MESSAGE FROM THE VICE CHANCELLOR OF BUSITEMA UNIVERSITY(HOST)

It is with great pleasure and pride that I warmly welcome you all to Busitema University at this NAPRECA – Uganda annual symposium 2024. Specifically, I welcome the Keynote speakers, presenters and international delegates to Uganda. When Busitema University was nominated to host the first ever NAPRECA – Uganda annual symposium outside Makerere University, I was extremely excited to host this historical event in our University which has seven campuses focusing on different science disciplines that are aligned to the National development plans and vision 2040.

In 2022, Busitema University established a Centre of Excellence in Natural Products Research and Innovation (NaPRiC) under the leadership of Dr. Samuel Baker Obakiro. NaPRiC has registered significant growth in research outputs and product development and contributed to our institutional advancement nationally and internationally. Forexample, NaPRiC developed Tazcov, a herbal remedy for acute respiratory symptoms in viral infections which has completed Phase II clinical trials at Makerere Lung institute. The Centre is currently working on other prototypes for diabetes mellitus, malaria, dental caries, HIV/AIDS, skin infections and erectile dysfunction.

This conference brings together experts, practitioners, and thought leaders from around the globe to share knowledge, exchange ideas and collaborate on advancing the field of natural products in solving societal problems. As a professor of clinical pharmacology with a bias towards drug discovery and development, I am elated to participate in this conference due to the immense role natural products possess as veritable sources of novel drug molecules. In the face of escalating antimicrobial resistance, emerging and remerging diseases including pandemics, the niche for natural products research and innovation is going to gain even more momentum. This was clearly evidenced during the covid-19 pandemics where all countries resorted to natural products to treat their citizens.

Busitema University is committed to fostering teaching, research and community outreach like any other University. However, we are now emphasizing the aspect of Innovation and product development as a fourth core business so as to contribute to the Qualitative leap and the ten growth strategy by 2040. This conference therefore perfectly aligns with our objectives of knowledge generation and dissemination. I encourage all participants to engage fully in this symposium, challenge one another's thinking and build long lasting partnerships to shape the future of Natural Products research and Innovation in Africa.

I wish you a productive, inspiring and successful conference

Professor Paul Waako, PhD.
VICE CHANCELLOR - BUSITEMA UNIVERSITY

MESSAGE FROM THE NAPRECA EXECUTIVE SECRETARY

Dear Members of NAPRECA-Uganda Chapter,
Greeting to All of You. On behalf of all NAPRECA members, please accept deepest appreciation for the great efforts in organizing Uganda chapter symposium under the leadership of Prof. Dr. Esezah Kakudidi.

Forty years ago, 1984, NAPRECA began as a dream to develop all aspects of natural products research in AFRICA, our continent that is rich in biodiversity but poor in research and innovation. I am sure after this long journey, you all know NAPRECA has faced major challenges, and we were always ready with actionable solutions. While we are celebrating the past, we all "TOGETHER" pave the way for a better future.

Let me wish you a very successful and fruitful meeting, hoping you can come out of your presentations and discussions with applicable recommendations and innovative solutions.

Sameh AbouZid

Prof. Dr. Sameh AbouZid
NAPRECA Executive Secretary

MESSAGE FROM THE PRESIDENT OF NAPRECA UGANDA

I warmly welcome you all to this NAPRECA – Uganda annual symposium 2024. This is the first ever NAPRECA – Uganda annual symposium to be held outside Makerere University. I am therefore grateful to the Vice Chancellor of Busitema University for accepting to host this event. The NAPRECA (U) Executive agreed to rotate this annual symposium to various Universities as a way of promoting inclusivity and equitable participation from all natural product scientists in Uganda. I want to thank the former President of NAPRECA – (U) chapter Professor Robert Byamukama for steering the association up to 2022. In a special way, I send my sincere appreciation to the NAPRECA Executive Secretary General Professor Sameh AbouZid for the new enthusiasm and commitment to NAPRECA particularly the NAPRECA – Uganda Chapter.

I want to thank the keynote speakers for accepting to share their rich knowledge on this conference. We received many abstracts and very important to note that a big number of them were from international scholars. The quality of the abstracts was top notch and demonstrated diversity across the several natural products research domains. I also welcome other delegates from the Secretariat of Science Technology and Innovation – Office of the President, National Drug Authority, Uganda Registration Services Bureau, traditional medicine practitioners and other thought leaders from around the globe. Your participation in this conference is not only relevant but very critical for translating our research outputs into practical solutions to solve societal problems as well as contribute to the knowledge economy. In this symposium we are going to share knowledge, exchange ideas and network to advance natural products research and innovation across borders. Natural products brings experts from different scientific field to work together and its application is not only limited to health, but also in agriculture, polymer, textile and dying industry, beauty and cosmetic industry, petroleum industry among others.

This symposium has been sponsored by Uppsala University and International Science Programme (ISP) and we are grateful for their financial support.

I wish you a successful conference

Professor Esezah K Kakudidi Ph.D
PRESIDENT – NAPRECA (U) CHAPTER

MESSAGE FROM THE CHAIRPERSON ORGANIZING COMMITTEE

Dear Distinguished Guests, researchers and participants,

On behalf of the organizing committee, it is my profound honour and privilege to welcome you all to the NAPRECA Uganda chapter 2024 symposium, held here at Busitema University. I would like to extend our heartfelt gratitude to our sponsors (Uppsala University and ISP), partners, and supporters who have made this event possible. I also wish to acknowledge the tireless efforts of our organizing team, NAPRECA Executive and Busitema University administration who have worked diligently to ensure the success of this conference.

The theme of this year's symposium, mining natural products for sustainable development, is a testament to our commitment to fostering innovation, collaboration, and knowledge-sharing. Our primary objective is to create a platform where ideas can be exchanged and collaborations can be initiated towards solutions to pressing challenges in our society.

Today, we will have the opportunity to engage with a number of insightful scientific presentations, panel discussion, and interactive sessions which I believe will inspire, educate and motivate all of us. We shall also have NAPRECA Uganda Annual general meeting and I call upon you to participate fully. I encourage non-members to join us in order to proper NAPRECA Uganda.

I want to express my excitement for the day ahead and I encourage you to fully engage in discussion and network with each other. Your contributions are essential to the success of our discussions and the advancement of our shared goals.

Thank you all for being here, and I wish you a fruitful and engaging conference.

