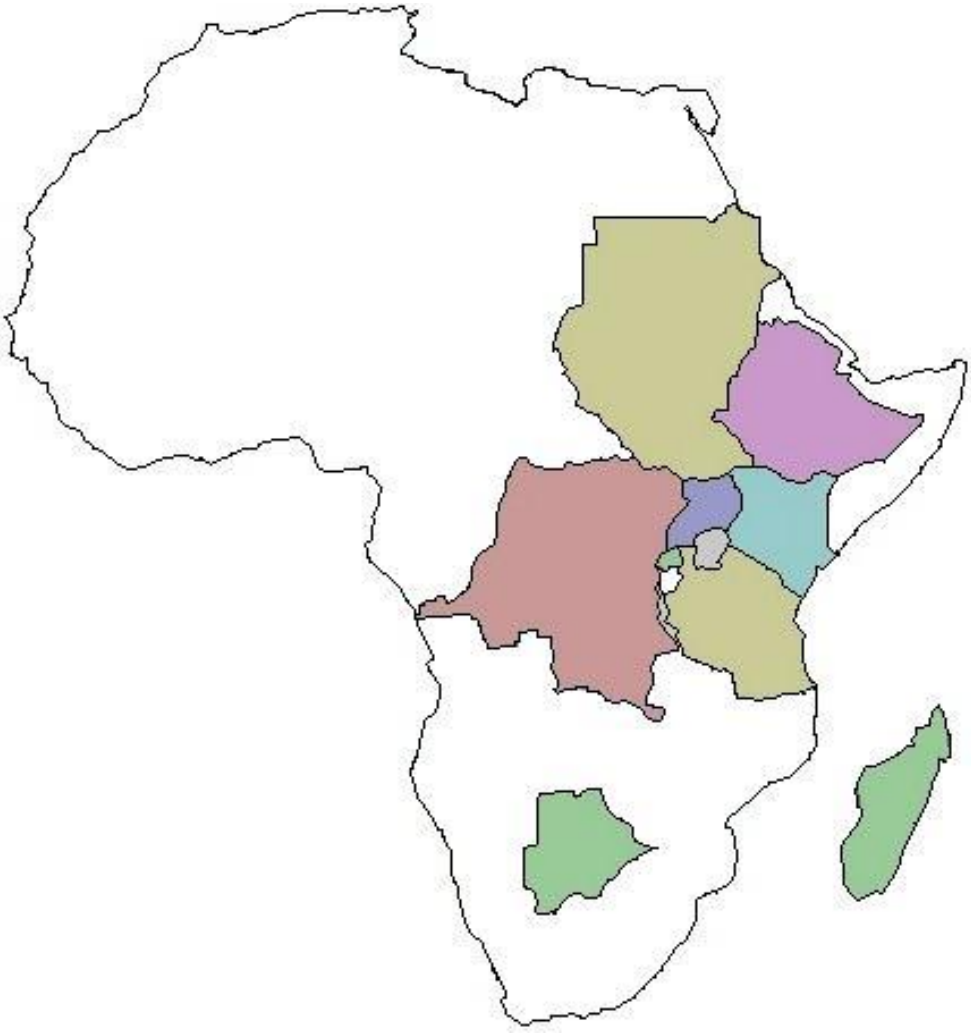
THE 12TH SYMPOSIUM OF THE NATURAL PRODUCT RESEARCH NETWORK FOR EASTERN AND CENTRAL AFRICA (NAPRECA)



AT

Hotel Africana, July 22-26, 2007

Kampala, Uganda

Theme "DRUG DISCOVERY FROM AFRICAN FLORA"

BOOK OF ABSTRACTS

»»» SCOPE OF THE SYMPOSIUM »»»

- **Role of ethnopharmacology in drug discovery**
- **Target identification and validation for diseases of concern to African countries**
- **Screening of extracts for bioactivity**
- **Herbal remedies**
- **Vector control agents and repellents**
- **Monitoring the isolation of active constituents**
- **Structure elucidation of bioactive compounds**
- **Ethics of Drug development**
- **Bringing active compounds into drug development**

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FOREWORD

PROGRAMME FOR THE 12TH NAPRECA SYMPOSIUM

SUNDAY, JULY 22ND 2007

HOTEL AFRICANA

SESSION I

16:00-18:00 Registration

18:00 – 20:00 Cocktail

MONDAY, JULY 23RD 2007

SESSION II (HALL A)

08:00 – 09:00 REGISTRATION CONTINUES

CHAIR PERSON:

09:00 – 10:30 Opening ceremony
KEYNOTE ADDRESS Prof. Grace Nambatya

10:30 – 11:00 Tea break

SESSION III (HALL A)

PLENARY LECTURES

CHAIR PERSON:

PL 1 11:00 – 11:40 Potential of Kenyan Medicinal Plants in Malaria Control
J. O. Midiwo

PL 2 11:40 – 12:20 Review of Naturally Occurring Homoisoflavonoids: Phytochemistry, Biological Activities and Synthesis
B. Abegaz

PL 3 12:20 – 13:00 Multi-facetted Novel Metabolites from Nature: Online-recognition, Stereostructures, Biosynthesis, and Synthesis
G. Bringmann

13: 00 – 14:00 Lunch

SESSION IV (HALL A)
PLENARY LECTURES

CHAIRPERSON:

PL 4 14:00 – 14:40 Bioactive secondary metabolites from fruiting bodies of Higher Fungi
Arnold, N.

PL 5 14:40 – 15:20 Standardized Herbal Products

Ermias Dagne

PL 6 15:20 – 16:00 Towards the Discovery of Drugs and Pesticidal Agents From East African Flora
Mayunga H.H. Nkunya

16:00 – 16:30 Tea break

SESSION V (HALL A)

SHORT LECTURES

Chair Person

[SL-1A] 16:30 – 16:50 The Importance of Plant Taxonomy in Drug Discovery
Kabuye, CS

[SL-2A] 16:50 – 17:10 Rotenoloids and a spirohomooxarotenoid: New subclasses of isoflavonoids from *Derris trifoliata*
Yenesew, A.

[SL-3A] 17:10 - 17:30 Role of LC/MS in the search for natural products
Litaudon, M.

