulation (low dose) and group IX (infected + *Anacardium occidentale*/*Moringa oleifera*/*Cymbopogon citrtus*/*Mangifera* polyherbal formulation (high dose). The infected mice were orally administered with the treatment once daily for 5 days and the parasitemia level and temperature were checked and recorded. Thereafter, the mice were sacrificed and blood samples were collected for hematological analysis and inflammatory cytokines determination. The results revealed that all groups treated the formulated polyherbal teas had reduced parasitemia levels, reduced pro-inflammatory cytokines, increased anti-inflammatory levels and normalized altered hematological parameters when compared to the non-treated group. However, infected mice treated with high dose of moringa/lemon grass/mango had significantly ( $p < 0.05$ ) suppressed parasitemia level (70.85%), reduced pro-inflammatory cytokine levels, increased anti-inflammatory cytokine levels and normalized altered hematological parameters when compared to others. While, the polyherbal tea containing *Anacardium occidentale*/*Moringa oleifera*/*Cymbopogon citrtus*/*Mangifera indica* had the least protective effect among the treated groups. This study suggests that the formulated polyherbal teas have antiplasmodic, anti-inflammatory, and hematoprotective properties, hence reaffirming their potential as an alternative therapy in malaria management.

PFC2025\_104

**Effect of Stool wood (*Alstonia boonei*) Aqueous Extract on key Enzymes linked with Diabetes and its Antioxidant Potential**

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**ABSTRACT**

*Alstonia boonei*, a medicinal plant native to West Africa, has long been utilized in traditional medicine for its potential therapeutic properties. This study seeks to investigate the anti-diabetic and antioxidant properties of *Alstonia boonei*. The stem bark aqueous extract of *Alstonia boonei* was prepared by weighing 1kg of *Alstonia boonei* stem bark powder and extracting it in 10 L of distilled water with constant shaking. The obtained extract was filtered and lyophilized, thereafter, 250 mg of the lyophilized extract was dissolved in 100ml of distilled water which was further used for different *in-vitro* biochemical assays. The

total phenol, total flavonoid, antioxidant properties (1,1-diphenyl-2-picrylhydrazyl (DPPH), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS) and nitric oxide radical scavenging activities) and antidiabetic properties of the aqueous extract of *Alstonia boonei* were evaluated. The result revealed that *Alstonia boonei* have high phenol and flavonoid content, also aqueous extract of *Alstonia boonei* exhibit antioxidant properties when compared with ascorbic acid, also *Alstonia boonei* exhibit inhibitory effect on key enzymes linked with diabetes when compared with metformin. Therefore, this study revealed the antidiabetic mechanism of *Alstonia boonei* aqueous extract. Therefore, further studies is required to investigate the blood glucose lowering properties of aqueous extract of *Alstonia boonei* in rats.

**PFC2025\_105**

**Neuroprotective Effects of *Piper guineense* Leaf Fortified Composite Snack in Scopolamine-induced Neurological Damage Rats**

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**ABSTRACT**

Functional foods have gathered increasing scientific and public health relevance due to their potential to confer bioactive components that provide health benefits beyond basic nutrient when consumed as part of a varied diet at regular and efficacious levels. This study aimed to assess the effects of *Piper guineense* leaf fortified composite snack in Scopolamine-induced neurological damage in rats. The composite snack was made from corn flour and wheat flour at ratio 6:1 fortified with *Piper guineense* powdered leaf at 0%, 1%, 2%, 3%, and 4% respectively. Sensory evaluation, proximate analysis, total phenol and total flavonoid content of the composite snack was conducted. The result of the sensory evaluation showed 0%, 1%, and 2% concentration of *Piper guineense* leaf fortified snack to be more acceptable. Thereafter, forty-eight Wistar rats were randomly divided into six groups; all the groups were administered Scopolamine (3mg/kg) except group 1 that served as control. Group 2 was fed with normal rat chow, group 3 was treated with Donepezil (20 mg/kg), group 4- 6 were treated with 0%, 1%, and 2% fortified snack respectively. The experiment lasted for 21 days, the rats were sacrificed, the brain were excised and homogenized in cold phosphate buffer pH 7.4. the cholinergic enzymes [acetylcholinesterase (AChE) and butyrylcholinesterase (BChE)], antioxidant enzymes [superoxide dismutase (SOD) and catalase], thiobarbituric acid (TBARS) level of the brain homogenate were determined. The result revealed the proximate content with increase total phenol, total flavonoid content of the snack, the bioassay showed a significant increase ( $p > 0.05$ ) in AChE, BChE activity and TBARS level with decreased SOD and catalase activity when comparing the untreated with the control group. There was a significant decrease ( $p < 0.05$ ) in the cholinergic enzyme activity with the TBARS level with increased antioxidant enzymes activity in the treated groups compared with untreated. The findings from this study showed fortified snack as functional food and could proffer protection against neuronal damage.

PFC2025\_106

**Phytochemical-Rich Baobab-Based Functional Beverages Modulate Hypertension and Renal Redox Pathways in Rats**

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**ABSTRACT**

The development of plant-based functional beverages offers a promising dietary approach to combating hypertension, a condition strongly linked to oxidative stress and nitric oxide (NO) deficiency. This study evaluated baobab-based beverages fortified with cloves, tiger nut, and dates in L-NAME + high-fat diet (HFD)-induced hypertensive rats, with a focus on their phytochemical composition, blood pressure regulation, renal enzyme modulation, and antioxidant activity. Phytochemical analysis revealed that formulations significantly differed in their bioactive contents, with total phenol values ranging from 12.11 ± 0.11 to 15.43 ± 0.22 mg GAE/mL and total flavonoids from 4.41 ± 0.14 to 7.03 ± 0.14 mg QE/mL, the highest observed in the 50% baobab + 25% clove + 25% date blend. Functionally, hypertensive rats displayed markedly elevated systolic and diastolic blood pressure, depleted kidney NO levels, and heightened angiotensin-converting enzyme (ACE) and arginase activities, coupled with suppressed antioxidant defenses. Intervention with the enriched beverages significantly reduced blood pressure, restored renal NO, suppressed ACE and arginase activity, and enhanced antioxidant enzymes such as superoxide dismutase and catalase, thereby reestablishing redox balance. Additionally, lipid profile improvements were observed, with reductions in total cholesterol, LDL, and triglycerides, and increases in HDL cholesterol. Overall, these findings demonstrate that baobab-based beverages enriched with cloves, tiger nut, and dates provide phytochemically rich, culturally relevant nutraceuticals that alleviate hypertension through NO preservation, enzyme modulation, and antioxidant reinforcement.

PFC2025\_107

**Nutraceutical Potentials of *Jatropha tanjorensis*: Glucosinolates, Polyphenolics, and Antioxidant Properties**

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**ABSTRACT**

The use of plants for food and as biopharmaceuticals to treat diseases in traditional and herbal medicine continues to attract global attention. *Jatropha tanjorensis*, commonly known as ‘efo iyana ipaja’ is a green vegetable widely consumed in Nigeria, reputed for its medicinal and nutritional benefits. Bioactive compounds such as glucosinolates and polyphenolics are of particular interest because of their therapeutic potential, especially in the prevention and management of chronic diseases. Glucosinolates are anionic, sulfur-containing secondary metabolites whose hydrolysis products, including isothiocyanates, have been linked to diverse biological activities such as antioxidant, anticancer, and antimicrobial effects. This study investigated the phytochemical composition and antioxidant properties of the aqueous leaf extract of *J. tanjorensis*. Quantitative analysis revealed a glucosinolate concentration of 11.4%, a value relatively higher than that found in many cruciferous vegetables, suggesting the plant as a promising dietary source of these compounds. In addition, the total flavonoid content (TFC), total phenolic content (TPC), and tannin content

(TC) were determined as indicators of polyphenolic abundance, with respective values of 41.73 mgQE/g, 11.17 mgGE/g, and 18.69 mgGE/g. The antioxidant capacity, assessed using 2,2-diphenyl-1-picrylhydrazine (DPPH) radical scavenging assay, showed significantly ( $p < 0.05$ ) higher activity in the plant extract compared to the ascorbic acid standard. Overall, the findings highlight that *J. tanjorensis* leaves are rich in glucosinolates, polyphenolics, and antioxidants, and may serve as a valuable nutraceutical resource. These properties underscore its potential for development into plant-based therapies for the prevention of oxidative stress-related diseases.

## PFC2025\_108

### Assessment of Functional Bread Formulations Enriched with Tiger Nut Flour and Moringa on Oxidative Stress in Hypertensive Rat Models

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#### ABSTRACT

Hypertension and oxidative stress are strongly connected pathological states, often worsened by diets high in refined flour and saturated fats. This study examined the *in vivo* antioxidant effects of functional bread formulations made from composite flours and enriched with Moringa in Wistar rats; with hypertension induced by L-NAME administration and a high-fat diet (HFD). The experimental groups included a basal diet, L-NAME + HFD alone, and L-NAME + HFD combined with breads made from all-purpose flour (APF), tiger nut flour (TNF), and Moringa powder (Mo) at various proportions, along with a commercial bread. The rats consumed their respective diets for 14 days, after which oxidative stress markers were measured. Malondialdehyde (MDA) was used as an indicator of lipid peroxidation, while reduced glutathione (GSH) levels and the activities of catalase (CAT), superoxide dismutase (SOD), and glutathione peroxidase (GPx) were analyzed in the liver, kidney, and heart. Rats fed with functional bread formulations containing APF-TNF blends and Moringa showed significant decreases in oxidative damage, marked by lower MDA levels and higher antioxidant enzyme activities compared to the L-NAME + HFD group. Additionally, functional breads-maintained tissue integrity and improved overall redox balance in a dose-dependent way, with TNF substitution and Moringa fortification offering synergistic advantages. In contrast, commercial bread failed to offer protective effects, highlighting the potential of functional breads as health-promoting dietary alternatives.

## PFC2025\_109

### Influence of Time Duration on Polyherbal Teas Antioxidant Status In-Vitro

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#### ABSTRACT

Polyherbal formulations are gaining increasing attention due to their synergistic bioactive compounds with health-promoting potentials. This study investigated the influence of time duration on the antioxidant status of polyherbal teas formulated from *Anacardium occidentale* (cashew), *Moringa oleifera* (moringa), *Cymbopogon citratus* (lemon grass), and *Mangifera indica* (mango) leaves in various combinations such as cashew/moringa/lemon grass leaves; moringa/lemon grass/mango leaves; and cashew/moringa/lemon grass/mango leaves. The combination was packaged into a tea bag, prepared and infused at varying time intervals (5,10,15,20 minutes), and evaluated for antioxidant activity using standard *in-vitro* assays,

including total phenol content, total flavonoid, 2,2'-Azino-bis (3-ethylbenzothiazoline 6-sulfonic acid) (ABTS), 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity, and ferric reducing antioxidant power (FRAP). Results revealed that the total phenol, total flavonoid and free radical scavenging capacity increased progressively between 5 to 15 minutes of infusion across all formulations. However, a slight decrease in the antioxidant properties, total phenol and total flavonoid content of the polyherbal tea at 20 minutes in some assays. However, polyherbal tea with moringa/lemon grass/ mango leaves consistently showed higher total phenol, total flavonoid and antioxidant property when compared with other formulated polyherbal tea. Among the polyherbal formulations, moringa/lemon grass/mango consistently showed the highest activity. It could be concluded that a 15-minute steeping time is optimal for maximizing the extraction of bioactive compounds from the polyherbal teas. While prolonged steeping might have effects on heat-sensitive bioactive compounds and might have responsible for the observed reduced in antioxidant property in tea steeped at 20 minutes.