Warm regards,
Dr Owor Richard Oriko
Chairperson, Organizing Committee

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3. Secretary General - Dr. Christopher Adaku
4. Deputy Secretary General - Dr. Christine Betty Nagawa
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NAPRECA-UGANDA SYMPOSIUM 2024

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Mining natural products for sustainable development

TENTATIVE PROGRAMME FOR Thursday, December 12th, 2024 at FoET conference Hall Busitema University

Time	Activities
	Opening Session **Chairpersons; Dr. Samuel Baker Obakiro and Dr. Richard Oriko Owor**
8:00-8:30	Registration
08:30 09:00	Welcome Remarks (i) Chair organizing committee (ii) President, NAPRECA Uganda Chapter (iii) Executive Secretary, NAPRECA (iv) ISP Representative (v) Vice Chancellor, Busitema University
	1st Scientific Session: Keynote Address and short talk presentation (ST) Chairpersons: Dr. Godwin Anywar and Assoc. Prof. Yahaya Gavamukulya
9:00-9:30 9:30-9:45	**Keynote Address** Prof. Dr. Muhammad Iqbal Choudhary, H.I., S.I., T.I., Coordinator General COMSTECH/ Director ICCBS **Reactions to the Keynote address**
9:45-9:55	**ST1: Dr. Peter Sekandi** The antibacterial, antioxidant and sun protection potential of a benzophenone from *Dolichopentas decora* (S. Moore)
9:55-10:05	**ST2: Dr Bunalema Lydia** Exploring Ugandan medicinal plants as potential anti-malarial sources; ethnobotanical use, anti-plasmodial activity and acute toxicity
10:05-10:15	**ST3: DR BELEMNABA Lazare** Phytochemical screening, acute toxicity and vasodilation properties of the aqueous decoction *Sclerocarya birrea* (A. rich.) Hochst (Anacardiaceae) trunk bark

	2nd Scientific Session: Short talk presentation (ST) **Chairpersons: Dr. Christine Betty Nagawa and Dr. Kwesiga George**
11:30-11:40	**ST4: Dr. Madina Mohamed Adia** Characterization of compounds isolated from *Helichrysum odoratissimum* plant species and their activities on selected oral microbes
11:40-11:50	**ST5: Paul Mukasa** Metabolomics phytochemical profile and Antibacterial Activity of Selected Medicinal plants used to Manage Dog bites in Uganda
11:50-12:00	**ST6: Mr. Khamis Rashid Kheir** Ethnobotanical survey of medicinal plants used to manage diabetes, asthma and hypertension in Zanzibar
12:00-12:10	**ST7: Moses Opio** In – Vivo Anti-Inflammatory, Analgesic and Acute Toxicity Evaluation of Ethanolic Extracts of the Aerial Parts of Tephrosia Linearis in Wistar Rats
12:10-12:20	**ST8: Eliah Kwizera** Methanol crude peel extract of *Punica granatum* prevents oxidative damage in Kidneys if rats exposed to highly active antiretroviral therapy
12:20-12:30	**ST9: Pierre Yemback** Lupane Derivatives: Design, Isolation, Synthesis and Evaluation of Antiplasmodial Activity against *Plasmodium falciparum* 3D7 strain
12:30-12:40	**ST10: Dr. Winifrida Kidima** Investigation on the impact of crude extracts of *Moringa oleifera* leaves and *Salvia hispanica* seeds in mRNA expression of selected autophagic and inflammatory genes in LPS challenged rats
12:40-13:10	**Wrap discussions for ST4 -11 presentations**
13:10-14:00	**LUNCH BREAK**
	3rd Scientific Session: Flash presentation (FP) **Chairpersons: Dr. Christine Kyarimpa and Dr. Benson Oloya**
14:00-14:05	**FP1: Dr. Omujal Francis** Ethnobotanical survey of medicinal plants used by the Batwa Indigenous People and Local Communities of Kisoro District, South Western Uganda
14.05-14.10	**FP2: Ms. Catherine Nabitandikwa** Optimization and Characterization of the Mucilage Extracted from The Pulp and Core of *Artocarpus Heterophyllus*
14:10-14.15	**FP3: KOUDJOU NZOFANG Franky Liza** Antiplasmodial guided investigation of *Combretum platypterum (*Combretaceae)
14:15-14.20	**FP4: Okot David Fred** In-vivo anti-cobra venom and inhibition of anticoagulant activity of venom by aqueous extract, in-vitro antivenom of novel pyranocoumarin derivatives of Toona ciliata M. Roem; Two New dipyranocoumarin derivatives
14.20-14.25	**FP5: Dr Hannington Gumisiriza** Medicinal Plants for Managing "African" Diseases by Local Communities in South-Western Uganda

14.25-14.30	**FP6: Ms Hellen Phiri** Evaluation of antioxidant activity of selected wild fruits and vegetables from Zambia
14.30-14.35	**FP7: Mr Malama Sunday** Exploration of in vitro cytotoxicity and antischistosomal activity of the dichloromethane root bark extract of *Friesodielsia obovata*
14.35-14.45	**Wrap discussions for FP1 -7 presentations**
	4th Scientific Session: Panel discussion **Chairpersons: Prof. Esezah Kakudidi and Dr. Samuel Baker Obakiro**
14:45-15:00	Herbal medicine regulation and TCM 2019 Act - **NDA**
15:00-15:10	Intellectual property rights and registration - **URSB**
15:10-15:20	Standardization of TCM and Clinical trials Integration of TCM into the health care system - **CONAT / DGAL**
15:20-15:30	Funding for Natural Products Research and Pathogen Economy Agenda **- STI-OP**
15.30-15.50	**Reactions to Panel discussion**
15.50-16.40	**Chairperson:** President, NAPRECA Uganda Chapter
	NAPRECA AGM
16.40-17:00	**Closing remarks and award of Certificates**
17:00	**Departure**

Programme Controller: Dr. Samuel Baker Obakiro Tel: +256704946479

The antibacterial, antioxidant and sun protection potential of a benzophenone from *Dolichopentas decora (S. Moore)*

Peter Sekandia[a], Jane Namukobe[a], Robert Byamukama[a], Christine Betty Nagawa[b],, Markus Bacher[c], Thomas Rosenau[c] , Linda Langat[d], Eduard Mas-Claret [e], Dulcie Mulholland[d]