TUESDAY, JULY 24TH 2007

SESSION VI (HALL A)

PLENARY LECTURES

CHAIR PERSON:

PL 7 08:00 – 08:40 Chemical analyses in the optimisation of the fermentation process in black tea (*Camellia sinensis* l.) processing
P. Okinda Owuor

PL 8 08:40 – 09:20 Bioactive compounds from the Southern African Hyacinthaceae
Dulcie A Mulholland

PL 9 09:20 – 10:00 A life time of natural products
J. Connolly

10:00 – 10:30 Tea break

SESSION VII
SHORT LECTURES

		HALL A			HALL B
Chair Person			Chair Person		
[SL-4A]	10:30 – 10:50	Chemistry and biological studies on *Bolusanthus speciosus*, *Erythrina abyssinica*, *Erythrina latissima* and *Erythrina lysistemon*. **Majinda, RRT**	[SL-1B]	10:30 – 10:50	Bio-prospecting for antileishmanial, larvicidal and insecticidal agents from Kenyan plants **Tonui W. G. E.**
[SL-5A]	10:50 – 11:10	Complex polysaccharides from *Solanum aculeastrum* –	[SL-2B]	10:50 – 11:10	*Toddalia asiatica*: a potential source of antimalarials and

		Are they implicated in wound healing? **Mabusela, W.T.**			mosquito repellent compounds suatable for malarial control **Jondiko, J.I.O.**
[SL-6A]	11:10 - 11:30	Natural products compounds from two Tanzanian endemic plants **Magadula, J.J.**	[SL-3B]	11:10 - 11:30	Insecticidal activity of 3-acetyl moraldehyde and agauriasterone from *Agauria salicifolia* **Kebenei J.S.**
[SL-7A]	11:30 - 11:50	Synthetic transformation of selected flavonoids **Mwaniki, J.M.**	[SL-4B]	11:30 - 11:50	Anthocyanins from selected plant species in Uganda **Bernard T. Kiremire**
[SL-8A]	11:50 - 12:10	Azadiron limonoids from *Turraea cornucopia* **Ndungu' M.W.**	[SL-5B]	11:50 - 12:10	Essential oils of *Ocimum basilicum* L. and *Ocimum gratissimum* L. from Kenya: composition, antiradical and antimicotoxicogenic activity **Thoithi, G.N.**
[SL-9A]	12:10 - 12:30	Screening for antimicrobial activity on secondary metabolites from *Psiadia punctulata* **Onemus M. Wanjau**	[SL-6B]	12:10 - 12:30	The antibacterial bioactivity of some medicinal plants used in reproductive health care from Western Uganda **Maud Kamatenesi-Mugisha**
[SL-10A]	12:30 – 12:50	Anti-plasmodial and cytotoxicity studies of *Fuerstia africanum* T.C.E. Fries (Lamiaceae) **Kirira, P.G**	[SL-7B]	12:30 – 12:50	Screening for antimicrobial principles from some traditional herbal medicines in Kenya **Amugune, P.K.**

13:00 – 14:00 Lunch

SESSION VIII (HALL A)
PLENARY LECTURES

CHAIR PERSON:

PL 10 14:00 – 14:40 Phytochemistry and Analytical Chemistry: A Strategy for Metabolomics
Mathew M Nindi

PL 11 14:40 – 15:20 Anthraquinones and Phenylanthraquinones: Unusual Structures and Biosynthetic Convergence in Nature
G. Bringmann

15:20 – 15:50 Tea break

SESSION IX
SHORT LECTURES

		HALL A			**HALL B**
Chair Person			Chair Person		
[SL-11A]	15:50 – 16:10	Antimicrobial compounds	[SL-8B]	15:50 – 16:10	Effects *Prunus africana* and

		from berries of *Harrisonia abyssinica*, (Simaroubaceae) **Cheplogoi, P.K.**			*Maytenus heterophylla* extracts on microbial **Mutai, C.**
[SL-12A]	16:10 – 16:30	Biodiesel from renewable plant resources **John M. Onyari**	[SL-9B]	16:10 – 16:30	Validation of some medicinal plants of gadumire sub-county, Uganda: the efficacy of plants used to treat diarrhoea and skin diseases **Tabuti, J.R.S.**
[SL-13A]	16:30 - 16:50	Antioxidants in Ugandan fruits and vegetables **Torunn Stangeland**	[SL-10B]	16:30 - 16:50	The Forests beneath the trees of East Africa: Ethnomycology, usage and Prioritization for domestication of Indigenous Edible and Medicinal Mushrooms the Lake Victoria Basin. **Olila, D.**
[SL-14A]	16:50 - 17:10	Anti-plasmodial flavonoids from *Erythrina* species **Solomon D.**	[SL-11B]	16:50 - 17:10	Antimicrobial activity of extracts from selected Aloe species growing in Kenya **Matasyoh, J.C.**
[SL-15A]	16:50 - 17:10	Bioactivity testing of secondary metabolites from selected marine natural products along the Kenyan Coast **Wanjala, C.W.**	[SL-12B]	16:50 - 17:10	Medicinal plants used to treat fowl diseases in Uganda with particular reference to Mbale, Rakai and Mbarara districts **R. Bukenya-Ziraba**

WEDNESDAY, JULY 25TH 2007

SESSION X (HALL A)

YOUNG SCIENTIST COMPETITION

CHAIRPERSON:

[YS-1] 08:00–08:15 Antiacetylcholinesterase activity of essential oils from six medicinal plants from Burkina faso
Kiendrebeogo, M.

[YS-2] 08:15–08:30 Constituents of allelopathic root extracts of *Desmodium uncinatum*
Salome M. Guchu

[YS-3] 08:30–08:45 Bioassay-guided isolation of antimalarial protoberberines and aporphine alkaloids from *Annickia kummeriae*
Hamisi M. Malebo

[YS-4] 08:45– 9:00 Phytochemical and bioactivity evaluation of *Commicarpus Plumbagineus* Standl. (Nyctaginaceae) use in reproductive health care in Uganda
Miriam F. Ojok

[YS-5] 09:00–09:15 Cleitenolide and cleitodienol: novel bioactive and other constituents of *Cleistochlamys kirkii*
Stephen Samwel

[YS-6] 09:15–09:30 Analgesic and anti-inflammatory activities of the aqueous extracts of *Maytenus senegalensis*, *Stereospermum kunthianum* and *Trichilia emetica* used in the treatment of dysmenorrhoea in Mali.
Sanogo, R.