## PFC2025\_110

### **Herbs And Spices as Functional and Nutraceutical Foods: Bridging Nutrition and Health**

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#### **ABSTRACT**

Herbs and spices which are traditionally valued for their flavour enhancement, have increasingly gained recognition for their functional and nutraceutical properties. Functional foods are defined as dietary components that provide health benefits beyond basic nutrition by positively influencing specific physiological functions and reducing disease risk. Similarly, nutraceuticals derived from the fusion of “nutrition” and “pharmaceuticals” refer to foods or food components that provide therapeutic or preventive benefits against chronic diseases. Herbs and spices such as turmeric, garlic, ginger, cinnamon and cloves contain bioactive compounds with antioxidant, anti-inflammatory, antimicrobial and cardio-protective properties. Their integration into daily diets supports improved health outcomes, including enhanced immunity, metabolic regulation and reduced risk of non-communicable diseases. Despite these benefits, misuse and excessive consumption can pose health risks such as gastrointestinal irritation, drug-herb interactions or blood thinning effects, emphasizing the need for informed and moderate use. This reviewed article highlights the dual role of herbs and spices as functional and nutraceutical foods, their classification, health promoting mechanisms and the delicate balance between therapeutic use and potential abuse. By exploring both scientific evidence and practical applications, this work reinforces Hippocrates’ adage which says, “Let food be thy medicine,” while emphasizing further that herbs and spices should complement, but not replace the conventional medical care. The incorporation of these bioactive-rich foods into everyday diets offers promising strategies for disease prevention, wellness promotion and the advancement of functional food innovation.

PFC2025\_111

**Safety evaluation of a pumpkin (*Cucurbita pepo*) seed–based fermented yoghurt in rats: Acute and sub-acute oral toxicity studies**

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**ABSTRACT**

Pumpkin seeds (*Cucurbita pepo* L.) are rich in protein, polyunsaturated fatty acids, minerals, and phytochemicals with antioxidant, anti-inflammatory, hypoglycaemic, and hypolipidaemic effects. However, limited data are available regarding the safety of fermented products derived from pumpkin seeds. This study investigated the acute and sub-acute oral toxicity of pumpkin seed–based fermented yoghurt in healthy Wistar rats. Two formulations were prepared: XYZ yoghurt (50% pumpkin seed milk + 50% dairy milk) and XMP yoghurt (100% pumpkin seed milk). In the acute toxicity study, rats (n = 18) received a single oral dose of 5000 mg/kg and were monitored for 14 days. In the sub-acute toxicity study, rats (n = 54) received daily oral doses of 100, 250, 500, or 1000 mg/kg for 28 days. Body and organ weights, hematological indices, serum biochemical markers (AST, ALT, ALP, creatinine, urea, total protein, albumin), and histopathology of liver and kidney tissues were evaluated. No treatment-related toxicity was observed. Body and organ weights remained unaffected. Hematological parameters remained within physiological limits, further supporting the safety of the yoghurt formulations. Similarly, biochemical and histopathological findings revealed no evidence of hepatic or renal toxicity, as relevant markers were within normal ranges. Pumpkin seed–based fermented yoghurt exhibited no acute or sub-acute systemic, hepatic, or renal toxicity, supporting its potential as a safe functional food candidate. Nevertheless, further studies are needed to determine the optimal dosage and confirm applicability in humans.

PFC2025\_112

**Effect of Stool wood (*Alstonia boonei* De Wild) Aqueous Extract on key Enzymes linked with Diabetes and its Antioxidant Potential**

**Akintoye Opeyemi Francis, Agunloye Odunayo Micheal and Ganiyu Oboh**

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**ABSTRACT**

*Alstonia boonei*, a medicinal plant native to West Africa, has long been utilized in traditional medicine for its potential therapeutic properties. This study seeks to investigate the anti-diabetic and antioxidant properties of *Alstonia boonei*. The stem bark aqueous extract of *Alstonia boonei* was prepared by weighing 1kg of *Alstonia boonei* stem bark powder and extracting it in 10 L of distilled water with constant shaking. The obtained extract was filtered and lyophilized, thereafter, 250 mg of the lyophilized extract was dissolved in 100ml of distilled water which was further used for different *in-vitro* biochemical assays. The total phenol, total flavonoid, antioxidant properties (1,1-diphenyl-2-picrylhydrazyl (DPPH), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS) and nitric oxide radical scavenging activities) and antidiabetic properties of the aqueous extract of *Alstonia boonei* were evaluated. The result revealed that *Alstonia boonei* have high phenol and flavonoid content, also aqueous extract of *Alstonia boonei* exhibit antioxidant properties when compared with ascorbic acid, also *Alstonia boonei* exhibit inhibitory effect on

key enzymes linked with diabetes when compared with metformin. Therefore, this study revealed the antidiabetic mechanism of *Alstonia boonei* aqueous extract. Therefore, further studies are required to investigate the blood glucose lowering properties of aqueous extract of *Alstonia boonei* in rats.

### PFC2025\_113

#### **Toxicological Evaluation of *Piper Guineense* Leaf Fortified Composite Snack Using Wistar Rats** **Babatola, L. J., Adeniyi, A.A., Adebayo, A. A., Adegoke, O. O.**

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#### **ABSTRACT**

Currently, functional foods have gathered increasing scientific and public health relevance due to their potentials to confer bioactive components that provide health benefits beyond basic nutrient when consumed as part of a varied diet at regular and efficacious levels. *Piper guineense*, commonly known as West Africa black pepper leaf, is a medicinal plant widely used in traditional African medicine for various neurological conditions. Thus, this study assessed the safe percentage inclusion of *Piper guineense* leaf in composite snack using rat model. Production of fortified composite snack, sensory evaluation, proximate analysis, and the toxicology evaluation using liver and kidney function markers. The composite snack was made from corn flour and wheat flour at ratio 6:1 with inclusion of *Piper guineense* leaf powder at 0%, 1%, 2%, 3%, and 4% respectively. Forty-eight male Wistar rats were randomly divided into six groups, group 1 as control was fed with normal rat chow while others were fed with the composite snack produced at 0 – 4% respectively. The result showed the acceptable concentrations as 0%, followed by 1% and then 2% being the most preferred, with improved proximate composition of the snack, and no significant difference ( $p < 0.05$ ) in the level of the liver function markers (AST, ALT, ALP, T-BIL, D-BIL) and kidney markers (Creatinine, Urea and Uric Acid) when compared with control group. The findings from this study showed that the *Piper guineense* leaf fortified composite snack produced is safe at the most acceptable concentration (1% and 2%) from this study. Hence further study can be carried out using the concentration.

### PFC2025\_114

#### **Formulation and Evaluation of Donkwa Snack Enriched with Goron Tula (*Azanza garckeana*) Flour for the Dietary Management of Erectile Dysfunction in Diabetic Patients.** **Olayinka Temidayo Mamukuyomi<sup>1</sup>, Oluwole Steve Ijarotimi<sup>1</sup>, and Adebajo Ayobamidele Badejo<sup>2</sup>**

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#### **ABSTRACT**

A major side effect of diabetes mellitus is erectile dysfunction (ED), which is frequently associated with oxidative stress, decreased nitric oxide signaling, and endothelial dysfunction. In diabetic populations, dietary therapies high in bioactive substances have shown promise as supplemental ED management techniques. Rich in flavonoids, saponins, and amino acids like L-arginine, Goron Tula (*Azanza garckeana*) is a fruit that has long been used for its aphrodisiac and therapeutic qualities. It may also improve vascular function and sexual health. In order to create a functional food that may help diabetic patients manage their ED through diet, this study investigates the composition of donkwa, a typical West African snack, enhanced with Goron Tula flour. The enhanced snack's proximate composition, phytochemical content, antioxidant

activity, and amino acid profile were assessed. To make sure it is appropriate for diabetics, its glycemic index and sensory acceptability were evaluated. In addition to encouraging the value-adding of local food resources, this work attempts to offer a sustainable, accessible, and acceptable dietary approach to support the management of erectile dysfunction in diabetic patients by combining a culturally appropriate food product with functional bioactive components

**PFC2025\_115**

**Baobab-Based Functional Beverages Restore Erectile Function in Hypertensive Rats through Phytochemical Enrichment and Enzymatic Modulation**

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**ABSTRACT**

Erectile dysfunction (ED), commonly associated with hypertension, is mediated by nitric oxide (NO) deficiency, phosphodiesterase-5 (PDE-5) overactivity, and oxidative stress. This study evaluated the potential of baobab-based beverages fortified with cloves, tiger nut, and dates in ameliorating ED in L-NAME + high-fat diet (HFD)-induced hypertensive rats. Phytochemical profiling revealed significantly enriched bioactive contents, with total phenols ranging from  $12.11 \pm 0.11$  to  $15.43 \pm 0.22$  mg GAE/mL and flavonoids from  $4.41 \pm 0.14$  to  $7.03 \pm 0.14$  mg QE/mL, the highest concentrations observed in the 50% baobab + 25% clove + 25% date blend. Functionally, hypertensive rats exhibited profound sexual impairment, characterized by reduced mount and intromission numbers, prolonged latencies, depleted penile NO levels, and elevated PDE-5 and arginase activities. Intervention with baobab-based beverages significantly improved sexual performance indices, restoring mount and intromission numbers while reducing latencies to levels comparable to lisinopril. These behavioral improvements were strongly correlated with enhanced NO bioavailability in penile tissue, suppression of PDE-5, arginase, and angiotensin-converting enzyme (ACE) activities, and restoration of antioxidant defenses including superoxide dismutase and catalase. Collectively, these results demonstrate that baobab-based functional beverages, particularly clove- and date-enriched blends, confer robust phytochemical and biochemical benefits that reverse hypertension-induced erectile dysfunction. These findings underscore their potential as culturally relevant nutraceuticals for restoring sexual health through synergistic modulation of NO signaling, enzymatic activity, and redox balance.

PFC2025\_116

### **Integrating Functional Foods into Primary and Secondary School Nutrition Education: Building Nutrition Literacy for the Future**

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#### **ABSTRACT**

Traditional nutrition education in schools typically emphasizes the basic food groups, yet it often overlooks the emerging concept of functional foods. Functional foods, enriched with bioactive compounds such as antioxidants, probiotics, and plant-derived phytochemicals, represent a rapidly advancing field in nutritional science with significant implications for health promotion and disease prevention. Despite their growing relevance, awareness of functional foods remains largely restricted to researchers, higher education institutions, and health professionals, leaving a critical gap in early nutrition literacy. This paper advocates for the deliberate integration of functional food concepts into primary and secondary school curricula. The aim is to build foundational nutrition literacy, cultivate scientific curiosity, and prepare students to engage with food science, biotechnology, and health innovation from a young age. A narrative review of literature in nutritional science, education, and science communication will be conducted. The review will examine pedagogical strategies for presenting functional food concepts in age-appropriate formats, including interactive classroom discussions, hands-on demonstrations, and project-based learning approaches that connect food with science, culture, and innovation. Embedding functional food education in early learning can help students go beyond rote knowledge of food groups. It encourages them to critically engage with both the cultural and health-related dimensions of diet. This exposure is expected to enhance scientific literacy, foster healthier food choices, and inspire future interest in careers across nutrition, food technology, and biomedical sciences. Functional food education should be positioned as an essential component of modern school curricula. By equipping young learners with knowledge of bioactive-rich foods and their roles in health and sustainability, this approach can foster a generation of informed citizens and future leaders in food, health, and innovation.