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Dolichopentas decora (S.Moore) (Rubiaceae) is used locally in Western Uganda in the treatment of microbial skin infections and could therefore be a potential source of antimicrobial agents. This study aimed at the isolation and identification of compounds from *D. decora* leaf extracts and an investigation of their bioactivities. The compounds were sequentially extracted from the powdered aerial plant parts using *n*-hexane, EtOAc, MeOH, and distilled water, and compounds were isolated using a combination of chromatographic techniques. Structure elucidation was performed using NMR spectroscopy and mass spectrometric techniques. This resulted in the identification of seven known compounds: squalene (**1**), β-sitosterol (**2**), stigmasterol (**3**), ursolic acid (**4**), rutin (**5**), mitraphenone A (**6**), and protocatechuic acid (**7**). An investigation of the antibacterial activity of the extracts and isolated compounds was carried out using an agar well diffusion test against *Pseudomonas aeruginosa*, *Staphylococcus aureus, Escherichia coli,* and *Klebsiella pneumoniae.* In addition, the extracts and isolated compounds were screened for antioxidant activity using the 2,2-diphenyl-1-picryl-hydrazyl (DPPH) radical scavenging assay. Compound (**6**) was screened for sun protection potential between 290 to 320 nm. The binding interactions of compound **6** against the penicillin-binding protein 1b (PBP 1b) of *E. coli* were studied using Molecular Operating Environment (MOE) 2015.10 software. Compound **6** was found to be active against *K. pneumoniae* (zone of inhibition, 10.0 ± 0.1 mm), it showed a good sun protection factor (SPF = 24.61) and a low radical scavenging activity (28.8%). Compound **6** binds better to lysine through the hydroxyl group of C-6'' with a binding affinity value (ΔG = -3.7 kcal/mol). This study is the first report of compounds **1** to **7** from *D. decora.*

Keywords: Skin infections, *Dolichopentas decora*, benzophenone, antioxidant activity, antibacterial activity, sun protection potential

Title: Exploring Ugandan medicinal plants as potential anti-malarial sources; Ethnobotanical use, antiplasmodial activity and acute toxicity

Bunalema Lydia

Background: Malaria remains a major cause of morbidity and mortality especially in sub-Saharan Africa. Whereas herbal medicines have long been used for disease remedy in many African communities, there is limited evidence on the extent of use, their safety, and efficacy. This study, sought to identify herbal medicinal plants used by communities in Uganda for managing of malaria; the antiplasmodial activity of prioritized plant spp and their toxicity profile.

Method: An electronic literature search was carried out using available databases including Pubmed, Google scholar and Scopus-indexed journals using keywords/ phases. Five medicinal plant species including *Combretum mole* G.Don, *Worburgia ugandesis* Sprague, *Zanthoxyllum leupreuirii* Guill. &Perr, *Vernonia lasiopus* O. Hoffm., *Microglossa pyrifolia* (Lam.) O. Ktze were selected and tested on chloroquine resistant (Dd2) and sensitive strains (3D7) of P. falciparum for their antiplasmodial activity. Acute toxicity tests were performed on the five medicinal plants in Wistar albino rats.

Results: A total of two hundred fifty-seven (257) plant *spp* belonging to seventy-eight (78) families are used in the treatment of malaria in ten Districts. *Combretum mole* G.Don,

Zanthoxyllum leprieurii Guill.&Perr. and *Vernonia lasiopus* O. Hoffm., were the most active with IC50 below 50µg/ml. Toxicity studies showed that all plant extracts were safe with LD50 >5000mg/ml.

Conclusion: Several plant species are used in Uganda for treatment of malaria by local communities and are potential candidates for development of new affordable antimalarial remedies.

Phytochemical screening, acute toxicity and vasodilation properties of the aqueous decoction Sclerocarya birrea (A. rich.) Hochst (Anacardiaceae) trunk bark's

BELEMNABALazare*,[1], SAWADOGO Bibata[1,2], NITIEMA Mathieu[1], OUEDRAOGO Windingoudi Rimwagna Christian[1], COMPAORE Souleymane[1], BELEMLILGA Bonewende Mohamed, KABORE Boukaré[1,2], KOALA Moumouni[1]

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Phytochemical screening, acute toxicity and vasodilation properties of the aqueous decoction Sclerocarya birrea (A. rich.) Hochst (Anacardiaceae) trunk bark's

Sclerocarya birrea (S. birrea) species is widely used to treat various diseases, including high blood pressure. The present study is undertaken to determine the acute toxicity, antioxidant, and vasodilator activities of a lyophilized aqueous decoction (DAL) of S. birrea trunk bark extracts. HPTLC analysis was carried out for DAL phytochemical groups contained. The OECD guideline 423 was applied for oral toxicity evaluation.

Moreover, the vasodilation effect of the DAL extract was studied ex vivo by myograph method. Results showed the presence of flavonoids, tannins, saponins, steroids, and triterpenes in the DAL extract. The vasodilation study showed that the DAL induced the relaxation of U46619 precontracted NMRI mice thoracic aorta in a concentration-dependent manner, both in the presence and absence of endothelium but also in the presence of L-Nitro Arginine Methyl Ester (L-NAME). The 50% effective concentrations (EC50) of DAL extract were 266.36±65.12 µg/mL, 592.43±78.05 µg/mL, and 365.57±97.54 µg/mLof, respectively. Moreover, The LD50 of this extract is estimated at 5000 mg/kg and it can be classified in category five and considered slightly toxic according to the Globally Harmonized System of Classification (GHS) and OECD guideline 423.

In summary, this study reported the presence of secondary metabolites of interest, such as phenols, flavonoids, tannins, saponins, steroids, and triterpenes, and the vasodilation effect of the DAL extract of S. birrea. These results may help to support the DAL safe use in traditional medicine for managing high blood pressure.

Keywords. Sclerocarya birrea; HPTLC; Acute toxicity; L-NAME; Vasodilators, In vivo

Characterization of Compounds Isolated from *Helichrysum Odoratissimum* Plant Species and their activities on selected Oral Microbes.

Madina Mohamed Adia[1], Osbert Ambassador[1], Muhammad Azeem[2], Beatrice Achan[3], John Baptist Kisitu[3], Aqsa Rasheed[2], Peter Ssekandi[1], Francis Ocheng[4].

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[4]*Department of Dentistry, College of Health Sciences, Makerere University, Uganda.*

Introduction: *Helichrysum odoratissimum* (L.) Sweet is used for traditional oral health care in Uganda and its crude extracts previously demonstrated activity against bacteria that cause Periodontal diseases (PD) and dental caries (DC).

Objectives: The aim of the study was to isolate and characterize compounds from the extracts and essential oil of *H. odoratissimum* and to test the antimicrobial activities of the isolated compounds.