[YS-7] 09:30–09:45 Extractives of *Millettia ferruginea*, *Tephrosia vogellii* and *Tephrosia pentaphylla* against the bean weevil Zabrotes subfaciatus (Boheman)
Jane Namukobe

[YS-8] 09:45–10:00 Toxicity of crude extracts, fractions and blends from two Tanzanian plants to *Anopheles gambiae* S.S larvae
Esther Innocent

[YS-9] 10:00–10:15 Bioactive terpenoids and other constituents of two *Hugonia* species
Baraza, L.D.

[YS-10] 10:15-10:30 Antimicrobial activities of uvaretin and its derivatives
Gumula, I.

10:30 – 11:00 Tea break

SESSION XI (HALL A)

CHAIRPERSON:

PLENARY LECTURES

PL 12 11:00 – 11:40 Bioactive compound research and the pharmaceutical industry
B. David

PL 13 11:40 – 12:20 Recent results in plants-based drug discovery in Madagascar
Philippe Rasoanaivo

PL14 12:20 – 13:00 The discovery of bioactive molecules from East African flora and fauna
Isaiah Ndiege

13:00 – 14:00 Lunch

SESSION XII (HALL A)
SHORT LECTURES

CHAIR PERSON:

[SL-16A] 14:00 – 14:20 Phytochemical analysis and *in vitro* antimicrobial evaluation of crude extracts of a selected medicinal plant used in ethnopharmacolgy and ethnoveterinary
Obbo, CJD

[SL-17A] 14:20 – 14:40 Herbal combination therapy in treatment of malaria: An investigation of in-vitro antiplasmodial activity of chloroquine-herbal extracts combination
Akenga, T.A.

[SL-18A] 14:40 – 15:00 Ethics in Ethnobiology Research
Kabuye, CS

SESSION XIII (HALL A)

PLENARY LECTURES

CHAIR PERSON:

PL 15 15:00 – 15:40 Cultivated and wild plants from Congo basin: raw materials for a local production of cosmetics and phytomedicines.
Dibungi T. Kalenda

PL 16 15:40 – 16:20 Preserving and studying forest biodiversity - On the tracks of Ugandan chimpanzees towards new bioactive molecules
Sabrina Krief

16:20 – 17:30

SESSION XIV

TEA AND POSTER SESSION

CHAIR PERSON:

[PS-1]	Bipa, J. D.	Homoisoflavanoids and xanthones from the bulbs of *Drimiopsis burkei* baker	[PS 17]	Wanyama Aaron	Characterization and analysis of some natural dyes from selected plants in Uganda
[PS-2]	Milkyas E.	Four diterpenenoids from the resin of *Boswellia papyrifera*	[PS 18]	Ochieng, C.O.	Anti-plasmodial effects of surface accumulated flavonoids of *Gardenia ternifolia* aerial parts
[PS-3]	Kinuthia E.W	Sreening for antimicrobial and larvicidal secondary metabolites from *Gardenia volkensii* fruits and *Meyna tetraphylla* leaves (Rubiacea)	[PS-19]	Rotich M. K	Extracted and purified drug stability: the use of cyclodextrins as a stabilizing agent.
[PS-4]	Erick K. Korir	A novel epimer of powelline from *Crinum moorei* (Amaryllidaceae)	[PS-20]	Matovu, H	Acaricidal activity of *Tephrosia vogelii* extracts on nymph and adult ticks
[PS-5]	Chifundera Z. K.	Possible detoxication of cobra venom by extract from *Alchornea laxiflora* (Euphorbiaceae) from D.R.Congo.	[PS-21]	Namutebi, A	Use of the Variation Picking Test-X-ray Fluorescent Spectroscopic tool to map Nutraceutical dense Biodiversity on Women Smallholder Farms of Ikumbya and Makuutu, Iganga District, Uganda
[PS-6]	Mudogo, V.	Antisickling activity of some Congolese plants	[PS-22]	Nakalembe, I.	Indigenous knowledge and uses of the wild mushrooms of Mid-western Uganda
[PS-7]	Mukanganyama, S.	The search for natural plant compounds that act as chemomodulators of the rv0194, an ATP Binding Cassette (ABC) Transporter From *Mycobacterium Tuberculosis*	[PS-23]	Hamisi M. Malebo	Antimalarial, antitrypanosomal and antileishmanial activity of some selected medicinal plants from Tanzania
[PS-8]	Munissi, JJE	In vitro antimicrobial activity and pharmaceutical potential	[PS-24]	Crispin D. Sesaazi	Medicinal plant utilisation to

		of metabolites of a marine Ascomyceteous fungus isolated from the coast of Dar Es Salaam.			alleviate hiv/aids related diseases in Kasese district**T**
[PS-9]	C. Mutai	Antibacterial, and antifungal activities of *Acacia mellifera*	[PS-25]	Naluyima Amoreen	Effects of *Hymnocardia* on haematology on wistar rats
[PS-12]	Martha Induli	Antiplasmodial flavonoids from the stem bark of *Erythrina abyssinica*	[PS-26]	Cyprian Osinde	Intergrating medicinal plants as nutritional supplements in management of HIV/AIDS and other opportunistic infection
[PS-13]	Biniam Fessehaye	Bioactivity of Capparidaceae plants	[PS-27]	Sabrina Krief	Antiparasite activity of the bark of *Celtis africana* Ulmaceae) eaten by wild chimpanzees in uganda : isolation and structure of active metabolites
[PS-14]	Tuwei, J.K.	Unique rotenoids from the seeds of *Derris trifoliata*			
[PS-15]	Hannington T.	A new flavonoid with antiplasmodial activity from the root bark of *Erythrina abyssinica*			
[PS-16]	Njue, A. W.	Search for antifungal compounds from submerged cultures of basidiomycetes against pytopathogen *Fusrium oxysporium* f. Sp. Lycopersici			

19:00 **Closing ceremony, Official dinner, Awards**

THURSDAY JULY 26TH 2007 EXCURSION

ABSTRACTS FOR PLENARY LECTURES (PL)

PL 1 POTENTIAL OF KENYAN MEDICINAL PLANTS IN MALARIA CONTROL

Jacob O. Midiwo, and Abiy Yenesew

Department of Chemistry, University of Nairobi, P.O. Box 30197, Nairobi.