PFC2025\_117

### **A Comparative Study of the Proximate and Mineral Composition of Neem, Neem-Lemon and Neem-Lime Blend of Beverages.**

**Funmilayo Mercy Ojo<sup>1,2</sup>, Adedayo O. Ademiluyi<sup>1</sup> and Ganiyu Oboh<sup>1</sup>**

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#### **ABSTRACT**

The development of functional drinks from local plants provides a sustainable approach to enhancing nutrition and health. This study examined the moisture, ash, and mineral content of leaf-based beverages made from *Azadirachta indica* (neem) alone and combined with *Citrus limon* (lemon) or *Citrus aurantifolia* (lime). Proximate analysis revealed apparent nutrient differences between formulations. Moisture was

highest in neem-lime (8.01%), followed by neem-lemon (7.65%), and lowest in neem alone (6.99%), reflecting the hydrating qualities of citrus. Ash content was highest in neem-lemon (2.45%), fats (11.02%) and proteins (7.35%) were highest in neem alone, implying that citrus dilutes neem's nutrients. Fiber increased in neem-lemon (3.05%) but decreased in neem-lime (1.87%), while carbohydrates were higher in citrus-fortified drinks (>71%) compared to neem (69.58%). Phytochemical tests showed slightly more tannins in citrus-fortified drinks (0.025%) than in neem (0.024%), while phytates, highest in neem (0.031%), decreased significantly in neem-lime (0.026%), indicating improved mineral absorption. Cyanogenic glycoside levels remained very low, with neem-lemon slightly elevated (0.002%). Mineral analysis showed that neem-lemon had higher sodium (1521mg/100g), potassium (1812mg/100g), and zinc (0.020mg/100g), consistent with its higher ash and fiber content. Neem-lime had better iron (0.84mg/100g) and phosphorus (113.2mg/100g), while neem alone was richest in calcium (380mg/100g), magnesium (772mg/100g), and manganese (0.077mg/100g). Overall, neem-lemon stands out as a mineral- and fiber-rich functional beverage; neem-lime as an energy and iron booster; and neem alone as a nutrient-dense formulation. These findings reveal the potential of neem-citrus drinks as culturally relevant, nutritionally targeted functional foods that fulfill specific dietary needs.

## PFC2025\_118

### **Erectogenic Role of *Parkia biglobosa* Jacq. (Locust Bean) Leaf and Seed Extracts on Streptozotocin-induced Diabetic Male Wistar Rats**

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#### **ABSTRACT**

*Parkia biglobosa* (Jacq.), commonly called African locust bean, is traditionally employed in West Africa for managing diabetes, infections, malaria, and inflammation. Erectile dysfunction (ED), a common complication of diabetes mellitus, is caused by oxidative stress, vascular damage, and impaired enzyme activity. This study investigated the effects of ethanol extracts from *P. biglobosa* leaves and seeds on diabetic-linked ED in male Wistar rats. Diabetes was induced in rats via a single intraperitoneal dose of streptozotocin (50 mg/kg), followed by 21-day treatment with leaf and seed extracts of *P. biglobosa* (100 or 200 mg/kg) or 100 mg/kg metformin. Sexual behavior was assessed, and biochemical parameters were measured in penile tissue. Extract-treated groups exhibited significant ( $P < 0.05$ ) improvement in mounting frequency and intromission rates relative to the untreated diabetic rats. Antioxidant defense was improved, as indicated by elevated superoxide dismutase and catalase activities, alongside reduced reactive oxygen species and thiobarbituric acid reactive substances, indicating mitigation of oxidative stress. The extracts also inhibited phosphodiesterase-5, favoring retention of cyclic GMP for smooth muscle relaxation and enhanced penile hemodynamics. Additionally, arginase activity was reduced, restoring nitric oxide bioavailability, while normalization of ATPdase and AMPdase activities suggested improved purinergic signaling. Histological findings further revealed the preservation of penile architecture in both the extract-treated and metformin-treated groups. These results suggest that *P. biglobosa* has multi-targeted therapeutic potential in alleviating diabetes-induced ED through glycemic control, antioxidant protection, enzyme modulation, and vascular restoration. Thus, *P. biglobosa* may represent a promising plant-based therapy for managing diabetes-linked ED.

PFC2025\_119

***Neurospora crassa* Fermentation Improved Nutritional Composition, Mineral Content, Antinutritional Factors and Antioxidant Properties of Rice Bran**

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**ABSTRACT**

*Neurospora crassa* is a filamentous fungus with strong enzymatic activity that enhances digestibility, nutrient release, and bioactive compound production in cereals. Rice bran, though nutrient-rich, is underutilized in food because of its high fiber and antinutrient content. This study evaluated the effect of *Neurospora crassa*-mediated solid-state fermentation on the nutritional profile, mineral composition, antioxidant properties, and antinutrient levels of rice bran. Fresh bran was obtained from local rice mills, and 3 kg was inoculated with a pure strain of *N. crassa*, mixed with nutrient solution, and spread in a wooden box fermenter at 3 cm depth. Fermentation was carried out at 30 °C and 90–93% relative humidity for 7 days. Fermentation significantly ( $p < 0.05$ ) increased protein (64%) while reducing carbohydrate (3%), fiber (13%), and moisture (30%). Magnesium nearly doubled, selenium and zinc increased, whereas potassium, phosphorus, iron, sodium, and calcium declined slightly, suggesting improved mineral bioavailability. Antinutrient levels showed increases in saponin (125%) and alkaloids (135%), but decreases in phytate (64%) and tannin (22%). However, Antioxidant properties improved, with ferric-reducing antioxidant power (121%), DPPH scavenging (93%), ABTS scavenging (88%), and flavonoid content (51%) all increasing. These results indicate that *N. crassa* fermentation enhances the nutritional profile, improved antioxidant potential, and reduced key antinutrients in rice bran, supporting its use in food and feed formulation.

PFC2025\_120

**Effect of *Citrus aurantium* Pulp on Some Biochemical Parameters Relevant to Oxidative Stress in Malaria-infected Mice**

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**ABSTRACT**

*Citrus aurantium*, commonly known as marmalade orange, is a fruit whose pulp contains bioactive compounds with antioxidant properties. Malaria infection causes the ability of principal cells of the immune system to trigger an inflammatory and immune response. This study evaluated the effect of *Citrus aurantium* pulp yoghurt on the oxidative stress and antioxidant markers of mice infected with *Plasmodium berghei* infected mice. Swiss albino mice (each weighing between 20 to 25g) were divided into six groups, with each group consisting of six animals. The mice were infected with the NK-65 strain of *Plasmodium berghei*, which was obtained from the Institute of Medical Advanced Research and Training (IAMRAT), University College Hospital, Ibadan, Nigeria. The mice were fed with the *citrus* pulp-enriched yoghurt (0%, 0.5%, and 1.0%). The oxidative stress marker (MDA) and antioxidant markers (SOD and catalase (CAT)) were assayed in the penile tissue of the infected mice. The mouse parasitaemia level and temperature were investigated in the infected mice. The mice treated with *citrus* pulp-enriched yoghurt with a percentage inclusion (0.5% and 1.0%) showed a significant reduction in parasitaemia level when compared with the untreated mice. The result showed a substantial increase in the SOD and CAT level and catalase levels in

the groups administered with *citrus* pulp-enriched yoghurt (0.5% and 1%). More results also showed a significant decrease in the oxidative stress marker (MDA) in the treated group. This research revealed that the *citrus* pulp-enriched yoghurt possesses an oxidative stress-lowering effect and enhances antioxidant status

## PFC2025\_121

### **Encapsulated Bioactive peptide fraction from African oil bean seed modulates CD39, CD73, phosphodiesterase-5' and adenosine deaminase activities in L-NAME-induced hypertensive rats** Adedayo Oluwaseun Ademiluyi<sup>1</sup>, Ohioname Joseph Ifijeh<sup>1,2</sup>, Ganiyu Oboh<sup>1</sup>

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#### **ABSTRACT**

Prevalence of hypertension and its complication is on the rise in sub-Saharan African with efforts at slowing this trend significantly hampered by high cost and adverse effects of commercially available synthetic ones. Hence, effort is geared towards cheap natural alternatives with little or no side effect. Fermented foods have been suggested as viable source of bioactive peptides with antihypertensive properties which could be explored for the management of the disease. Hence, this study explored the effect of encapsulated antihypertensive peptide fraction from fermented African oil bean seeds (AOB) on CD39, CD73, phosphodiesterase-5' and adenosine deaminase activities in the plasma of N-nitro-L-arginine-methyl ester (L-NAME)-induced hypertensive male Wistar rats. The animals were randomly sorted into five groups; I (normal control), II (hypertensive control), III (hypertensive + Lisinopril 10mg/kg bw), IV (hypertensive + AOB 1 mg/kg bw) and V (hypertensive + AOB 2 mg/kg bw). All treatments were orally administered via gavage to the animals and these were performed concurrently for 10 days. Thereafter, the animals were sacrificed after an overnight fast and blood was collected via direct cardiac puncture. Subsequently, plasma activities of CD39, CD73, phosphodiesterase-5' and adenosine deaminase were determined. The result revealed significant ( $P < 0.05$ ) alteration in the activities of these markers in the hypertensive rats when compared with the normal control group. However, encapsulated peptides (AOB) treatment mitigated the alterations significantly ( $P < 0.05$ ) to levels close to the normal control group. Taken together, this finding suggests that encapsulated bioactive peptide fraction from fermented African oil beans could modulate altered nucleotide hydrolysis observed in hypertensive state and represent viable natural alternative for the management of hypertension.

## PFC2025\_122

### **Fermented locust bean-derived encapsulated antihypertensive peptide altered purinergic signaling in L-NAME induced hypertensive rats**

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#### **ABSTRACT**

Recently, the health benefits fermented legumes particularly in combating cardiovascular diseases have gained attention even now that the prevalence of hypertension has increased, especially in low and middle-income countries. These benefits are attributed to bioactive peptides produced from the fermented condiments. This study aimed to evaluate the effect of fermented locust bean derived encapsulated antihypertensive peptide on purinergic signaling in L-NAME induced hypertensive rats. Locust bean seeds were sorted, cleaned, boiled and processed into fermented condiment. Thereafter, the fermented condiment was dried, soluble peptide was extracted, lyophilized and subsequently encapsulated. Adult male Wistar rats were grouped randomly into five groups; 1 (normal control group), 2 (hypertensive induced group), 3 (hypertensive + lisinopril 10mg/kg b.wt), 4 and 5 (hypertensive + 1mg/kg and 2mg/kg dose/b.wt respectively). L-NAME and treatment were administered orally via gavage concurrently to all animals for 10 days. Thereafter, the animals were sacrificed by cervical dislocation and plasma purinergic indices were determined. The results obtained showed significant ( $p < 0.05$ ) increase in ATPase, ADPase, AMPase, 5' ectonucleotidase and adenosine deaminase (ADA) in the hypertensive group when compared with the normal control group. However, these alterations were mitigated significantly ( $p < 0.05$ ) following the administration of the encapsulated antihypertensive peptide in a dose dependent manner. The findings of this study suggest that the encapsulated peptide from locust bean possess antihypertensive potential and could be used as a therapeutic measure for the management of hypertension through the modulation of purinergic signaling pathways.

## PFC2025\_123

### **Modulatory Effect of Encapsulated Peptide Fraction from Fermented African Locust Bean on Haemodynamics Indices, Antioxidant Status and Biochemical Markers of Hypertension In N-nitro-L-arginine-methyl ester (L-NAME) Induced Hypertensive Rats.**

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#### **ABSTRACT**

Hypertension is the leading cause of cardiovascular disease and premature death especially in developing countries of the world. Synthetic drugs used to manage the disease are often very expensive and caused adverse side effects. However, fermented food peptides have demonstrated the ability to safely reduce blood pressure and other biochemical markers of hypertension. This study focused on the modulatory effect of encapsulated peptide fraction from fermented African locust bean (LOB) on haemodynamics indices, antioxidant status and biochemical markers of hypertension in L-NAME induced hypertensive rats. Twenty-five male Wistar rats were randomly divided into five groups of 5 rats each ( $n = 5$ ). Group 1 (normal control), group 2 (hypertensive), group 3 (hypertensive + 10 mg/kg b.wt of lisinopril), group 4 and 5 (hypertensive + LOB 1mg/kg and 2mg/kg dose/ b.wt respectively). Treatments lasted for 10 days orally via gavage and the rats were sacrificed by cervical dislocation. Plasma samples from the rats were used to assess the modulatory effect of the encapsulated peptide fraction on haemodynamics indices, antioxidant status and biochemical markers of hypertension. The results showed significant ( $P < 0.05$ ) increased in SBP, DBP, MAP, ROS, TBARS, arginase, ACE and decreased in plasma NO, total thiol, GSH, GPx SOD, catalase, and GST activities in the hypertensive group when compared with the normal control group. However, LOB encapsulated peptide administered mitigated the alterations significantly ( $P < 0.05$ ) by normalizing plasma blood pressure, antioxidant indices, and modulating critical enzyme activities. The study demonstrates that encapsulated LOB peptide possessed antihypertensive and antioxidant properties and thus could be useful in the management of hypertension.