Methods: The essential oil was extracted by hydro-distillation of fresh areal parts and its chemical composition analyzed using GC-MS. Crude extracts were obtained by maceration extraction of dried plant material. Chromatographic and spectroscopic techniques were used in isolation and characterization of compounds. Antibacterial and antifungal activities were investigated through determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC).

Results: The essential oil was dominated by sesquiterpene hydrcarbons like α-caryophyllene (17.5%), trans-β-caryophyllene (16.8%) and monoterpenes like α-pinene (15.8%). Two flavones 3-O-methylquercetin **(1)** and 3,5-dihydroxy-6,7,8-trimethoxyflavone **(2)** and two sterols β-sitosterol **(3)** and stigmasterol (**4)** were isolated from *H. odoratissimum*. Compound **1** had a MIC of 0.98 µg/ml and 250 µg/ml against *Streptococcus mutans* and *Streptococcus aureus* respectively, compound **2** had a MIC of 125 µg/ml and 250 µg/ml against *Streptococcus mutans* and *Candida albicans* respectively while compounds **3** and **4** had an MIC of 0.98 µg/ml against *Streptococcus mutans*.

Conclusions: It is the first time compounds 3 and 4 are isolated from the plant *H. odoratissimum*. The essential oil and extracts of *H. odoratissimum* contain phytochemicals that are active on oral microbials which justifies its use as a traditional medicine for oral health care. The study is in line with SDG no. 3 which is good health and wellbeing of community members who use the plant in oral care.

Key words: *Helichrysum odoratissimum*; Dental caries; Periodontal diseases; Oral microbials; antibacterial; antifungal; Essential oil.

Metabolomics phytochemical profile and Antibacterial Activity of Selected Medicinal plants used to Manage Dog bites in Uganda

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Dog bites cause polymicrobial contamination of dog bite wounds which could lead to several health risks such as bacterial infections like meningitis to the human victim. *Rhiocissus tridentata*, *Gynanthenum thomsonianum*, *Bacharoides lasiopus* are used in the traditional medicine to manage dog bites in Uganda. Studies on the secondary metabolites profile of these plants and their antibacterial potential on dog's oral bacterial diversity effects are limited. The crude extracts were evaluated for the phytochemical constituents and their antibacterial potential against bacteria species isolated and identified from the indigenous dog oral cavities that contaminate the dog bite wounds.

Ultra-High-Performance Liquid Chromatography-High Resolution Mass spectrometry (UHPLCHRMS/MS) and the Global Natural Products Social (GNPS) molecular networking platform were used to dereplicate the secondary metabolites in the crude extracts. Colony morphology and conventional biochemical tests were used to identify the bacterial isolates from oral dog cavities. Antibiotics susceptibility of the bacterial isolates and antibacterial potential of the crude extracts were evaluated using the Agar well and Kirby-Bauer disk diffusion methods respectively.

Analysis of the classical molecular networks from the GNPS platform revealed the presence of basically bioactive flavonoids. *G. thomsonianum* and *B. laziopus* showed no antibacterial activity. The extracts of *R. tridentata* exhibited supreme antibacterial effects against 13 selected isolated bacteria species (out of the 29 identified superbugs from the indigenous dog oral cavities), model standard and multi-drug resistant strains like *Enterococcus faecalis*, *Staphylococcus aureus*, *Streptococcus mutans*, *Proteus mirabilis*, *Klebsiella pneumoniae, Escherichia coli,* with MBC/MIC ratios ≤ 4.

The study illuminates the medicinal potential of majorly *R. tridentata* and its use in traditional and complementary medicine to manage bacterial infections associated with dog bites. *R. tridentata* is a more promising candidate for isolation and development of antibacterial agents.

Keywords: Dog bites, metabolomics, phytochemistry, antibacterial activity, *R. tridentata*.

ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED TO MANAGE DIABETES, ASTHMA AND HYPERTENSION IN ZANZIBAR

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Background: The rapid increasing of the use of medicinal plants urged the researchers to conduct study on plants uses in the management of disease. The ethno-botanical information is useful for medicinal plants uses in non-communicable disease in Zanzibar.

Objective: The study is intended to collect substantial information on application of medicinal plants used to manage non-communicable disease in Zanzibar.

Methods:.The ethnobotanical survey was carried out from April 2022 to June 2022, interviews were conducted and data collected using Kobo system from twenty four (24) traditional healers in twelve (12) shehias of all Districts in Unguja and Pemba.

Results: A total number of twenty-four (24) plants reported to manage asthma, fifteen (15) plant species used to manage hypertension and a total of twenty (20) plants species were reported to manage diabetes during the survey. Male traditional healers were 72% of collected information of ethnobotanical use of medicinal plants compared to 28% from female respondents

Conclusion: Thus, the data revealed that, in Zanzibar people still depends on medicinal plants for management of different diseases including non-communicable diseases. The Basic information of medicinal plants identified will serve a platform for ethno botanists and pharmacologists to further research regarding pharmacological and phytochemical screening of the plant species.

Keywords: Ethnobotany, Medicinal plant, Asthma, hypertension, diabetes.

In – Vivo Anti-Inflammatory, Analgesic and Acute Toxicity Evaluation of Ethanolic Extracts of the Aerial Parts of Tephrosia Linearis in Wistar Rats.

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Inflammatory diseases affect millions globally and pose significant treatment challenges. Traditional plant-based remedies have been used for managing inflammation and related symptoms. This study aimed to evaluate the anti-inflammatory, analgesic and acute toxicity effects of ethanolic extracts from the aerial parts of Tephrosia linearis in Wistar albino rats. The plant samples were harvested from Eastern Uganda, processed and extracted using 70% v/v ethanol. Quantitative phytochemical assay was performed by UV/Vis spectroscopy. Acute toxicity was evaluated using Locke's method. Analgesic and anti-inflammatory activities were evaluated using Complete Freud's Adjuvant-induced arthritis model, paw edema test, and formalin-induced pain scoring. Three doses of T. linearis (190, 380 and 760mg/kg) were compared against 20mg/kg of diclofenac (control). Flavonoids (82.9±0.1mg/g), tannins (140.2±0.9mg/g), alkaloids (93.4±1.0mg/g) and triterpenoids (76.1±1.5mg/g) were present in the extract. Doses below 1000mg/kg did not produce any toxic effects. Higher doses (2900 & 5000mg/kg) produced toxic effects and mortality and were effectively used to estimate the LD50 which was estimated to be 3800mg/kg. Dose dependent increase in analgesic (18.98%, 18.98% &16.70%) & anti inflammatory (19.45%, 21.73% & 26.52%) activities with reduction in arthritic scores were noted though they were unsignificant ($p > 0.05$). Diclofenac showed significantly higher activity for all the parameters $p < 0.05$. White blood cells (WBC's) were elevated in the diclofenac group while erythrocytes, hematocrit and hemoglobin were not altered in all the other groups. T. linearis demonstrated notable anti-inflammatory and analgesic activity and is a safe herbal remedy for management of inflammation. Optimization such as isolation of active ingredients can confer better therapeutic benefits.