Malaria is the most difficult problem afflicting people in the Southern hemisphere. In Africa, more than 100 million people are infected with malaria parasites every year, out of a global figure of 300-500 million, ending up with a mortality rate of 1-1.5 m a year. Control measures against malaria are designed to eradicate the parasite, or by vector eradication intervention methods such as application of larvicides in breeding ponds or mosquito adulticides in households. High rate of resistance development to drugs and chemicals by the parasite and the vector respectively makes the necessity of malaria control research virtually a continuous one. A source of these principles is the rich tropical flora. From our work with the plant families, Polygonaceae, Myrsinaceae, Asteraceae, Sapindaceae, Leguminosae, Guttiferae, and Rutaceae, among others, we have found principles that are anti-plasmodial and mosquito larvicidal. The acetone extract of the roots of *E. abyssinica* showed potent anti-plasmodial activities against W2 (chloroquin-resistant) and D6 (chloroquin-sensitive) strains of *P. falciparum* with IC_{50} values of 0.49± 0.07 and 0.64 ±0.06 μg/ml respectively. Amongst the compounds tested were abyssinone – IV (**1**) with LC_{50} of 7.7 and 9.0 μg/ml and erythrabyssin-II (**2**) with 6.5 and 8.1μg/ml against W2 and D6 plasmodium strains respectively were quite promising (Abiy et al 2003a). *Millettia usaramensis* stem bark extract showed several flavonoids with anti-plasmodial activities. The geranylated chalcone, 4, 2'-dihydroxy-4'-0-geranylchalcone (**3**) gave the best activity for W2 and D6 with IC_{50} values of 8.7 and 10.6 μM respectively. Rotenoids in the mixture showed significant but less activity. *Polygonum senegalense* chalcones and flavanones also showed similar activities.

Aedes aegyptii larvicidal activity testing (as a model) has been used as a model for surveying natural mosquito control agents in our laboratories for quite awhile. The surface exudate of the Polygonaceae, *Polygonum senegalense* showed sub-milligram IC_{50} toxicity against 2nd instar. *A. aegyptii* larvae; this activity reached 3 μg/ml on the 7th day. The surface exudates component flavonoid, 2', 6'-dihydroxy-4'-methoxydihydrochalcone (**3**) had an LC50 of 2.2 μg/ml while the hydrophilic flavonol, quercetin (**4**) had the LC_{50} of 8.6 μg/ml on the 7th day respectively (Gikonyo et al 1998). The Myrsinaceae benzoquinone embelin (**5**), myrsinone (**6**) and myrsinaquinone (**7**) also gave encouraging activities; they had LD_{50} values of 2.40, 2.54 and 2.69 μg/ml respectively (Midiwo et al 1995). *Millettia dura* seed crude extract rotenoids showed virtually a total kill at a concentration of less than 3.5 μg/ml for crude seed extract; the oil-free version of the extract activity improved to 0.9 μg/ml indicating that the rotenoid components were the causative larvicides. The rotenoids, deguelin (**8**) and tephrosin (**9**) showed potent activities with LC_{50} values 1.6 and 1.4 μg/ml respectively. These results augur for the search of alternatives to DDT and other environmentally persistant chemicals.

PL 2 REVIEW OF NATURALLY OCCURRING HOMOISOFLAVONOIDS: PHYTOCHEMISTRY, BIOLOGICAL ACTIVITIES AND SYNTHESIS

Berhanu M. Abegaz[a], Joan Mutanyatta-Comar[a], Dieudonne Ngamga[b] and Mathew Nindi[a]

[a]*Department of Chemistry, University of Botswana, Private Bag 00704, Gaborone, Botswana, abegazb@mopipi.ub.bw*
[b]Department of Chemistry, University of Dschang, Dschang, Cameroon.

This review [1] covers the phytochemical, biological properties, and synthesis of naturally occurring homoisoflavonoids. Homoisoflavonoids are a very important class of secondary metabolites whose numbers have grown from 20 in 1981 to 157 at the present time. Nearly a third of these have been isolated from our laboratories in Gaborone [2,3]. They are found to occur in seven plant families. They are classified into four groups: 3-benzylchroman-4-ones, 3-benzylflavans, $\Delta^{3,9}$ and $\Delta^{2,3}$ 3-benzylchroman-4-ones, benzocyclobutenes (scillascillins) and rearranged homoisoflavonoids (brazilin and related compounds). Biosynthetically, the 3-benzylchroman-4-ones and the 3-hydroxy-derivatives have been shown to arise from a chalcone precursor (sappanchalcone) and there is strong evidence that this isolable intermediate can be converted into the diverse structures such as the benzocyclobutenes (scillascillins) and the rearranged, brazilin-type compounds. Homoisoflavonoids possess a wide range of biological activities, including, antimicrobial, antimutagenic, anti-inflammatory, antidiabetic, etc, properties. In this review we will also surveys the chemical synthesis of natural homoisoflavonoids. Analytical methods for the determination of these important metabolites are also reviewed. A brief review of the diagnostic NMR spectroscopic features of homoisoflavonoids will also be presented. Recently we have also isolated a rather unique homoisoflavone-related isoquinoline alkaloid with a probably unique biosynthesis [unpublished results].

1. B. M. Abegaz, J. Mutanyatta-Comar and M. Nindi. 2007. Naturally occurring homoisoflavonoids: Phytochemistry, biological activities and synthesis. *Natural Product Communications,* **2**, 475-498.
2. Mutanyatta, J., Matapa, B. G., Shushu, D. D. and Abegaz, B. M. 2003. Homoisoflavonoids and xanthones from the tubers of wild and in vitro regenerated *Ledebouria graminofolia* and cytotoxic activities of some of the homoisoflavonoids, *Phytochemistry*, 62, 797-804.
3. Alphonse Silayo, Bonaventure T. Ngadjui and Berhanu M. Abegaz, 1999. Homoisoflavonoids and stilbenes from the bulbs of *Scilla nervosa. Phytochemistry.* 52, 947-955.

PL 3 MULTI-FACETTED NOVEL METABOLITES FROM NATURE: ONLINE-RECOGNITION, STEREOSTRUCTURES, BIOSYNTHESIS, AND SYNTHESIS

Gerhard Bringmann *et al.*
Institute of Organic Chemistry, University of Würzburg, Germany
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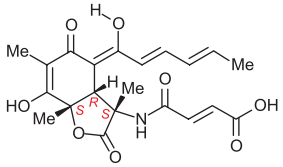
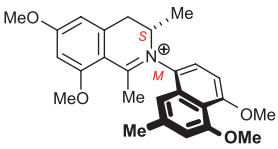
Nature provides a huge variety of structurally diverse natural products. Many of them originate from simple acetate-malonate units catalyzed by polyketide synthases (PKSs), often in combination with other enzymes. For the directed search for novel acetogenic metabolites right from crude extracts, we have composed the analytical triad LC-MS/MS-NMR-CD, in combination with quantum chemical CD calculations. The lecture reports on the use of this methodology for the early recognition and online-structural elucidation of novel-type natural products, including their absolute configurations. Furthermore, their bioactivities, their total synthesis, and their biosynthetic origins are described.