PFC2025\_124

**Encapsulated Anti-hypertensive Peptide from African Oil Bean Seeds Modulates Arginase/NOx Signaling, ACE and Antioxidant Indices in Hypertensive Rats.**

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**ABSTRACT**

Proteinous food contains numerous biologically-active peptides (BAPs). These BAPs can exert positive physiological responses in the body beyond their basic nutritional roles such as antihypertensive and antidiabetic. Hence, this study focused on the modulatory effect of encapsulated antihypertensive peptide from African oil bean seeds (AOB) on Arginase/NOx signaling, ACE and antioxidant indices in the plasma of N-nitro-L-arginine-methyl ester (L-NAME)-induced hypertensive rats. Peptide from African oil bean seeds was extracted and freeze-dried and then encapsulated. Male adult Wistar rats were randomly placed into five groups of five rats each (n =5). Group 1 (normal control group), group 2 (hypertensive), group 3 (hypertensive + 10mg/kg of lisinopril), group 4 (hypertensive + 1mg/kg of AOB dose/b.wt) and group 5 (hypertensive + 2mg/kg of AOB dose/b.wt). Hypertension was induced with 40mg/kg of N-nitro-L-arginine-methyl ester (L-NAME) followed by treatment with the encapsulated peptide from AOB concurrently orally via gavage for 10 days. The rats were sacrificed by cervical dislocation and the plasma arginase, nitric oxide (NO), angiotensin-1- converting enzyme (ACE) and antioxidant indices were determined. The results showed alterations in Arginase/NOx signaling, ACE and antioxidant indices in the hypertensive group compared with the normal control group. However, treatment with encapsulated peptide from AOB countered the alterations by modulating Arginase/NOx signaling, ACE and antioxidant indices in a dose dependent manner. Following this modulation, the finding suggests that encapsulated peptide from AOB has antihypertensive properties and could be a useful natural alternative for the management of hypertension.

PFC2025\_125

**Erectogenic Role of *Parkia biglobosa* Jacq. (Locust Bean) Leaf and Seed Extracts on Streptozotocin-induced Diabetic Male Wistar Rats**

**Aderiike Grace Adewumi<sup>1</sup>, Kayode Olusola Ogunwenmo<sup>1</sup>, \*Oluwapelumi Micheal Ajiboye<sup>1,2</sup>, Foluke O. Idowu Odutayo<sup>1</sup>, Rufus Olusegun Animashaun<sup>1</sup>, Precious Kasham Bako<sup>1</sup>**

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**ABSTRACT**

*Parkia biglobosa* (Jacq.), commonly called African locust bean, is traditionally employed in West Africa for managing diabetes, infections, malaria, and inflammation. Erectile dysfunction (ED), a common complication of diabetes mellitus, is caused by oxidative stress, vascular damage, and impaired enzyme activity. This study investigated the effects of ethanol extracts from *P. biglobosa* leaves and seeds on diabetic-linked ED in male Wistar rats. Diabetes was induced in rats via a single intraperitoneal dose of streptozotocin (50 mg/kg), followed by 21-day treatment with leaf and seed extracts of *P. biglobosa* (100

or 200 mg/kg) or 100 mg/kg metformin. Sexual behavior was assessed, and biochemical parameters were measured in penile tissue. Extract-treated groups exhibited significant ( $P < 0.05$ ) improvement in mounting frequency and intromission rates relative to the untreated diabetic rats. Antioxidant defense was improved, as indicated by elevated superoxide dismutase and catalase activities, alongside reduced reactive oxygen species and thiobarbituric acid reactive substances, indicating mitigation of oxidative stress. The extracts also inhibited phosphodiesterase-5, favoring retention of cyclic GMP for smooth muscle relaxation and enhanced penile hemodynamics. Additionally, arginase activity was reduced, restoring nitric oxide bioavailability, while normalization of ATPase and AMPase activities suggested improved purinergic signaling. Histological findings further revealed the preservation of penile architecture in both the extract-treated and metformin-treated groups. These results suggest that *P. biglobosa* has multi-targeted therapeutic potential in alleviating diabetes-induced ED through glycemic control, antioxidant protection, enzyme modulation, and vascular restoration. Thus, *P. biglobosa* may represent a promising plant-based therapy for managing diabetes-linked ED.

#### PFC2025\_126

##### **Antioxidant and Mineral Composition of Bio-fortified Cassava Peels**

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##### **ABSTRACT**

This study investigates the mineral and antioxidant enhancement of cassava peels through bio-fortification using solid-state fermentation (SSF) with micro-fungi, aiming to increase their viability as a low-cost poultry feed ingredient. Cassava peels, although nutrient-rich, contain high levels of anti-nutritional factors (ANFs) that limit their direct use in animal feed. By fermenting cassava peels with *Aspergillus niger*, *Rhizopus oryzae*, and *Saccharomyces cerevisiae*, we observed significant improvements in mineral content and antioxidant properties. *Saccharomyces cerevisiae*-fermented peels demonstrated the highest levels of potassium (123.2 ppm) and calcium (8.8 ppm), while *Rhizopus oryzae*-fermented peels showed a notable increase in magnesium (31.15 ppm). Antioxidant assays revealed that fermentation improved the ferric reducing antioxidant power (FRAP) and DPPH radical scavenging activity of the peels. The total phenolic content rose significantly, with *Rhizopus oryzae* and *Aspergillus niger* showing increases to 248.7 and 227.7 mg/g, respectively, compared to 181.6 mg/g in the control. These findings indicate that SSF can effectively enhance both the nutritional and functional qualities of cassava peels, making them a sustainable alternative to maize in poultry feed. The results support the feasibility of using fermented cassava peels (MFCP) as a feed component, potentially lowering feed costs while contributing to waste valorization. Further studies are recommended to assess the effects on poultry performance and production efficiency.

#### PFC2025\_127

##### **Carcass Characteristics and Organ Weights of Broiler Chickens Fed Varying Levels of Micro-fungi Fermented Cassava (*Manihot esculenta*) Peels Diet**

<sup>1</sup>Adu, O.A, <sup>1</sup>Azeez, F.T, <sup>1</sup>Oboh, T.B., <sup>2</sup>Adefegha, A.S., and <sup>\*2</sup>Oboh G.

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##### **ABSTRACT**

With escalating cost of conventional feed ingredients posing a significant challenge to poultry farming, the need for exploration of alternative, cost-efficient feed resources has begun. Cassava peels, a by-product of cassava

processing, offer considerable promise due to their widespread availability, So this study evaluated the effects of varying levels of micro-fungi fermented cassava peels diets on the carcass characteristics and organ weights of broiler chickens. 270 broiler chicks were randomly allocated to nine treatment groups with diets incorporating 0%, 25%, or 50% cassava peels diets, fermented with *Aspergillus niger*, *Rhizopus oryzae*, and *Saccharomyces cerevisiae*. Birds were fed ad libitum for 42 days, after which organ and carcass weights were analyzed. Results revealed that inclusion of cassava peels had no significant impact on the liver, spleen, heart, or proventriculus weights ( $P>0.05$ ). However, gizzard weights increased significantly ( $P<0.05$ ) at higher inclusion levels, reflecting dietary fiber adaptation. Similarly, microbial types had no significant effect on organ weights, except for a slight increase in spleen weight observed with *Saccharomyces cerevisiae*. Carcass traits such as eviscerated weight, drumstick, thigh, and breast showed no significant differences ( $P>0.05$ ) across treatments. Live weight decreased significantly ( $P<0.05$ ) at higher inclusion levels, likely due to residual anti-nutritional factors and reduced energy density of cassava peel diets. Among microbial treatment types, diets fermented with *Aspergillus niger* supported the highest live weight, underscoring the potential of its enzymatic activity to enhance nutrient availability. 50% inclusion of bio-fortified cassava peels in broiler diets, particularly when fermented with *Saccharomyces cerevisiae* or *Aspergillus niger*, does not compromise organ weights or carcass quality, except for gizzard weight. This research highlighted the potential of fermented cassava peels as a sustainable alternative feed ingredient, provided fermentation is used to mitigate anti-nutritional factors.

## PFC2025\_128

### Chemical and Anti-nutritional Composition of Bio-fortified Cassava Peels to Enhance Its Suitability for Use in Poultry Feed Formulation

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#### ABSTRACT

Cassava peels (CPs) and its effluent are the two main wastes generated during cassava tuber processing. The wastes are discarded and allowed to rot in the open and this normally result into environmental pollution. This, coupled with increased cost of maize necessitated the need for this research, which was carried out to determine the chemical, and anti-nutritional compositions of micro-fungi fermented cassava peels using (MFCPs) three microorganisms to enhance its suitability for use in poultry feed formulation. Freshly harvested cassava tubers were collected, peeled and grated into pulp. The cassava pulps were divided into three parts and then fortified with *Rhizopus oryzae*, *Saccharomyces cerevisiae* and *Aspergillus niger* organisms separately and allowed to ferment for 7 days. The cassava peels were sundried to 2.5% moisture and grounded in a motorized hammer mill into crumbs. Squeezed juice from the fermented cassava tuber pulps were collected and then added to the crumbs and allowed to ferment for 7 days using a solid-state fermentation technology. The microbial fermented crumbs were then sundried to 2.5% moisture for eventual use as poultry feed ingredient. Samples were taken from each bio-fortified crumbs for proximate and anti-nutrient analysis. The results showed that *A. niger* significantly ( $p>0.05$ ) had the highest carbohydrate (60.60%) with the lowest fibre (7.99%) contents while *S. cerevisiae* had the highest protein (14.71%) and ash (9.10%) contents. The peels further contained some varying levels of anti-nutritional factors such as tannins the highest being *saccharomyces cerevisiae* (1.24mg/g) followed by *Rhizopus oryzae* (1.22mg/g), *Aspergillus niger* (1.18mg/g) and the lowest is control (0.8mg/g). Compare to Non-microbe fermented cassava peels (control), the three microorganisms used for fermentation in this study significantly ( $p>0.05$ ) degraded the cyanide contents of the cassava peels. The study concluded that *Saccharomyces cerevisiae*, *Aspergillus niger* and *Rhizopus oryzae* could be used to ferment CPs to enhance its nutrient with degraded cyanide contents. It is recommended that MFCPs could be employed as a substitute for maize in animal feed formulation.