Keywords: Tephrosia linearis, anti-inflammatory, analgesic, herbal medicine

Methanol Crude Peel Extract of *Punica Granatum* Prevents Oxidative Damage in Kidneys of Rats Exposed to Highly Active Antiretroviral Therapy

Highly Active Antiretroviral Therapy (HAART) has been linked to oxidative damage to kidney cells leading to renal disease in people living with HIV/AIDS on HAART treatment. The purpose of this study was to investigate the nephron-protective activity of methanol crude peel extract of *Punica granatum* (MPEPG) in HAART-administered Wistar rats.

Thirty male albino Wistar rats weighing between 180–200g were randomly divided into six groups of five rats each. Group 1 served as normal control and was given distilled water only. Group 2 serves as a negative control and was given HAART at a dosage of 64 mg/kg. Groups 3 and 4 were given 100 and 400 mg/kg of MPEPG, respectively, while groups 5 and 6 were given MPEPG dosages of 100 and 400 mg/kg along with HAART, respectively, for 40 days. The rats were sacrificed under halothane anaesthesia, and the kidneys were removed for histological evaluation, while blood samples were analyzed for biochemical parameters.

In the HAART (TLD) treated group, there was a significantly high amount of MDA and a lower level of the antioxidant enzymes SOD and CAT. Biochemical analysis revealed that animals treated with HAART (TLD) had significantly higher levels of urea and creatinine than the normal control animals. In contrast, all the kidney function markers were returned to normal levels in the HAART-treated group after administration of MPEPG. The kidney tissues of animals given HAART had considerable structural damage as revealed by histopathological studies. When HAART exposed rats were treated with MPEPG, both the biochemical and histological results significantly improved.

Methanol crude peel extract of *P. granatum* provided effective protection against kidney oxidative injury brought on by HAART because of its anti-oxidant and free radical scavenging properties.

Keywords: HAART, oxidative stress, nephrotoxicity, *Punica granatum*

Lupane Derivatives: Design, Isolation, Synthesis and Evaluation of Antiplasmodial Activity against Plasmodium falciparum 3D7 strain.

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In our attempts to isolate natural products for drug discovery and development from a rational approach as a part of a laboratory project on re-investigating Cameroonian medicinal plants, compounds from the Cameroon Natural Product Library (CANAPL), were screened by molecular docking studies against the enzyme target glyceraldehyde-3-phosphate dehydrogenase (P*f*GAPDH) of *Plasmodium falciparum*. Amongst the docking hits were lupeol cinnamate and oleanane cinnamate. Triterpenoids with structural similarities to lupeol cinnamate and oleanane cinnamate were isolated from *Baillonella toxisperma* (Pierre); olean-12-en-3β-decanoate, 3-β-trans cinnamoyloxylup-20(29)-ene**,** 3β-amyrin acetate, taraxerol, betulonic acid, β-sitosterol, betulinic acid, 3β-(trans-p-Coumaroyl)oxylup-20(29)-en-28-oïc acid and screened alongside Betuline and oleanolic acid. The favorable compounds (betulonic acid and 3β-(trans-p Coumaroyl oxylup-20(29)-en-28-oïc acid) with 100 % growth inhibition on *P. falciparum* 3D7 strain together with compounds 3-β-trans cinnamoyloxylup-20(29)-ene, betulinic acid and Betuline were structurally optimized to afford new lupane derivatives with the privileged α,β-unsaturated carbonyl medicinal scaffolds; betulonic acid acryl aldehyde, betulin acryl aldehyde, 3β-(trans-p- Coumaroyl)oxylup 20(29)-en-28-oïc acid acryl aldehyde, betulinic acid acryl aldehyde and 3-β-trans cinnamoyloxylup-20(29)-ene acryl aldehyde exhibiting more potent antiplasmodial activities with IC_{50} values of 0.703 μM, 2.15 μM, 1.28 μM, and 3.79 μM respectively. The presence of the α, β-unsaturated carbonyl moiety increased binding interactions during docking analyses. The modified compounds with the privileged α,β-unsaturated carbonyl medicinal scaffolds could be further optimized into potent drugs such as antimalarial agents.

Investigation on the Impact of Crude Extracts of *Moringa oleifera* Leaves and *Salvia hispanica* Seeds in mRNA expression of selected autophagic and inflammatory genes in LPS challenged rat

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Background: *Moringa oleifera* and *Salvia hispanica* are widely recognized medicinal plants used for various therapeutical purposes all over the world.

Aim: This study aimed to investigate the protective impact of crude extracts of *M. oleifera leaves* and *S. hispanica* seeds on mRNA expression of selected autophagic and inflammatory genes in LPS-challenge male albinos Wistar rats.

Methods: Rats were set into groups. The first experimental group was treated with 400 mg/Kg body weight (BW) crude extract of *M. oleifera* leaves whereby, the second one received 1.5 g of *S. hispanica* seeds. This procedure was performed twice daily for 14 and 28 days consecutively. On the 15th and 29th days, the rats were orally administered 10 mg/kg BW of LPS. In addition, one group served as negative control and received no treatment, while another one received only LPS. Six hours after LPS administration, blood and intestinal tissue samples were collected for analysis including, gross pathology and histological examination of intestinal tissue. The mRNA expression levels of autophagic markers (Beclin-1, LC3-II, p62) and inflammatory cytokines (IL-6, IL-1β, TNF-α) in blood and intestinal tissues were analysed using RT-qPCR.

Results: Results showed that the autophagic genes of the rats administered with the crude extracts of *M. oleifera* leaves and *S. hispanica* seeds were upregulated. This was evidenced by the decreased fever-associated temperatures and increased expression of autophagic genes while the enhanced inflammatory cell infiltration in the intestinal epithelium was observed following LPS induction. The LPS-induced expressions of inflammatory cytokines (TNF-α, IL-1β, IL-6) were significantly suppressed in rats administered with *M. oleifera* leaves and *S. hispanica* seed. The autophagic gene upregulation and inflammatory cytokines downregulation observed in this study is a shred of clear evidence that *M. oleifera* leaves and *S. hispanica* seeds have the potential to enhance immune activity in Wistar rats.