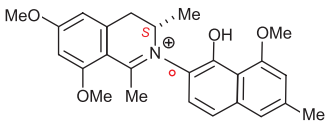
Three such novel-type structures are sorbicillactone A (**1**), the first sorbicillin-derived alkaloid,[1] and ancistrocladinium A (**2**) and B (**3**), the first *N*,*C*-coupled naphthyldihydroisoquinoline alkaloids.[2]



Sorbicillactone A (**1**)



Ancistrocladinium A (**2**)



Ancistrocladinium B (**3**)

Sorbicillactone A (**1**) is remarkable due to its unprecedented structure, but also because of its biosynthesis from acetate units, alanine, and an as yet unknown C_4 precursor, and it exhibits a selective antileukemic activity. In a similar way, **2** and **3** are interesting stereochemically (with respect to the phenomenon of atropisomerism), and, in particular, for their antiinfectious properties, which have meanwhile been further improved by synthetic work. Another unique feature of naphthylisoquinoline alkaloids is their biosynthesis, since they are the first isoquinoline alkaloids that one formed from acetate units (and not from amino acids, as usual).

We report on the structural elucidation of **1**-**3**, on their biosynthetic origin from acetate units, on their total synthesis (in the case of **2** and **3**), and on their rewarding antitumoral and antiinfectious activities, respectively.

1. G. Bringmann, T.A.M. Gulder, G. Lang, S. Schmitt, R. Stöhr, J. Wiese, K. Nagel, J. Imhoff; Large-Scale Biotechnological Production of the Antileukemic Alkaloid Sorbicillactone A; *Marine Drugs* **2007**, *5*, 23-30.
2. G. Bringmann, I. Kajahn, M. Reichert, S.E.H. Pedersen, J.H. Faber, T. Gulder, R. Brun, S.B. Christensen, A. Ponte-Sucre, H. Moll, G. Heubl, V. Mudogo; Ancistrocladinium A and B, the First *N*,*C*-Coupled Naphthyl-dihydroisoquinoline Alkaloids, from a Congolese *Ancistrocladus* Species; *J. Org. Chem.* **2006**, *71*, 9348-9356.

PL 4 SECONDARY METABOLITES FROM HIGHER FUNGI AS A SOURCE OF BIOACTIVE COMPOUNDS

Norbert Arnold, Tilo Lübken, Axel Teichert, Jürgen Schmidt, Andrea Porzel, Ludger Wessjohann

Leibniz Institute of Plant Biochemistry, Dept. Bioorganic Chemistry, Weinberg 3, D-06120 Halle (Saale)
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Mushrooms are likely the largest group of higher organisms of our globe with an estimated 10^6 species. They live frequently in close symbiosis with plants, e.g. as mycorrhiza. At present only approx. 5% (75.000) of the estimated total in species are known. During the evolution, fungi developed a large variety of secondary metabolites to protect the fruiting bodies, the medium for their reproduction units (spores). The evolutionary selection that lead to these compounds should provide a benefit for drug lead candidates.

Fruiting bodies of the mycorrizal genus *Hygrophorus* are rarely attacked by parasitic fungi or insects in their natural environment. A series of new 5-(hydroxyalkyl)-2-cyclopentenone derivatives (hygrophorones) could be isolated. Chemically, hygrophorones are 2-cyclopentenones with hydroxy or acetoxy substituents at C-4 and/or C-5. An odd-numbered 1' oxidized alkyl chain (C_{11}, C_{13}, C_{15}, or C_{17}) is attached at C-5. In addition, the new γ-butyrolactone derivative 5-(*E*)-2-hydroxytetradexylidene-5*H*-furan-2-one could be isolated. A remarkable fungicidal as well as bactericidal activity against gram-positive bacteria could be demonstrated. Furthermore, fatty acids (C_{16}, C_{18}) with γ-oxocrotonate partial structure could be isolated from fruiting bodies of *Hygrophorus* species. Initial tests demonstrate a significant bactericidal and fungicidal activity also for these metabolites. Structurally they can be interpreted as precursors of the hygrophorones. The alkaloids harmane and norharmane could be detected in fungal fruiting bodies of 35 selected *Hygrophorus* species. So far, the occurrence of both alkaloids within a species is independent of the geographic distribution, i.e. their production appears to be quite constant within a species. Therefore, the occurrence of harmane and norharmane might act as a chemotaxonomic marker for the genus *Hygrophorus.*

References:

Lübken, T., Schmidt, J., Porzel, A., Arnold, N., & Wessjohann, L. (2004) - Hygrophorones A–G: fungicidal cyclopentenones from *Hygrophorus* species (Basidiomycetes). Phytochemistry, 65, 1061-1071.

Teichert, A., Lübken, T., Schmidt, J., Porzel, A., Arnold, N. & Wessjohann, L. (2005) - Unusual bioactive 4-oxo-2-alkenoic fatty acids from *Hygrophorus eburneus*. Z. Naturforsch. 60b, 25-32.

Teichert, A., Lübken, T., Kummer, M., Besl, H., Haslberger, H. & Arnold, N. (2005)- Bioaktive Sekundärmetaboliten aus der Gattung *Hygrophorus* (Basidiomycetes). Z. Mykol., 71 (1), 53-62.

Lübken, T., Arnold, N., Wessjohann, L., Böttcher, C. & Schmidt, J. (2006) - Analysis of fungal cyclopentenone derivatives from Hygrophorus spp. by liquid chromatography/electrospray-tandem mass spectrometry. J. Mass Spectrometry 41 (3), 361 – 371.

PL 5 STANDARDIZED HERBAL PRODUCTS

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In most African countries natural products are sold in raw form with very little processing and value-addition. Raw products are exported to more advanced countries where they are incorporated into high value foods (nutriceuticals, functional foods and dietary supplements), cosmetics and pharmaceuticals.