PFC2025\_129

**Modulatory effect of Bitter Leaf (*Vernonia amygdalina*) Flavoured Non-Alcoholic Beer on Antioxidant Mechanisms and Cholinergic Enzyme Activities in Scopolamine-Induced Amnesic Rats**  
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**ABSTRACT**

Cognitive impairment, a hallmark of Alzheimer's disease (AD), is strongly associated with structural and functional deterioration in the brain. Scopolamine administration has been widely employed as an experimental model to mimic AD-related memory deficits in rodents. Given the limitations, high costs, and adverse effects of current pharmacological therapies, attention has shifted towards natural products with strong antioxidant potential, since oxidative stress is a key mechanism underlying AD pathology. This study investigated the effect of *Vernonia amygdalina* (bitter leaf) flavoured non-alcoholic beer (NAB) on antioxidant status and cholinergic enzymes in the brain of scopolamine-induced amnesic rats. Memory impairment was induced through intraperitoneal administration of scopolamine (1 mg/kg) for 3 days. Thirty-five male Wistar rats were randomly assigned into seven groups (n = 5). Group 1 served as control (distilled water), while Group 2 received scopolamine only. Groups 3 and 5 were administered NAB (25% and 50%, respectively) in combination with scopolamine. Groups 4 and 6 received NAB alone (25 mg/kg and, respectively), while Group 7 received the standard drug, donepezil (2.5 mg/kg), in combination with scopolamine. The effects of the treatments on acetylcholinesterase (AChE), butyrylcholinesterase (BChE), monoamine oxidase (MAO), reduced glutathione (GSH), and thiobarbituric acid reactive substances (TBARS) were evaluated. Results showed that scopolamine significantly ( $p < 0.05$ ) elevated TBARS levels and cholinesterase activities (AChE and BChE), accompanied by a decline in antioxidant status. Treatment with NAB improved antioxidant defenses and significantly reduced TBARS, AChE, BChE, and MAO activities. Notably, the 50% NAB formulation was more effective than the 25% formulation. These findings suggest that bitter leaf-flavoured non-alcoholic beer mitigates scopolamine-induced cognitive deficits through attenuation of oxidative stress, inhibition of neuronal degeneration, and enhancement of cognitive function.

PFC2025\_130

**Dietary Inclusions of Cotton Seed Exhibit Antiplasmodia and Antioxidant Properties in an Experimental Model of Malaria**  
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**ABSTRACT**

Malaria infection induces oxidative stress, contributing to tissue damage and disease progression. This study investigated the antioxidant and antimalarial effects of dietary cotton seed supplementation in *Plasmodium berghei* infected mice. Thirty-eight mice were allocated to five groups: normal control, *P. berghei*-infected only, *P. berghei*-infected mice administered quinine, *P. berghei*-infected mice fed dietary inclusion of 5% cotton seed, and *P. berghei*-infected mice fed dietary inclusion of 10% cotton seed. In

addition to their feed, the groups administered with cotton seed each received 50 g of the cotton seed sample daily. All mice except the control were infected with *P. berghei* to induce oxidative stress, and parasitemia levels were evaluated twice using Leishman-stained blood smears. Rectal temperatures were also monitored (ranges fell within 34.5–39.0 °C). Biochemical analyses of liver, kidney, and testes demonstrated elevated reactive oxygen species (ROS) and malondialdehyde (MDA) levels in the negative control, indicating severe oxidative stress and lipid peroxidation. In contrast, cotton seed supplemented and quinine treated groups showed pronounced reductions in ROS and MDA, alongside enhanced activities of antioxidant enzymes including glutathione peroxidase (GPx), catalase, superoxide dismutase (SOD), and glutathione-S-transferase (GST). Non-enzymatic antioxidants (thiol levels) were also restored in treated groups, reflecting improved redox homeostasis. These findings indicate that cotton seed supplementation particularly at 10% significantly mitigates oxidative stress, enhances enzymatic and non-enzymatic antioxidant defenses, lowers parasitemia, and protects vital organs against malaria associated oxidative damage. Dietary cotton seed may thus provide a complementary strategy with dose-dependent antioxidant and antimalarial benefits comparable to standard quinine treatment.

### PFC2025\_131

#### **Effect of Selenium-Biofortified African Eggplant on Memory Index and Antioxidant Indices in Fruit Fly (*Drosophila melanogaster*)**

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#### **ABSTRACT**

Selenium is an essential micronutrient with critical roles in antioxidant defense, redox regulation, and cognitive function. Dietary biofortification of vegetables with selenium has gained attention as a sustainable strategy to improve nutritional quality and confer health benefits. This study investigated the effects of selenium-biofortified African eggplant (*Solanum macrocarpon*) on memory index and antioxidant status in *Drosophila melanogaster*. Adult flies were divided into control and treatment groups, with the latter receiving diets supplemented with selenium-enriched African eggplant for a period of seven days. Cognitive performance was assessed using the memory index derived from olfactory learning and retention assays, while antioxidant indices including catalase (CAT), superoxide dismutase (SOD), and reduced glutathione (GSH) levels, alongside malondialdehyde (MDA) concentration, were quantified as markers of oxidative balance. Results demonstrated that flies fed selenium-biofortified eggplant exhibited a significant increase in memory index compared to controls, indicating enhanced learning and memory retention. Biochemical analyses further revealed elevated activities of SOD and CAT, alongside increased GSH levels, suggesting strengthened endogenous antioxidant defense. Concurrently, MDA concentrations were markedly reduced, reflecting attenuation of lipid peroxidation and oxidative damage. These findings suggest that selenium biofortification of African eggplant not only improves its nutritional profile but also exerts neuroprotective and antioxidant effects in vivo. In conclusion, dietary intake of selenium-biofortified African eggplant may enhance cognitive performance and oxidative stress resilience, supporting its potential as a functional food for mitigating neurodegenerative processes and promoting brain health. Further studies are recommended to validate these effects in higher organisms.

**PFC2025\_132****Effects of Extrusion Parameters on Starch Composition, Glycemic Indices, Antioxidative and Antidiabetic Properties of Pearl Millet-based Extruded snacks****Toyin J. Arogundade<sup>1,2\*</sup>, Olusola S. Jolayemi<sup>2</sup>, Oluwole S. Ijarotimi<sup>2,3</sup>, Tayo N. Fagbemi<sup>2</sup>, Yetunde O. Esan<sup>1</sup>**<sup>1</sup>Department of Food Science and Technology, Joseph Ayo Babalola University, Ikeji-Arakeji, Nigeria<sup>2</sup>Department of Food Science and Technology, Federal University of Technology, Akure, Nigeria<sup>3</sup>Department of Nutrition and Dietetics, Federal University of Technology, Akure, Nigeria\*Corresponding Author: [tjarogundade@jabu.edu.ng](mailto:tjarogundade@jabu.edu.ng)**ABSTRACT**

Consumers' demand for healthy convenience foods is globally increasing due to busy lifestyles and prevalence of oxidative stress-mediated diseases including Type-2 diabetes at an alarming rate. Therefore, this study aims to investigate the effects of different feed moisture (20% and 26%) and barrel temperature (120°C and 140°C) on starch composition, amylose and amylopectin contents, antioxidant properties and estimated glycemic index of extruded snacks produced from optimized flour blend of pearl millet, soybean cake and rice bran. The inhibitory effects of the extruded snacks on  $\alpha$ -amylase and  $\alpha$ -glucosidase activities was also determined. The formulated extruded snacks produced at lower barrel temperature (M<sub>20</sub>T<sub>120</sub> and M<sub>26</sub>T<sub>120</sub>) demonstrated lower starch and sugar contents, higher amylose-amylopectin ratio, higher antioxidant properties, lower estimated glycemic index as well as higher  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitory activities than the extruded snacks produced at higher barrel temperature (M<sub>20</sub>T<sub>140</sub> and M<sub>26</sub>T<sub>140</sub>) and the commercial extruded snack. Feed moisture and barrel temperature had varied effects on the investigated assays. Nevertheless, barrel temperature had more influence than feed moisture. Therefore, this study showed that extruded snack produced at lower barrel temperature especially M<sub>26</sub>T<sub>120</sub> demonstrated promising dietary intervention as functional food that could be harnessed for management of type-2 diabetes.

**PFC2025\_133****Quality and sensory properties of functional biscuit produced from pearl millet, Bambara ground nut and tiger nut flour****Rebecca Olajumoke Oloniyo<sup>1\*</sup>, Jiruma Francis Kaku<sup>1</sup>, Solomon Achimugu<sup>1</sup>, Amina Shaibu<sup>1</sup>, and Opeyemi Banke Abiodun<sup>2</sup>**<sup>1</sup>Department of Food, Nutrition and Home Sciences, Prince Abubakar Audu University, P.M.B 1008, Anyigba, Kogi State, Nigeria,<sup>2</sup>Department of Food Science and Technology, Wesley University, P.M.B 507, Ondo, Ondo State, NigeriaCorresponding Author: [oloniyo.ro@ksu.edu.ng](mailto:oloniyo.ro@ksu.edu.ng)**ABSTRACT**

Foods produced from indigenous food-crop flour help to promote its widespread cultivation and also help to alleviate some micronutrient deficiency. This study was carried out to determine the quality of biscuits produced from pearl millet flour (PMF), bambara nut flour (BNF), and tiger nut flour (TNF). Five samples were developed for the production of biscuit at 100% PMF (control sample); 90% PMF, 5% PMF BNF, 5% TNF; 80% PMF, 15% BNF, 5% TNF; 70% PMF; 20% BNF; 10% TNF; 60% PMF; 20% BNF; 20% TNF. Biscuits produced were analyzed for proximate, minerals, anti-nutrient, and sensory analysis. It was observed that ash content ranged from 1.80 to 2.35%; fibre content ranged from 0.96 to 1.37%; protein content ranged from 12.68 to 18.23; potassium content ranged from 204.80 mg/kg to 340.23 mg/kg. All the anti-nutrients considered were within the acceptable limit. The sensory properties of the biscuit varied significantly ( $p < 0.05$ ) with one another; aroma ranged from 6.69 to 8.15, crispiness ranged from 6.07 to 7.46, taste ranged from 6.00 to 7.38, overall acceptability by the panelists ranged from 6.38 to 7.54. This research showed that biscuit produced with 60% PMF; 20% BNF; 20% TNF had good quality biscuit with

the highest value of crude protein, crude fibre, crude ash and minerals but biscuit sample with 90% PMF, 5% BNF, 5% TNF compared favourably with the 100% pearl millet flour biscuit.

#### **PFC2025\_134**

### **Quality and Sensory Characteristics of Biscuit Produced from Deffated Sesame Seed, Unripe Plantain and Rice Bran Flour blends**

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#### **ABSTRACT**

This study was conducted to evaluate the physico-chemical properties of biscuit produced from unripe plantain, deffated sesame seed and rice bran flour blends. Four (4) samples were formulated with addition of deffated sesame flour and rice bran flour into unripe plantain flour respectively. The functional properties and mineral composition of the flour blends was determined using standard methods. The proximate, mineral, antioxidants and antinutrients composition of the biscuit were determined using standard methods. The sensory characteristics of the biscuit were also determined. Data collected were analyzed statistically using the Analysis of Variance (ANOVA) and the means were separated. The results of the functional properties of flour blends revealed that the water absorption capacity, oil absorption capacity, swelling capacity, solubility index, loosed bulk density, parked bulk density ranged from 130.32 - 229.72 %, 73.51 - 77.06 %, 405.99 - 527.28 %, 9.05 - 10.45 %, 0.39 - 0.44 g/ml and 0.72 - 0.77 g/ml respectively. The result of the mineral composition of the flour blends showed that the calcium, potassium, iron, zinc and phosphorus ranged from 205.00 - 225.99 mg/100g, 22.00 - 36.50 mg/100g, 7.75 - 8.55 mg/100g, 0.21 - 0.31 mg/100g and 162.50 - 190.00 mg/100g. The result of the proximate composition of the biscuit revealed that the moisture content, crude protein, crude fat, crude fiber, total ash and carbohydrate ranged from 10.73 - 13.50 %, 5.20 - 13.42 %, 6.54 - 11.16 %, 0.96 - 1.21 %, 3.65 - 4.45 % and 58.98 - 70.00 % respectively. The samples showed no significant difference in terms of colour, taste, crispness, aroma and overall acceptability. The study showed that incorporating deffated sesame seed and rice bran flour into unripe plantain flour significantly improves the nutritional composition as well as the functional properties of the flour. From respondent assessment, sensory attributes such as colour, appearance, aroma, taste and overall acceptability of biscuits were rated high between like moderately and like extremely. This is an indication that apart from additional nutritional benefits, the eating quality and suitability of the biscuits satisfied consumer's perception.