Conclusion: These findings suggest that *M. oleifera* leaves and *S. hispanica* seeds can alleviate LPS – induced intestinal inflammation by controlling autophagy. Further studies should investigate the efficacy of the aforementioned plant in combination-based therapeutic techniques.

Ethnobotanical survey of medicinal plants used by the Batwa Indigenous People and Local Communities of Kisoro District, South Western Uganda

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The Batwa indigenous people relied on the forests for their health care and food for millennia, making them a rich source of traditional medicine knowledge (TMK). However, their eviction from the forests by the government of Uganda in 1992 in order to conserve forest biodiversity has caused enormous changes in life resulting in loss of TMK. This study documented TMK of Batwa indigenous people and local communities (IPLC) in Kisoro district in South Western in Uganda. An ethnobotanical survey was conducted among 90 traditional health practitioners (THPs) using a semi structured questionnaire and focus group discussions in six Batwa IPLCs communities. The study documented 234 medicinal plant species used for treatment of 95 health conditions. The plant family with the highest number of species was Asteraceae (18%), followed by Lamiaceae (7%), Fabaceae (5%), and Solanaceae (4%). The plant parts used were leaves (75%), roots (8%), stem bark (5%) ,whole plant (4%), aerial parts (3%) and flowers (3%). Notably, 45% of the plant species reported were obtained from the wild (forests). The diseases each THP treated ranged from two to seven, with the majority (26%) reporting three. The diseases with high number of treatment formulations were wounds (29 mentions) ,Cough (19), malaria (18), stomach disorders (15), diarrhea (13) and worms (13). The plant that was most mentioned to treat cough, malaria, wounds and worms included; *Salvia nilotica* Juss. ex Jacq.*, Acacia mearnsii (*black wattle)*, Vernonia amygdalina* (Bitter leaf) and *Dryopteris cristata* (crested wood fern), respectively. The route of administration of TMK was mostly oral (72%) followed by topical 24%. The Batwa IPLCs are endowed with a wide medicinal knowledge innovation for treatment of various diseases. Therefore, the documented TMK should be evaluated to justify their therapeutics claims for bio-prospecting health products.

Key words:: Ethnobotanical survey, Batwa IPLC, indigenous people, Kisoro district, Uganda

OPTIMIZATION AND CHARACTERIZATION OF THE MUCILAGE EXTRACTED FROM THE PULP AND CORE OF *ARTOCARPUS HETEROPHYLLUS*

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Introduction: Mucilage, a complex polysaccharide biopolymer, has versatile applications in food, pharmaceutical, and cosmetic industries due to its unique physicochemical properties. The extraction and optimization of mucilage yield are influenced by various factors such as temperature, contact time, and solvent-to-plant ratios. Mucilage has been extracted from *Artocarpus heterophyllus*, but there are no studies on the optimization of mucilage extraction.

Objective: This study sought to determine the optimal extraction parameters that provide maximum mucilage yield from the pulp and core of *Artocarpus heterophyllus*, and to compare the physiochemical properties of the extracted mucilage.

Methodology: Mucilage was extracted using a solvent-assisted method from the pulp and core of *Artocarpus heterophyllus*. Response Surface Methodology was employed to optimize extraction parameters, including temperature, contact time, and water-to-sample ratio. The mucilage was characterized for physicochemical properties and phytochemical screening was conducted.

Results: The study findings indicated a higher mucilage yield from the pulp (54.62g) compared to the core (8.35g). Samples treated at 75 °C, 1:5 sample-to-water ratio, and 12-hour contact time showed the highest yield in both the core and pulp. The physicochemical properties revealed that the pulp mucilage was yellow and smooth, while the core mucilage was brown and rough, with pH values of 6.2 and 6.4 respectively. The core and pulp mucilages were tasteless, odorless, and irregularly shaped. Phytochemical screening indicated the presence of carbohydrates, glycoproteins, and other compounds.

Conclusion: The study successfully optimized the extraction parameters for mucilage from

Artocarpus heterophyllus, demonstrating significant yields from the core than the pulp at 75 °C, 1:5 sample-to-water ratio, and 12-hour contact time.

Recommendations: The higher mucilage yield from the pulp compared to the core suggests that the *Artocarpus heterophyllus* pulp mucilage has potential industrial applications, which offer sustainable value addition for this underutilized plant.

Keywords: Mucilage, *Artocarpus heterophyllus*, optimization, response surface methodology.

Antiplasmodial guided investigation of *Combretum platypterum* (Combretaceae)

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Background: Plants belonging to *Combretum* genus are traditionally used to treat diseases such as fever and malaria showing their antiparasitic potential. Malaria is a disease caused by a parasite belonging to *Plasmodium* genus. This disease is transmitted by the bites of infected mosquitos. *Plasmodium falciparum* is the most dangerous species. Each year, about 13.7 million people worldwide died of malaria and about 3 million of these deaths occurred in children under 5 years.

Purpose statement: Our research work is to investigate the antiplasmodial potential of extracts, fractions and compounds from *Combretum platypterum.*

Methodologies: Different extracts of the roots, flowers and twigs of this plant were subjected to antiplasmodial screening against Chloroquine multiresistant Dd2 and sensitive 3D7 strains of *Plasmodium falciparum* using SyBr Green fluorescence-based assay. These extracts were fractionated by liquid-liquid partition and subjected to usual chromatographic separation techniques to afford pure compounds.

Results: The hydroethanolic extract of the roots have shown a good activity with IC_{50} of 40.42 μg mL on *Pf*Dd2 and the methanolic extracts of the roots, flowers and twigs showed good activities with IC_{50} ranging from 32.1 to 40.49 μg/mL on *Pf*Dd2 and 42.72 to 47.7 μg/mL on *Pf*3D7. In addition, the n-hexane fraction of the twigs of this plant have shown a very good activity on the resistant strains of *Plasmodium falciparum* with the IC_{50} of 4.67 µg/mL. The chemical investigation of the flowers and twigs of *Combretum platypterum* led to the isolation of seven compounds in which the compound 3, 3', 4-tri-*O*-methylellagic acid have shown a good antiplasmodial activities of 1.46 μg/mL on *Pf*Dd2 and 1.37 μg/mL on *Pf*3D7 strains.

Conclusion: Given the interesting results, *Combretum platypterum* could be the base for the preformulation of an effective antiplasmodial phytomedicine, if the extracts are non-toxic.

Keywords: *Combretum platypterum,* antiplasmodial, phytomedicine.