It is not enough to speak only of protecting our natural resources from being exploited. Our immediate course of action should be to take measures that aim at adding value to natural products in the countries of origin so that the producing communities derive more benefit and therefore become more aware of the advantages of the sustainable utilization of these resources. If such efforts are not launched the consequences are grave. Our natural resources in particular the vulnerable and threatened plants will continue to be depleted till extinction, losing some of them forever from the face of the globe.

Value addition to natural products requires developing processes from the very rudimentary to industrial scale. To be effective in this endeavor we should build capacity to monitor quality of the raw materials and their products. The role chemistry plays in assessing quality of natural products cannot be overemphasized. In this lecture, we will present results of our efforts to monitor the quality of natural products destined for regional and internationals markets.

PL 6 TOWARDS THE DISCOVERY OF DRUGS AND PESTICIDAL AGENTS FROM EAST AFRICAN FLORA

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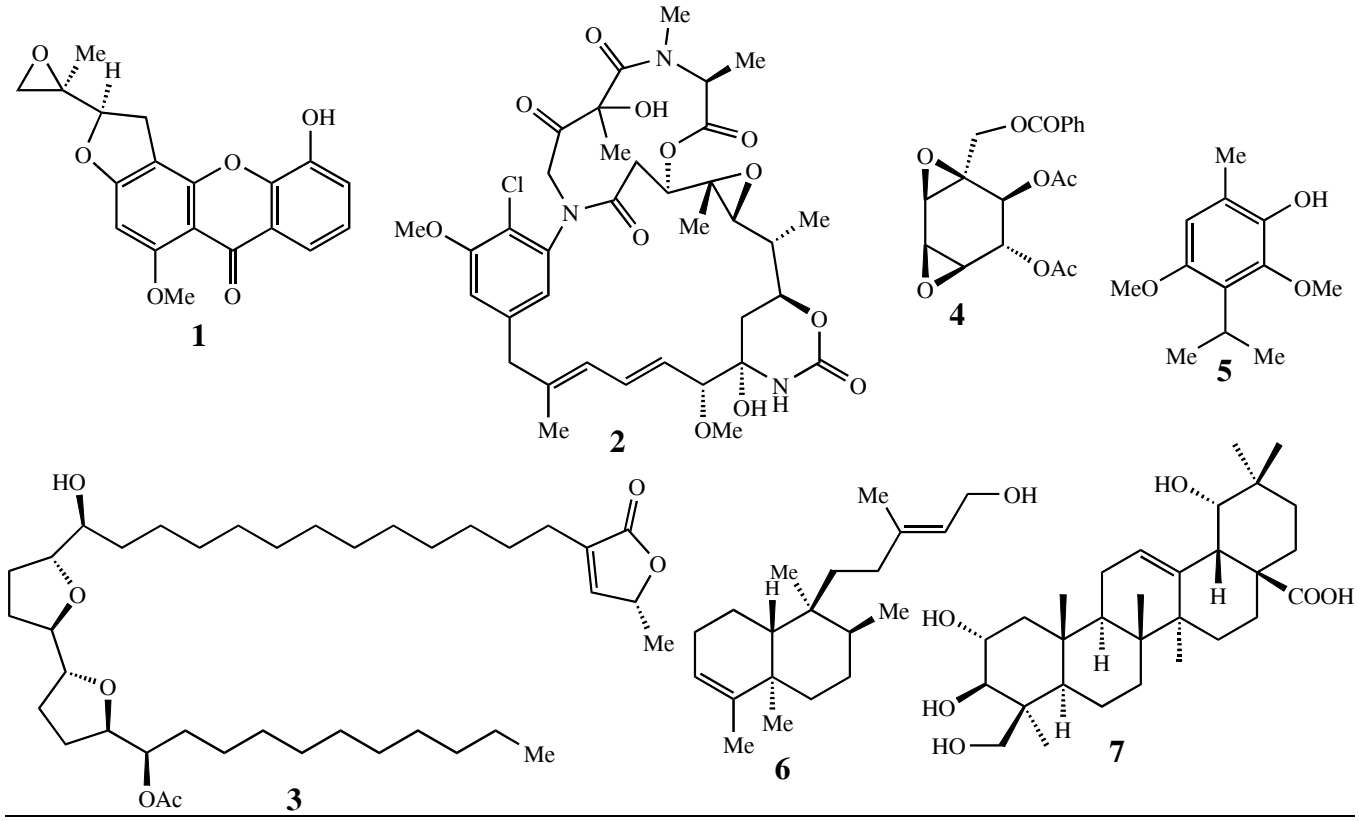
The East African region is taxonomically considered to be a single floral block that is endowed with a high diversity of vascular plant species, consisting of 21,650 species that are distributed in Kenya (5,000), Uganda (6,000) and Tanzania (10,650). This floral diversity and the deployment of a good number of the vascular plants in traditional medicine and as local insecticides has inspired enormous research efforts to prospect for lead natural products for drug and pesticide development, involving both local and foreign research groups. Thus, in the 1960s and 1970s American researchers carried out an extensive analysis of East African plants, primarily in the search for antitumour and antileukemic agents and this saw the discovery of several potent natural products, including psorospermin (**1**) from *Psorospermum febrifuga*, maytansinoids such as maytanbicyclinol (**2**) from *Maytenus buchananii,* uvaricin (**3**) from *Uvaria accuminata* and crotepoxide (**4**) from *Croton macrostachys*. Recently some peptides, the circulins were isolated from a Tanzanian plant and shown to be potent anti-HIV agents. On-going research in East African laboratories has led to the isolation of a number of natural products that have insecticidal properties, such as flavonoids from *Tephrosia* and *Neorautanenia* species, and the mosquitocidal constituent of *Uvaria scheffleri,* espintanol (**5**) that was obtained together with its trimeric derivative (±)-schefflone. In several laboratories in East Africa the focus has been to search for natural products with activity against organisms causing infectious diseases, such as antibacterial, antifungal, antimalarial and antitrypanosomal compounds, as well as natural products with physiological activity against non-infectious diseases like diabetes. Such research efforts have yielded interesting results, including the isolation of iso-kolavenol (**6**) as a novel antitrypanosomal compound from *Entada abyssinica*, and some glycosides that exert a wide range of biological activities, including suppression of diabetes, or sericoside (**7**) from *Terminalia sericea* that has interesting cosmetic properties. These and other findings will be discussed in details in the presentation.