#### **PFC2025\_135**

### **Effects of Flavonoid-Rich Extract of *Buchholzia coriacea* Leaf on Streptozotocin-Induced Changes in Rats**

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#### **ABSTRACT**

Diabetes is a severe metabolic disorder that its management is usually associated with one side effect or the other. Hence, the desire to search for alternative safer drugs by exploring hypoglycaemic agents from indigenous plants becomes imperative. This study evaluated the anti-diabetic efficacy of methanol extract of *Buchholzia coriacea* leaf in streptozotocin (STZ)-treated rats. Thirty male rats (80 – 145 g) were used in the study and subjected to fasting blood sugar (FBS) test following administration of STZ (45 mg/kg b.w)

for 48 hours. The rats were divided into six groups of five animals each. Group 1 (negative control) were not induced; Group 2 (positive control) were induced but not treated; Group 3 were administered the standard drug, metformin at 50 mg/kg b.w; Group 4 were administered flavonoid fraction (60 mg/kg b.w); Group 5 were administered flavonoid fraction (100 mg/kg b.w); and Group 6 were administered 100 mg/kg of methanol extract of *B. coriacea* leaf. The animals were sacrificed after 14 days of treatment, and the serum, kidney and liver samples were collected for biochemical analyses. The extract of *B. coriacea* leaf significantly at ( $p < 0.05$ ) reduced alanine aminotransferase, urea and uric acid in the serum of extract treated rats when compared with positive control and metformin-treated rats. The activities of aspartate aminotransferase and superoxide dismutase were increased in the liver with a concurrent reduction of liver bilirubin and kidney malondialdehyde levels in the treated rats. Conclusively, BC leaf extracts are capable of mopping up free radicals, reduce hyperglycemic effects when compared to metformin and showed the mechanism of anti-diabetic activity of bioactive compounds. It is therefore recommended that BC leaf extracts serve as alternative anti-diabetic drug source.

### PFC2025\_136

#### **Effect of *Musa paradisiaca* and ABB Hybrid Flour Extracts on Hypertensive Related Enzymes and Digestive Enzymes Activities**

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#### **ABSTRACT**

Diabetes mellitus (DM) and hypertension are diseased conditions closely linked and strongly predispose to one another's development. Both comprise many factors and signaling pathways that require a combination of various therapeutic regimens including multicomponent-based natural products. This study evaluates and compares the antihypertensive and antihyperglycemia effects of whole and pulp of two varieties of *Musa* cultivars flour (*Musa paradisiaca* and ABB Hybrid). Effects of *Musa paradisiaca* (PLA, WPLA) and ABB hybrid (HYB, WHYB) aqueous extracts were assessed on key enzymatic systems implicated in blood pressure and blood sugar regulation, including arginase, nitric oxide (NO) pathways, angiotensin-converting enzyme (ACE) and, digestive enzymes ( $\alpha$ -amylase and  $\alpha$ -glucosidase). Collectively, the results demonstrated that all tested parameter (*PLA, WPLA, HYB, and WHYB*) aqueous extracts exerted antihypertensive and antihyperglycemia via notable enhanced nitric oxide scavenging ability, arginase inhibition and significant ACE inhibition. The Plantain pulp (PLA) and whole ABB hybrid (WHYP) consistently showed slightly higher inhibitory activity across all assays. Furthermore, results revealed that Plantain pulp (PLA) and ABB hybrid whole and pulp (HYB and WHYB) revealed notable inhibitory effects on  $\alpha$ -amylase, and  $\alpha$ -glucosidase activity, with WHYB consistently showing higher inhibition across the tested groups. The findings demonstrated that incorporating peel into *Musa* cultivars flour diet could be effective in diabetic-hypertension comorbidity therapeutic management.

**PFC2025\_137****Assessment of Nutritional, Elemental and Phytochemical Constituents of *Tetradium daniellii* Fruit Extracts**Spencer S. Oluwakemi<sup>1</sup>, Sunmonu O. Oluwaseyi<sup>1</sup>, Oyeleye S. Idowu<sup>2</sup><sup>1</sup>Department of Science Laboratory Technology, Federal Polytechnic, Ile-Oluji. 200223, Ondo, Nigeria<sup>2</sup>Department of Biomedical Technology, Federal University of Technology, P.M.B. 704, Akure 340001, Nigeria\*Corresponding Authors: [oluspencer@fedpolel.edu.ng](mailto:oluspencer@fedpolel.edu.ng); 08069095629**ABSTRACT**

*Tetradium daniellii* has historically been used in traditional medicine systems in East Asia and some West African countries to cure various diseases. However, the nutritional, elemental, and antioxidant properties of its fruit extract have not been thoroughly investigated. The fruits of *T. daniellii* were subjected to solvent extraction using ethanol (ETD) and distilled water (ATD). ETD and ATD sample extracts were subjected to nutritional and elemental constituent screenings along with total phenolics and total flavonoids analysis. The results revealed that the fruits were rich in essential minerals, particularly calcium, magnesium, sodium, potassium, manganese, and phosphorus, with moderate levels of zinc and iron, while nickel was present only in trace amounts. The fruit extract was found to contain significant amounts of both phenolic and flavonoid compounds, as indicated by the gallic acid and quercetin equivalent plots. The highest total phenolic content was observed in ATD compared to ETD. Conversely, notably higher total phenolic content was revealed in the ethanolic extract (ETD) compared to the aqueous extract (ATD). Specifically, the ETD showed approximately five to six times higher flavonoid content than the ATD. Overall, the results indicate that *T. daniellii* fruit extracts—both aqueous and ethanolic—possess strong elemental and nutritional values and antioxidant potentials capable of addressing micronutrient deficiencies and oxidative stress-related disorders.

**PFC2025\_138****Effect of *Rauvolfia vomitoria* (Afezel.) and *Xylopi aethiopica* (Dunal.) on the cognition and locomotion performance of the mice offsprings after prenatal cadmium pollution**

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\*Corresponding Authors: [oogunraku@oauife.edu.ng](mailto:oogunraku@oauife.edu.ng)**ABSTRACT**

The impact of environmental pollution on neurological development during pregnancy has been extensively characterised by growing risks of neurodevelopmental disorders (NDD) due to its distinct phase of vulnerability. With the increased in Neurodevelopmental disorders prevalence, it is critical to identify and understand the processes by which environmental pollutants could negatively impact the developing brain and hiking the risk. Therefore, our investigation focuses on the link between prenatal cadmium exposures and the offspring from the first generation to provide information regarding the amelioration potential of *Rauvolfia vomitoria* and *Xylopi aethiopica* on perturbations in the cerebral cortex following prenatal exposure to cadmium. Initially, pregnant mice were randomly divided into two groups; the Control group which had free access to distilled water and the Cd test group exposed to 150 mg/L CdCl<sub>2</sub> from the first day of gestation until parturition. Thereafter, male offsprings (28 – 42 days) from the first generation were randomly selected into five groups to evaluate the effects of the aqueous of *Rauvolfia vomitoria* and *Xylopi aethiopica* on learning, memory and locomotion parameters. Neurochemical markers such as acetylcholinesterase activity (AChE), monoamine oxidase activity (MAO), superoxide dismutase activity (SOD), catalase activity, and total thiol levels were measured in the cerebral cortex. Results from this study shown a significant increase ( $p < 0.05$ ) in the concentration of Cd in the brain of male offsprings exposed

to Cd during gestation. However, there was no significant difference in brain cadmium accumulation in the groups treated with *R. vomitoria* and *X. aethiopica*. In addition, there was a significant increase in escape latency, reference memory error and anxiety-like behavioural activity as well as a significant decrease ( $p < 0.05$ ) in locomotion performances in the mice administered orally with cadmium chloride. However, treatment with 150 mg/Kg leaf extract of *R. vomitoria* and *X. aethiopica* pods abrogated such deficits. Furthermore, there was a significant increase in cortical AChE and MAO activities and significantly decreased in catalase and SOD activities in the Cd groups. This was reversed on treatment with *R. vomitoria* and *X. aethiopica* compared with control. This study therefore concluded inhibition of acetylcholine esterase and monoamine oxidase activities by the *R. vomitoria* and *X. aethiopica* could result in increased function of acetylcholine and dopamine, giving rise to improved memory and locomotion performances observed in this study. Additionally, *R. vomitoria* and *X. aethiopica* improved oxidative stress status, which improved cognitive and motor locomotion impairment.

### PFC2025\_139

#### **Modulatory Potential of Functional *ogiri* Produced from *Citrullus vulgaris* Seeds Fermented with Mutant *Bacillus subtilis* on Cardiac Function and Haemodynamic of $\alpha$ -Carrageenan-Inflamed Rats** Catherine Y. Babatuyi <sup>1</sup>, Anjola F. Ojo <sup>\*2</sup>, and Christianah A. Ogungbile <sup>2</sup>

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#### **ABSTRACT**

Cardiovascular inflammation is a major contributor to disease progression, often impaired haemodynamic balance and cardiac functions. Non-steroidal drugs like indomethacin are effective, but with adverse effects necessitate safer alternatives. Functional *ogiri*, a fermented product of *Citrullus vulgaris* seeds fermented with mutated *Bacillus subtilis* has been researched as a potential functional food without side effects when ameliorated inflammation due to elevated pro-inflammatory cytokines due to oxidative stress and haemodynamic. This study aims to assess the potency of anti-inflammatory, cardioprotective and haemodynamic functions of  $\alpha$ -carrageenan-induced inflammatory rats treated with functional *ogiri* and standard drug. Inflamed male Wistar rats were induced with  $\alpha$ -carrageenan and treated orally for 14 days. The rats were divided into five groups of treatment: Group 1 (normal/ negative control), Group 2 (carrageenan-induced, untreated positive control), Group 3 (indomethacin), Group 4 (MCS25) and Group 5 (MCS35) were two different mutated *Bacillus subtilis* strains fermented with *C. vulgaris* to produce functional *ogiri* samples. Pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ , IL-6), ACE (Angiotensin-Converting Enzyme), arginase, nitric oxide, and haemodynamic status were investigated. Elevated ACE were drastically reduced when treated with Group 5, while Group 4 showed better arginase activity restoration, suppressed elevated NO and significantly improved haemodynamic properties. Groups 4 and 5 remarkably ameliorated pro-inflammatory cytokines. Oxygen saturation was significantly noticed in Group 3. Sample MCS25 effectively reduced NO levels, modestly restored arginase, lowered ACE, and showed potential amelioration better than other treatment, especially cardiovascular dysfunction.