In-vivo anti-cobra venom and inhibition of anticoagulant activity of venom by aqueous extract, *in-vitro* antivenom of novel pyranocoumarin derivatives of *Toona ciliata* M. Roem; Two New dipyranocoumarin derivatives.

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Snakebites constitute a significant global health threat, characterized by alarmingly high mortality and morbidity rates. Despite antivenom being the sole officially recognized treatment, it faces limitations such as high cost and inability to address complications like necrosis. In Uganda, traditional medicinal plants are frequently employed to treat snakebites. This study sought to assess the acute toxicity, in-vivo anti-cobra venom efficacy, and in-vitro anticoagulant properties of the aqueous root extract from *Toona ciliata* M. Roem against the venom of *Naja melanoleuca* (forest cobra). The study involved *in-vivo* testing on rats, an anticoagulant assay using citrated human plasma, and evaluation of the anti-caseinolytic activity through gel electrophoresis with protein markers as controls. Remarkably, doses ranging from 100 to 1000 mg/kg of the aqueous extract demonstrated no toxicity. *In-vivo* test with 2000 and 4000 mg/kg displayed significant protection for envenomed rats, with mean survival times (MST) following 5 mg/kg venom exposure recorded at 0.65 and 1.33 hours, respectively, compared to a control group's MST of 0.56 hours. Treating with 2500 and 3500 mg/kg against 1.25 mg/kg venom yielded MSTs of 2.5 and 3.0 hours, outperforming the control (2.0 hours). Additionally, groups given a combination of 1.25 mg/kg venom with 3500 or 5000 mg/kg extract showed no mortalities, thus, venom neutralization. Two new compounds, 5-methoxyseselin and 3-(1,2-dimethylallyl)xanthyletin, were identified as novel pyranocoumarin derivatives due to effective inhibition of caseinolytic activity. Furthermore, two additional new di pyranocoumarins were characterized (10-hydroxy 5-(7-hydroxy-8,8-dimethoxy- 6-(3-methylbut-2-en-1-yl)-2,9-dioxo-2,7,8,9-tetrahydropyrano[3,2-h]chromen-5-yl)-2H,8Hpyrano[3,2-g]chromene-2,8-dione and 10-hydroxy-5-(7-hydroxy-8,8-dimethoxy-6-(3-methylbut- 2-en-1-yl)-2,9-dioxo-2,7,8,9-tetrahydropyrano[3,2-h]chromen-5-yl)-2H,8H-pyrano[3,2- g]chromene-2,8-dione.), representing significant advancements in natural product research with antivenom properties. The aqueous extract of *T. ciliata* proved non-toxic while exhibiting powerful *in-vivo* anti-venom activity and complete venom neutralization. The identified pyranocoumarins possess anti-caseinolytic properties and hold promise for development into innovative anti-venom therapies.

Keywords: *Toona ciliata*, antivenom, anticoagulant, 5-methoxyseselin, pyranocoumarin, caseinolytic.

Medicinal Plants for Managing "African" Diseases by Local Communities in South- Western Uganda

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Ethnopharmacological relevance: Traditional African medicine combines herbalism and spiritual healing to address illnesses considered uniquely "African" and treatable only through indigenous methods. The knowledge of treating "African" diseases with medicinal plants is orally transmitted, but rapid westernization highlights the urgent need for documentation to prevent its loss.

Aim and Methods: This research explored the medicinal plants used by the local communities of Rukungiri district, South-Western Uganda, for managing "African" diseases. A cross-sectional approach was employed on 196 participants, using questionnaires and interview guides. Traditional healers were the key informants. Data were analyzed using descriptive statistics and the Informant consensus factor.

Results: A total of 67 medicinal plant species, spanning 27 families and 62 genera, were identified during the study. The Asteraceae family recorded the highest number of utilized plant species. The most frequently cited plants included *Chenopodium opulifolium* (27 mentions), *Sesbania sesban* (26), *Thevetia peruviana* (25), *Leonotis nepetifolia* (23), *Momordica foetida* (23), *Euphorbia hirta* (21), and *Cassia mimosoides* (20). Water was used to prepare oral remedies, while petroleum jelly was the medium for ointments. The reported medicinal plants were used to manage 39 conditions, categorized into 10 disease groups according to the International Classification of Primary Care (ICPC-2). Informants demonstrated strong agreement on the use of specific plants for various conditions, particularly in the neurological (FIC = 0.90), general and unspecified (FIC = 0.87), digestive (FIC = 0.86), and female genital (FIC = 0.82) categories.

Conclusion: The locals and traditional healers possess rich cultural heritage of medicinal plants. Thus, collaborating indigenous knowledge with modern science is vital to harnessing medicinal plants for "African" diseases and developing innovative drugs from indigenous knowledge.

Keywords*:* "African" diseases, African traditional medicine, Medicinal plants, South-Western Uganda

Evaluation of Antioxidant Activity of Selected Wild Fruits and Vegetables from Zambia

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Natural antioxidants present in herbs, spices, fruits, and vegetables have the ability to inhibit and prevent the deleterious effects of reactive oxygen species (ROS), hence there are essential in the regulation of oxidative stress. Oxidative stress is implicated as a precursor for several pathological conditions, including cardiovascular, neurodegenerative disorders, premature aging and cancer. In this study, the antioxidant activity of two traditional vegetables (*Cucurbita moschata,* CM and, *Bidens pilosa*, BP) and three edible wild fruits (*Tamarindus indica,* TI, *Adansonia digitata*, AD, and *kigelia africana,* KA) commonly consumed in Zambia was investigated. Pulverized plant materials were macerated in either methanol or ethanol. The resultant crude extracts were analyzed for phytochemical content, total phenolic content (TPC), total flavonoid content (TFC). Antioxidant activity (AA) was determined by reduction of stable radicals 2,4,6-tripyridyl-s-triazine (TPTZ) in ferric ion reducing antioxidant power assay (FRAP), 2,2-Diphenyl-1-picrylhydrazyl in the DPPH assay and hydrogen peroxide (H_2O_2) in the H_2O_2 radical scavenging assay, respectively. The TPC ranged from (0.53 ± 0.01 to 23.74 ± 0.02 mg GAE/g), and TFC ranged from (0.02 ± 0.00 to 15.03± 0.45 mg QE/g). Antioxidant activity with FRAP ranged from (3.59 ± 0.16 to 35.76 ± 0.33 mmol Fe (II)/g), % DPPH inhibition at 100 µg/ml of crude extract ranged from (25.53 ± 0.36 to 77.74 ± 0.48 µg/mL) and % H_2O_2 inhibition at 100 µg/ml of crude extract ranged from (24.70 ± 0.03 to 64.73 ± 0.02 µg/mL) respectively. The vegetables, BP and CM displayed higher TP/TF content and antioxidant activity than other samples. However, generally, all the samples investigated in this study demonstrated good antioxidant activity (correlation coefficient, R2> 0.5) and their inclusion in a diet would offer protection from oxidative stress.