PL 7 CHEMICAL ANALYSES IN THE OPTIMISATION OF THE FERMENTATION PROCESS IN BLACK TEA (*CAMELLIA SINENSIS* l.) PROCESSING

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Tea (*Camellia sinensis* (L. O. Kuntze)) is an important cash crop for many African countries particularly Kenya, Malawi, Tanzania, Uganda, Rwanda, Burundi, and Zaire, creating employment in the rural areas and generating large amounts of foreign exchange. The price realisation from black tea is dependent on its quality as it is largely sold in international markets based on an auction system where buyers select what to buy depending on their desired taste. Fermentation is a critical stage in the processing of black tea from the tender leaves of the tea plant as most of the chemical transformations occur at this stage. Optimisation of the process ensures that the resultant black tea is of high quality to attract high prices. The in-line theaflavins analysis that had been developed to correctly measure fermentation duration was shown to be less accurate compared to the measurement of the total theaflavins in black made tea. Whereas black tea theaflavins increase then reaches a maxima, then declines, the thearubigins increase continuously with fermentation duration. However, different tea cultivars ferment at different rates leading to black teas of different chemical quality parameters composition, particularly the theaflavins, thearubigins and the volatile flavour compounds. The variations in the different rates of fermentation also depend on the geographical area of production, oxygen supply, temperatures, degree of wither, and plucking standard. But generally, the black tea quality is enhanced by fermenting at cool temperatures below 20^{o}C. Short fermentation duration produces black tea with greenish aroma due to high concentration of group I volatile flavour compounds (VFC), while longer fermentation produce more aromatic black tea resulting from high concentration of the group II thereby improving tea flavour. The individual theaflavins form at different rates during fermentation. For production of high quality tea, it is necessary that fermentation conditions are monitored to ensure maintenance of cool temperatures, adequate air supply and maintaining correct duration.

PL 8 THE PHYTOCHEMISTRY OF THE HYACINTHACEAE OF SOUTHERN AFRICA

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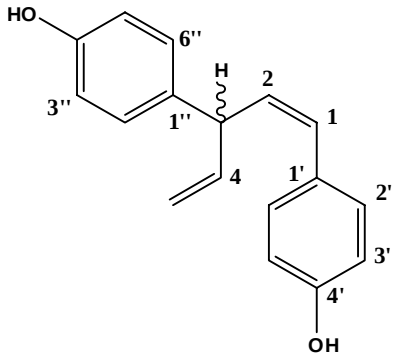
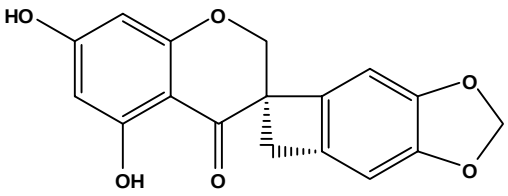
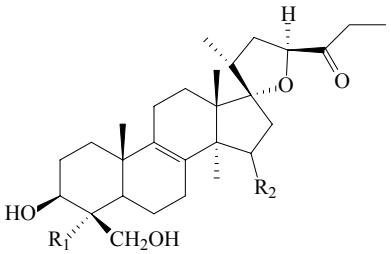
Southern Africa is one of two world centres of diversity in the Hyacinthaceae, harbouring approximately half the world's family representatives. Some 368 species in 27 genera are locally represented. Plants are well distributed throughout the region, with a predominance in the Western Cape of South Africa. Some fifty species in ten genera have been phytochemically investigated, revealing compounds belonging to a diverse range of chemical classes including homoisoflavanones, spirocyclic nortriterpenoids, cholestane glycosides and bufadienolides[1].

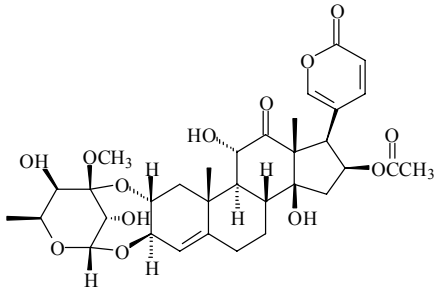
Interest in the chemistry of the Hyacinthaceae was initiated over one hundred years ago after stock losses were noted to occur following ingestion of aerial parts of *Ornithogalum thyrsoides*[2]. A number of other *Ornithogalum* species have subsequently been implicated in stock poisoning. These observations led to feeding trials being undertaken on almost forty members of the Hyacinthaceae at the Onderstepoort Veterinary Research Institute which positively linked members of the *Ornithogalum, Scilla, Dipcadi* and *Urginea* genera to poisonings[3]. Plants are employed for traditional medicinal purposes ranging from the treatment of hangovers, rheumatic fever, sprains and syphilis to cancer and as homicide agents. [1]

The chemistry, bioactivity and ethnobotany of southern African hyacinthacs will be discussed and examples of compounds including novel xanthones, homoisoflavanones, norlignans and bufadienolides, such as those shown below, isolated from the three subfamilies occurring in southern Africa (the Hyacinthoideae, Urgineoideae and Ornithogaloideae) will be described. Compounds isolated in this work have been screened for anti-inflammatory activity and norlignans and homoisoflavanones have been found to exhibit activity. The significant activity exhibited by the norlignans isolated has led to extensive investigations into the synthesis of these compounds.









References

1. Pohl, TS, Crouch, NR and Mulholland, DA (2000) South African Hyacinthaceae: Chemistry, Bioactivity and Ethnobotany. *Current Organic Chemistry,* **4**, 1287-1324.
2. Hutcheon, D (1904) *Agric. J. Cape of Good Hope,* **25**, 48-50.
3. Bullock, AA (1952) *Kew Bull.,* **1**, 117-130.

PL 9 A LIFE TIME OF NATURAL PRODUCTS

Prof. J. Connolly

University of Glasgow

In almost fifty years of natural product research I have met a lot of very nice people and a lot of very nice compounds. In my talk I want to look back and to highlight some of the major changes I have seen over the years. Then I shall discuss some of the compounds isolated by my Cameroon colleagues in their quest for anti-malarial activity. Finally I shall mention some of my favourite compounds from other parts of the world.