### PFC2025\_140

## **Neuroprotective Effects Of *Piper Guineense* Leaf Fortified Composite Snack On Scopolamine-Induced Neurological Damage Rats**

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### **ABSTRACT**

Functional foods have gathered increasing scientific and public health relevance due to their potential to confer bioactive components that provide health benefits beyond basic nutrient when consumed as part of a varied diet at regular and efficacious levels. This study aimed to assess the effects of *Piper guineense* leaf fortified composite snack in Scopolamine-induced neurological damage in rats. The composite snack was made from corn flour and wheat flour at ratio 6:1 fortified with *Piper guineense* powdered leaf at 0%, 1%, 2%, 3%, and 4% respectively. Sensory evaluation, proximate analysis, total phenol and total flavonoid content of the composite snack was conducted. The result of the sensory evaluation showed 0%, 1%, and 2% concentration of *Piper guineense* leaf fortified snack to be more acceptable. Thereafter, forty-eight Wistar rats were randomly divided into six groups; all the groups were administered Scopolamine (3mg/kg) except group 1 that served as control. Group 2 was fed with normal rat chow, group 3 was treated with Donepezil (20 mg/kg), group 4- 6 were treated with 0%, 1%, and 2% fortified snack respectively. The experiment lasted for 21 days, the rats were sacrificed, the brain were excised and homogenized in cold phosphate buffer pH 7.4. the cholinergic enzymes [acetylcholinesterase (AChE) and butyrylcholinesterase (BChE)], antioxidant enzymes [superoxide dismutase (SOD) and catalase], thiobarbituric acid (TBARS) level of the brain homogenate were determined. The result revealed the proximate content with increase total phenol, total flavonoid content of the snack, the bioassay showed a significant increase ( $p > 0.05$ ) in AChE, BChE activity and TBARS level with decreased SOD and catalase activity when comparing the untreated with the control group. There was a significant decrease ( $p < 0.05$ ) in the cholinergic enzyme activity with the TBARS level with increased antioxidant enzymes activity in the treated groups compared with untreated. The findings from this study showed fortified snack as functional food and could proffer protection against neuronal damage.

**PFC2025\_141**

## **Ameliorative Effects of *Cocos Nucifera* Husk Extracts On Malaria-Induced Hepatic And Renal Dysfunction**

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### **ABSTRACT**

Malaria remains a major cause of organ dysfunction, particularly affecting the liver and kidney. This study evaluated the hepatoprotective and nephroprotective effects of *Cocos nucifera* Linn. (husk) extracts in *Plasmodium berghei*-infected mice. Fifty Swiss albino mice (18–23 g) were infected intraperitoneally with parasitized blood and randomly assigned to seven groups: infected/untreated, aqueous extract (100 mg/kg), ethanolic extract (100 mg/kg), tea infusion (100 mg/kg), chloroquine (25 mg/kg), artemisinin-based combination therapy (25 mg/kg), and non-infected untreated control. Treatments were administered orally for seven days, after which blood samples were collected for biochemical analyses. Liver and Kidney functions were assessed using alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total protein, albumin, and bilirubin, creatinine, urea, and antioxidant enzymes superoxide dismutase (SOD), catalase (CAT). The infected untreated group showed significant elevations ( $p < 0.05$ ) in ALT, AST, ALP, creatinine, and urea, with reduced albumin and antioxidant activity,

compared with controls. Treatment with *C. nucifera* extracts significantly ameliorated these alterations in a dose-dependent manner, restoring enzyme activities and improving protein and antioxidant profiles. These findings demonstrate that *C. nucifera* husk extracts possess both hepatoprotective and nephroprotective properties against malaria-induced organ injury, highlighting their potential as adjunct therapy in the management of malaria.

**PFC2025\_142**

**Toxicological Evaluation of *Piper Guineense* Leaf Fortified Composite Snack Using Wistar Rats  
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**ABSTRACT**

Currently, functional foods have gathered increasing scientific and public health relevance due to their potentials to confer bioactive components that provide health benefits beyond basic nutrient when consumed as part of a varied diet at regular and efficacious levels. *Piper guineense*, commonly known as West Africa black pepper leaf, is a medicinal plant widely used in traditional African medicine for various neurological conditions. Thus, this study assessed the safe percentage inclusion of *Piper guineense* leaf in composite snack using rat model. Production of fortified composite snack, sensory evaluation, proximate analysis, and the toxicology evaluation using liver and kidney function markers. The composite snack was made from corn flour and wheat flour at ratio 6:1 with inclusion of *Piper guineense* leaf powder at 0%, 1%, 2%, 3%, and 4% respectively. Forty-eight male Wistar rats were randomly divided into six groups, group 1 as control was fed with normal rat chow while others were fed with the composite snack produced at 0 – 4% respectively. The result showed the acceptable concentrations as 0%, followed by 1% and then 2% being the most preferred, with improved proximate composition of the snack, and no significant difference ( $p < 0.05$ ) in the level of the liver function markers (AST, ALT, ALP, T-BIL, D-BIL) and kidney markers (Creatinine, Urea and Uric Acid) when compared with control group. The findings from this study showed that the *Piper guineense* leaf fortified composite snack produced is safe at the most acceptable concentration (1% and 2%) from this study. Hence further study can be carried out using the concentration.

PFC2025\_143

**Curcumin Administration Plus Treadmill Exercise Ameliorate Impaired Brain Na<sup>+</sup>/K<sup>+</sup>-ATPase Activity and other Purinergic/Cholinergic/Monoaminergic Signaling Modulations in Pilocarpine-Induced Epileptic Seizure in Rats**

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**ABSTRACT**

Epilepsy is a chronic neurological disorder marked by recurrent seizures and significant psychological burden, particularly in under-resourced regions such as Africa, where it remains one of the most neglected neurological diseases. The sodium-potassium pump (Na<sup>+</sup>/K<sup>+</sup>-ATPase) and purinergic signaling are essential for maintaining neuronal stability, and their dysregulation has been implicated in epileptogenesis. This study investigated the therapeutic potential of physical exercise and curcumin in modulating Na<sup>+</sup>/K<sup>+</sup>-ATPase activity, purinergic signaling, and related neurochemical enzymes in a pilocarpine-induced rat model of epilepsy. The rats were divided into six groups: Group 1 (Control), Group 2 (Pilocarpine-induced), Group 3 (Pilocarpine + Diazepam), Group 4 (Pilocarpine + Exercise), Group 5 (Pilocarpine + Curcumin), and Group 6 (Pilocarpine + Curcumin+ Exercise). Treatments were administered over a 14-day period, followed by assessment of seizure frequency and enzymatic activities in brain tissue. Na<sup>+</sup>/K<sup>+</sup>-ATPase activity was significantly reduced in the pilocarpine and pilocarpine + diazepam groups, but restored by exercise. ENTPDase (ATP) activity showed no significant differences, while ENTPDase (ADP), ecto-5'-nucleotidase and ADA levels were significantly elevated in induced groups, indicating purinergic disruption. MAO levels were markedly increased in the pilocarpine, pilocarpine + curcumin, and pilocarpine + exercise groups, but significantly reduced in the combined pilocarpine + curcumin + exercise group. BChE levels were elevated in the pilocarpine and pilocarpine + exercise groups, but ameliorated in curcumin-treated rats, especially when combined with exercise. AChE activity, which was significantly reduced in the pilocarpine group, was restored in all treated groups. In conclusion, physical exercise and curcumin, individually and synergistically, exert neuroprotective effects by restoring Na<sup>+</sup>/K<sup>+</sup>-ATPase function and modulating purinergic and cholinergic signaling pathways. These findings support their potential as non-pharmacological strategies for epilepsy management.

**PFC2025\_144**

**Dietary Selenium Biofortification in African Eggplant (*Solanum macrocarpon* L) Enhances Antioxidant Defense and Reduces Oxidative Damage in *Nauphoeta cinerea***  
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**ABSTRACT**

Selenium is an essential micronutrient that contributes to the regulation of oxidative stress by supporting antioxidant enzyme systems. Crop biofortification with selenium represents a promising approach to improving dietary quality and promoting oxidative balance. This study evaluated the antioxidant response of *Nauphoeta cinerea* to selenium-biofortified African eggplant (*Solanum macrocarpon*). Adult cockroaches were fed varying concentrations of selenium-enriched African Eggplant, and their survival, antioxidant enzyme activities, and lipid peroxidation levels were assessed. Across all treatment groups, no significant mortality was recorded, indicating that the biofortified plant material did not exert acute toxicity. Biochemical analysis revealed a dose-dependent enhancement of antioxidant defenses, with significant increases in total thiol content, catalase activity, and superoxide dismutase activity. In parallel, lipid peroxidation, measured by malondialdehyde levels, was markedly reduced in a concentration-dependent manner. These findings demonstrate that selenium-biofortified *S. macrocarpon* L effectively augments antioxidant capacity while protecting against oxidative damage in *N. cinerea*. The absence of toxicity suggests that selenium enrichment of this dietary plant is well tolerated within the tested range. Collectively, the results highlight the potential health-promoting value of selenium biofortification in African eggplant and support its relevance as a functional food source. Furthermore, the use of *N. cinerea* as a non-mammalian model provides a useful platform for preliminary nutrigenomic and toxicological evaluations of selenium-enriched crops.

**PFC2025\_145**

**Effect of King of Bitter Leaf-Enriched Non-Alcoholic Beer On Hematological Parameters And Parasitemia In Malaria-Infected Mice**

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**ABSTRACT**

Malaria remains a significant public health challenge in sub-Saharan Africa, further exacerbated by the emergence of drug-resistant strains and malaria-associated hematological abnormalities. This study investigated the antimalarial efficacy, hematological modulation, and safety profile of *Andrographis paniculata* (King of Bitters)-enriched non-alcoholic beer in a murine model, alongside assessments of product quality and sensory attributes. A sorghum-hop beer matrix was fortified with 25%, 50%, and 75% *A. paniculata* leaf extract and administered orally to *Plasmodium*-infected mice over a five-day treatment period. The formulations produced a dose-dependent suppression of parasitemia, with the 75% enrichment demonstrating comparable efficacy to chloroquine. Hematological indices, including red and white blood cell counts, hemoglobin concentration, and platelet levels, were better preserved in treated groups relative to the infected untreated control. Biochemical analyses revealed no evidence of hepatotoxicity. Physicochemical parameters of the beer remained within acceptable quality ranges; however, sensory evaluation indicated a decline in palatability with increasing enrichment levels. Collectively, these findings suggest that *A. paniculata*-enriched non-alcoholic beer exhibits promising antimalarial and

hematoprotective potential, supporting its development as a novel functional beverage for malaria management, with further optimization required to enhance consumer acceptability.

**PFC2025\_146**

**Antioxidant Potential of King of Bitter Leaf (*Andrographis paniculata*) Enriched Non-Alcoholic Beer in *Plasmodium*-Infected Mice**

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**ABSTRACT**

Malaria remains a life-threatening infectious disease in which oxidative stress, induced by *Plasmodium* infection, contributes substantially to cellular injury and disease progression. This study investigated the antioxidant and therapeutic potential of *Andrographis paniculata* (King of Bitters; KOB) fortified non-alcoholic beer in *Plasmodium berghei*-infected mice. Experimental beer formulations were prepared at varying KOB-to-hops ratios (25:75, 50:50, and 75:25) and characterized for physicochemical attributes including pH, alcohol content, titratable acidity, specific gravity, color, turbidity, and bitterness. Antioxidant status was evaluated *in vivo* by assessing malondialdehyde (MDA), reactive oxygen species (ROS), superoxide dismutase (SOD), catalase (CAT), glutathione S-transferase (GST), glutathione peroxidase (GPx), reduced glutathione (GSH), and total thiols in splenic tissue. The physicochemical analysis showed pH values of 2.95–3.15, alcohol content of 0.1% ABV, titratable acidity of 0.50–0.58 mol/L, and specific gravity of 1.002–1.004. Increasing KOB inclusion decreased color intensity (8.03–6.93 EBC) but elevated turbidity (7.85–10.90 NTU), while bitterness remained high (117.6–118.65 IBU). Infected mice treated with KOB-fortified beer exhibited significant reductions in MDA and ROS levels ( $p < 0.01$ ), coupled with enhanced activities of SOD, CAT, GST, and GPx ( $p < 0.0001$ ), as well as elevated GSH and total thiol concentrations. The 75% KOB formulation elicited the strongest antioxidant response and the greatest suppression of parasitemia. In conclusion, *A. paniculata*-enriched non-alcoholic beer demonstrated potent antioxidant and antimalarial activities, supporting its potential development as a functional dietary adjunct for malaria management.