Exploration of in vitro cytotoxicity and antischistosomal activity of the dichloromethane root bark extract of Friesodielsia obovata.

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Schistosomiasis, commonly known as bilharzia, is a parasitic disease caused by trematode blood flukes. It is a neglected tropical disease that is strongly correlated with poverty and affects at least 240 million people annually in 74 poor countries in the tropics and subtropics. School-aged children are the most affected while the severity of the disease is minimized by acquired immunity in adults. Moreover, in adults, decreased water exposure minimizes the chances of contracting the disease. *Biomphalaria* and *Bulinus* species are snails used as intermediate hosts by *schistosoma mansoni* and *schistosoma haematobium* respectively where *S. haematobium* is the most prevalent in Zambia. Treatment of schistosomiasis has been done traditionally by administering Praziquantel, a drug that has been used for more than 40 years. However, in a case of development of resistance against praziquantel, prevalence of bilharzia would greatly increase and pose great danger. The therapeutic pipeline for schistosomiasis is dry and this calls for robust drug discovery. In this study, dichloromethane (DCM) extraction of root bark of *Friesodielsia obovata* gave a yield of 5.98% and phytochemical screening showed that the plant contains; Phenols, Saponins, Flavonoids, Alkaloids. Terpenoids, and Steroids. Quantification of phenolic content and flavonoids was done. The total phenolic content of the extract was found to be 72.75±0.5 mg/g gallium acid equivalent (GAE) and and the total flavonoid content was found to be 12.04±0.5 mg/g quercetin equivalent (QE). In vitro tests of the crude extract against bulinus snail species were conducted and the lethal dose (LD) values were determined. LD_{50} and LD_{90} of the extract against the snails were found to be 6ppm and 9ppm respectively.

Keywords: *Friesodielsia obovata, Prazinquantel Biomphalaria, Bulinus, Schistosoma mansoni, Schistosoma haematobium, Lethal dose, In vitro*

Medicinal plant species used for the prevention and treatment of malaria in West Nile, Uganda

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Introduction: Uganda has the third highest burden of malaria cases globally, with incidence rates of more than 250 cases per 1,000 individuals compared to the world average of 58 cases per 1,000 individuals. The largest high-risk malaria areas in Uganda are in the West Nile and Acholi regions in Northern Uganda. In the West Nile region, malaria contributes to 62% of outpatient care for children under five and pregnant women in health facilities.

Aim: The aim of this study was to systematically document for the first time the traditional medicinal plants and practices used by traditional medicine practitioners (TMP) in the prevention and treatment of malaria in West Nile. **Methods:** We conducted a descriptive cross-sectional ethnobotanical study in the selected districts of Arua, Koboko, Madi-Okollo, Maracha, Nebbi, Pakwach, Terego, Moyo and Zombo in West Nile. Semi-structured interviews and focus group discussions were undertaken among purposively selected participants. The participants who were all practicing TMP were identified through the Snowballing technique.

Results: We documented 187 medicinal plant species used for treating malaria. The identity of the other species that were collected is still being confirmed. However, it was not possible to collect voucher specimens for some of the species. We interviewed 152 traditional medicine practitioners most of whom (86.7%) were male with a median age of 54.5. The most commonly used species were *Aristolochia elegans* Mast. with a frequency of mention of 34, followed by *Senna obtusifolia* (L.) H.S.Irwin & Barneby (20), *Aloe vera* L. (16), *Azadirachta indica* A. Juss (12), *Securidaca longepedunculata* Fresen. (10), and *Gymnanthemum amygdalinum* (Delile) Sch Bip. (9). Most of the herbalists carried out other jobs to supplement their incomes especially as peasant farmers (68.2%) and most of them (60%) had primary level education. Malaria was referred to by different names in the different districts where this study was conducted. More than one quarter of the respondents (26.7%) attributed malaria to exposure to excessive cold air.

Conclusion: There is wide spread use of medicinal plants in the prevention and treatment of malaria in West Nile. The TMPs have a rich repertoire of traditional medicines.

Keywords: Malaria, Medicinal Plants, Ethnobotanical Surveys, Traditional Medicine, Indigenous Knowledge

Acute and subacute toxicity profile of ethanolic stem bark extract of Albizia coriaria Welw. ex Oliv. in Wistar albino rats

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Albizia coriaria (Fabaceae) crude extracts are key ingredients of several licensed and unlicensed herbal products for management of several ailments in East Africa (Anywar et al., 2020; Obakiro et al., 2020; Tabuti et al., 2023). However, there was limited and often contradicting information regarding its toxicity. We therefore evaluated the acute and subacute toxicity effects of the ethanolic stem bark extract of A. coriaria in mature healthy Wistar albino rats following Lorke's method and OECD guidelines 407. The median lethal dose (LD50) of the ethanolic stem bark extract of A. coriaria was 2000 mg/kg. The acute toxicity signs observed included piloerection, hyperventilation, lethargy, and loss of lighting reflex. There was a significant increase in aspartate aminotransferase, alkaline phosphatase, red blood cells and haemoglobin in rats after 28 days at the dose of 500mg/kg. Histological analyses revealed multifocal random parenchymal necrosis and scattered periportal mononuclear inflammatory cells infiltration in the liver, interstitial nephritis in the kidney and multifocal lymphoid accumulation in the peribronchiolar and perivascular lung tissue at 500 mg/kg. The ethanolic stem bark of A. coriaria was therefore moderately toxic to the rats when administered in a single high oral dose within 24 hours. The extract caused a dose dependent toxicity with significant damage to the kidney, liver and lung tissues at a dose 500 mg/kg after 28 days. Although the study could not confirm the exact compounds, the nephrotoxicity and hepatotoxicity could be attributed to the tannins and terpenoids (Chung et al., 1998) while the pneumotoxicity to the hydroquinone (Ribeiro et al., 2011) or other unknown secondary metabolites present in this plant. Therefore, herbal medicines containing A. coriaria extracts should be consumed cautiously due to likelihood of toxicity particularly at higher doses greater 500mg/kg. Further studies should be conducted to identify the toxic compounds in A. coriaria.

Keywords; Toxicity, Medicinal plants, Herbal medicine, Biochemistry, Histopathology