PFC2025\_147

**Phytochemical Profile, Antioxidant Properties, and Parasitemia-Suppressive Potential of Turmeric Tea in *Plasmodium berghei*-Infected Mice**

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**ABSTRACT**

Herbal teas, such as turmeric tea, are increasingly investigated for their health-promoting potential as natural antioxidants and as adjuncts in malaria treatment. The bioactive compounds in turmeric may reduce oxidative stress while suppressing parasite proliferation. This study evaluated the phytochemical composition, antioxidant activity, and antimalarial potential of turmeric tea. The tea was prepared by hot-water extraction at a concentration of 5 mg/mL and analyzed *in vitro* through phytochemical screening, including total phenolic content (TPC), total flavonoid content (TFC), and antioxidant assays (ABTS, DPPH, FRAP, and iron chelation). A total of 32 Swiss albino mice were used: 8 served as the normal control, while 24 were infected with *Plasmodium berghei* and divided into three groups (untreated, Artemether–Lumefantrine–treated, and turmeric tea–treated). Oral treatment lasted for five days at a dosage of 100 mg/kg body weight, and parasitemia levels were monitored before treatment and on day 5 post-treatment. Turmeric tea exhibited high concentrations of phenols ( $16.61 \pm 0.02$  mg GAE/g) and flavonoids ( $10.20 \pm 0.37$  mg QUE/g), along with strong antioxidant properties, demonstrated by significantly high ferric-reducing antioxidant power ( $50.99 \pm 3.34$  mg AAE/g), comparable to ascorbic acid, strong ABTS and DPPH radical scavenging activities ( $3.04 \pm 0.02$  mmol TEAC/g and  $61.63 \pm 2.21\%$ , respectively), and notable iron-chelating capacity ( $17.00 \pm 0.926\%$ ). *In vivo*, turmeric tea significantly reduced parasitemia, lowering levels from  $8.450 \pm 0.909$  (pre-treatment) to  $3.785 \pm 0.065$  (turmeric tea post-treatment), corresponding to a suppression percentage of  $54.784 \pm 5.910$  within five days of treatment. This effect was significantly higher than the untreated group ( $22.051 \pm 2.521\%$ ) and comparable to the standard drug–treated group ( $49.639 \pm 6.294\%$ ). These findings suggest that the observed effects are linked to the tea's antioxidant activity. Overall, turmeric tea demonstrates strong antioxidant and parasite-suppressive properties, highlighting its potential as a natural adjunct in malaria management.

PFC2025\_148

**Black Tea Ameliorates Malaria-Induced Hematological Alterations in *Plasmodium berghei*-Infected Mice**

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**ABSTRACT**

Malaria significantly disrupts hematological balance, often leading to anemia, leukocyte alterations, and reduced packed cell volume due to parasite-induced red blood cell lysis and immune dysregulation. These complications aggravate disease severity and increase mortality risk, while conventional antimalarial drugs provide limited protection against hematological damage. Black tea (*Camellia sinensis*), a widely consumed beverage, is rich in polyphenols, flavonoids, and theaflavins with established antioxidant, anti-inflammatory, and immunomodulatory properties. This study investigated the hematoprotective effects of black tea in *Plasmodium berghei*-infected mice. Black tea was prepared by hot-water extraction at a concentration of 5 mg/mL. Thirty-two Swiss albino mice were used, of which 24 were infected and assigned to untreated, Artemether–Lumefantrine–treated, and black tea–treated groups, while 8 mice served as

normal control. Oral treatment was administered for five days at a dosage of 100 mg/kg body weight, after which blood samples were analyzed for red blood cell count (RBC), white blood cell count (WBC), hemoglobin concentration (Hb), and packed cell volume (PCV). Infected untreated mice showed significant reductions in RBC ( $5.550 \pm 0.495 \times 10^{12}/L$ ), Hb ( $9.400 \pm 0.424$  g/dL), and PCV ( $19.250 \pm 5.445\%$ ), compared with normal controls (RBC:  $7.670 \pm 0.099 \times 10^{12}/L$ ; Hb:  $12.950 \pm 0.495$  g/dL; PCV:  $45.250 \pm 1.909\%$ ). Black tea treatment significantly improved these parameters, restoring RBC to  $5.865 \pm 0.021 \times 10^{12}/L$ , Hb to  $17.800 \pm 1.414$  g/dL, and PCV to  $27.900 \pm 0.990\%$ , which was comparable to the standard drug-treated group (RBC:  $8.390 \pm 0.481 \times 10^{12}/L$ ; Hb:  $13.105 \pm 1.549$  g/dL; PCV:  $41.950 \pm 0.495\%$ ). Malaria infection also caused a significant reduction in WBC count (normal:  $5.700 \pm 0.283 \times 10^9/L$ ; untreated:  $2.050 \pm 0.495 \times 10^9/L$ ), but treatment restored levels, with black tea ( $5.900 \pm 0.424 \times 10^9/L$ ) and the standard drug ( $3.200 \pm 0.191 \times 10^9/L$ ) improving leukocyte counts and indicating immune balance recovery. Overall, black tea demonstrated strong hematoprotective activity in malaria-infected mice, suggesting its potential as a supportive natural remedy for preserving blood health during malaria infection.

**PFC2025\_149**

**Neuroprotective and Anti-Inflammatory Effects of Citrus Peel Fortified Ice-cream  
Supplementation in Plasmodium berghei-Infected Mice**

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**ABSTRACT**

Malaria infection, caused by plasmodium species is a global and significant challenge particularly in Africa. Malaria infection is a leading cause of morbidity, in addition to its systemic effects, malaria induces neuroinflammation and oxidative stress which impairs neuronal signaling and cognitive function. Brain Derived Neurotrophic Factor (BDNF) and cAMP Response Element Binding Protein (CREB) are for neuronal survival and memory, while TNF $\alpha$  and IL10 are inflammatory cytokines. The study aims to evaluate the effect of dietary supplements of citrus peel on the expression of BDNF, CREB, TNF $\alpha$  and IL10 mRNA, as well as oxidative stress markers superoxide dismutase (SOD), and malondialdehyde (MDA) in *P. berghei* infected mice. The male Wistar albino mice were divided into 7 groups comprising; normal control, Plasmodium-infected group, Plasmodium-infected mice treated with a standard drug (Chloroquine), Plasmodium-infected mice treated with varying concentration of 0%, 0.25%, 0.5% and 1% of citrus peel. The findings revealed that the groups treated with citrus peel supplementation showed a significant upregulation of BDNF and CREB mRNA expression which indicates enhanced neuronal signaling. For TNF $\alpha$ , the mRNA expression showed a downregulation of the TNF gene, while for IL10, the mRNA expression showed a significant upregulation which indicates anti-inflammatory effects. In addition, *P. berghei* infection suppressed SOD activity and elevated MDA levels, which indicates oxidative stress. Chloroquine ameliorated SOD and mitigated MDA, while citrus peel supplementation produced dose-dependent amelioration, reflected in modest increases in SOD activity and reductions in MDA. The findings shows that citrus peel supplementation modulates neuroprotective, antioxidant and inflammatory pathways in *P. berghei* mice which therefore makes citrus peel supplementation a functional food with therapeutic effects and value in the management and prevention of malaria.

**PFC2025\_150****Effect of Bitter Leaf (*Vernonia amygdalina*) and Siam Weed (*Chromolaena odorata*) on Parasitemia Level, sperm parameters, Hormonal Profiles and Liver Functions in *Plasmodium berghei*-induced Malarial Mice**Abidemi Abiola Bolarinde<sup>1</sup>, Idowu Sunday Oyeleye<sup>2</sup>, Olawuyi Toluwase Solomon<sup>3</sup>, Olajide Raymond Ojo<sup>1</sup> and Ganiyu Oboh<sup>1\*</sup><sup>1</sup>Department of Biochemistry, The Federal University of Technology, Akure, Ondo State, Nigeria.<sup>2</sup>Department of Medical Biochemistry, The Federal University of Technology, Akure, Ondo State, Nigeria.<sup>3</sup>Department of Anatomy, School of Basic Medical Sciences, The Federal University of Technology, Akure, Ondo State, Nigeria.

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**ABSTRACT**

Malaria is a great health problem in sub-Saharan Africa. Interest in herbal alternatives for its treatment is rising due to the effect of antimalarial drugs on male fertility. This study focused on the effect of bitter leaf and Siam weed extracts (BLE and SWE) on sperm quality and related biomolecules in *Plasmodium berghei*-infected mice. The study used mature male mice inoculated with strain NK65 *P. berghei* (Chloroquine-sensitive). The mice were grouped into 9 (n = 8) including the normal control group. Thereafter, the parasitemia and mice temperature were assessed. Groups 4 to 9 were treated with BLE and SWE (100, 200, and 400 mg/kg) for five days, respectively, while group 3 was treated with 10 mg/kg chloroquine. Sperm and hormonal parameters were assessed and the extracts phytoconstituents were characterized. The results revealed that both BLE and SWE reduced plasmodium load, but had no effect on hormone level except a substantial decrease in the follicle-stimulating hormone of the group treated with bitter leaf 400 mg/kg. BLE (p<0.05) improved sperm quality while SWE exerted a dose-dependent negative effect. Both extracts had protective effects on liver function. In addition, eighteen and thirteen bioactive compounds were characterized in SWE and BLE, respectively. Findings from this study revealed that 200 mg/kg BLE can be considered an effective dose to treat malaria with no adverse effect on sperm quality and its related biochemical parameters.

**PFC2025\_151****Proximate Composition of Ashanti Pepper Seed-Fortified Bread and Assessment of Its Effect on Lipid Profile in Wistar Rats**Leye J. Babatola<sup>1</sup>, \*Olusola O. Adegoke<sup>1,2</sup>, Adeniyi A. Adebayo<sup>1</sup> and Hephzibah O. Oke<sup>1</sup><sup>1</sup>Department of Biochemistry, Joseph Ayo Babalola University, Ikeji Arakeji, P.M.B 5006, Ilesa, Osun state, Nigeria<sup>2</sup>Department of Biochemistry, Federal University of Technology, Akure, P.M.B. 704, Akure, Nigeria 34001

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**ABSTRACT**

Lipid profile is a series of tests used to assess the levels of plasma lipids such as total cholesterol, triglycerides, low-density lipoprotein (LDL), and high-density lipoprotein (HDL), which are critical markers of diseases such as cardiovascular disease, diabetes, cancer, obesity etc. Abnormal lipid levels

especially elevated LDL and triglycerides, and reduced HDL are strongly associated with atherosclerosis, coronary artery disease, and stroke. This study therefore, explored the nutritional composition, sensory acceptability, and lipid-modulating effects of bread fortified with Ashanti pepper seed powder in male Wistar rats. Twenty (20) male Wistar rats were divided into four groups ( $n = 5$ ) as follows: Control Group; Standard Bread Group (no fortification); 0.5% Ashanti pepper seed powder fortified bread and 1% Ashanti pepper seed powder fortified bread. The experiment lasted for 21 days after which blood sample of the rats were collected through cardiac puncture. Analysis for proximate composition and sensory quality of the bread was carried out while the plasma lipid profile was analyzed. Results from the proximate analysis revealed that Ashanti pepper seed powder fortified bread exhibited increased carbohydrate and ash content, with a slight reduction in moisture, protein and fat content compared to the non-fortified bread. Sensory evaluation using a 7-point hedonic scale indicated that fortification up to 1% was acceptable in terms of taste, texture, aroma, color, and general acceptability. Lipid profile analysis showed that rats fed with Ashanti pepper seed powder fortified bread experienced significant ( $p < 0.05$ ) reductions in total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C) and atherogenic index, when compared to control, supporting Ashanti pepper's seed hypolipidemic potential. However, high-density lipoprotein cholesterol (HDL-C) was significantly increased, which support cardioprotective effect. The results from this study shows that Ashanti pepper seed powder fortified bread could have some modulatory effects on lipid profile.

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