PL 10 PHYTOCHEMISTRY AND ANALYTICAL CHEMISTRY: A STRATEGY FOR METABOLOMICS

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Natural products chemistry research is an area that a number of African universities have pursued with reasonable success judging by the number of publications and postgraduate students that have been successful trained. Traditionally postgraduate training in phytochemistry has often been taught with emphasis on isolation and characterization of metabolites. However, as the interest in the search for bioactive compounds increased the typical approach to phytochemistry had to change, hence partnership to analytical chemistry. The need to identify bioactivity in plants extracts requires combined skills of phytochemistry and analytical chemistry. Separation techniques combined with suitable detection method are very ideal for performing rapid chemical profiling of plants extract directly without sample preparation. This presentation will review the aspect of this marriage citing some work done at our University, potential of this approach.

PL 11 ANTHRAQUINONES AND PHENYLANTHRAQUINONES: UNUSUAL STRUCTURES AND BIOSYNTHETIC CONVERGENCE IN NATURE

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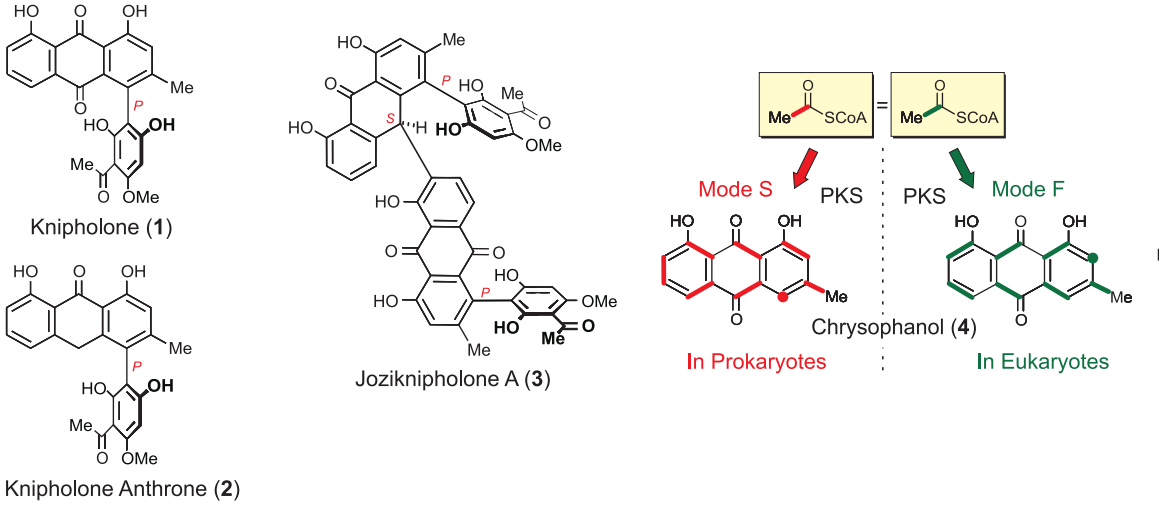
Polyketide synthases (PKSs) convert simple building blocks such as acetate and/or malonate into a huge variety of structurally diverse acetogenic natural products. Two noteworthy, since 'mixed' – octaketidic-tetraketidic – metabolites are knipholone (**1**) and knipholone anthrone (**2**). We have recently revised their absolute axial configuration by high-level quantum chemical CD calculations.[1] Moreover, we have, in a nice collaboration with A. Yenesew, J. Midiwo, and M. Peter, discovered and configurationally assigned the first phenylanthraquinone dimers like, *e.g.*, joziknipholone A (**3**), a cross-coupling product of knipholone (**1**) and knipholone anthrone (**2**).



The investigation of the biosynthesis of knipholone (**1**) led to two unexpected discoveries:

- The 'northern' portion of **1**, the long-known anthraquinone chrysophanol (**4**), was found to be the first polyketidic metabolite that can originate *via* more than one folding type: In eukaryotes (like fungi, plants, and insects) it is formed according to mode F, while prokaryotes choose a different synthetic strategy, mode S[2]. More recently we have even discovered a third pathway, mode S', again leading to the same target molecule, chrysophanol.
- The 'southern' portion of **1**, the 2,4,6-trioxoacetophenone part, does not exhibit the expected C_2-wise randomization of ^{13}C labelling after $^{13}C_2$ acetate feeding, showing that an early *O*-methylation is the decisive symmetry-preventing step, which hints at a close cooperation of the *O*-methyltransferase with the involved PKS.[3]

The results provide illustrative insight into the function and evolution of PKSs.

1. G. Bringmann, K. Maksimenka, J. Mutanyatta-Comar, M. Knauer, T. Bruhn; The absolute axial configurations of knipholone and knipholone anthrone by TDDFT and DFT/MRCI CD calculations: a revision; *Tetrahedron* **2007**, in press.

2. G. Bringmann, T.F. Noll, T.A.M. Gulder, M. Grüne, M. Dreyer, C. Wilde, F. Pankewitz, M. Hilker, G.D. Payne, A.L. Jones, M. Goodfellow, H.-P. Fiedler; Different polyketide folding modes converge to an identical molecular architecture; *Nature Chem. Biol.* **2006**, *2*, 429-433.

3. G. Bringmann, T.F. Noll, T. Gulder, M. Dreyer, M. Grüne, D. Moskau; Polyketide Folding in Higher Plants: Biosynthesis of the Phenylanthraquinone Knipholone; *J. Org. Chem.* **2007**, *72*, 3247-3252.

PL 12 BIOACTIVE COMPOUNDS RESEARCH AND PHARMACEUTICAL INDUSTRY

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Natural compounds have been a major source for bio-active compounds and the basis of most early medicines. Over the last twenty years, about 60% of the anticancer chemical entities commercially available are of natural origin.

Recently in the pharmaceutical industry, screening capacities have greatly increased with the use of Ultra High Throughput Screening (u-HTS) robotic systems which can routinely scan thousands of molecules a day for biological activities. Subsequently, the enthusiasm for using natural products in the discovery of novel pharmaceutical leads has declined in the last decade, with many big pharma companies stopping or significantly scaling down their natural substances programs. On average, over 500,000 different compounds are screened on one HTS pharmacological target and the research cycles are much shorter. The majority of these small molecules are now provided by combinatorial or parallel chemistry. Despite the acceleration and the more widely spread use of robotics, massive introduction of combinatorial chemistry, the output of annually launched drugs has fallen while the amount of money currently invested in R&D has skyrocketed. In this context, natural compounds are needed to be revisited as a rich source of promising lead molecules. They represent a unique reservoir of bio-active chemiodiversity.

Nevertheless, natural products present some drawbacks. Drug discovery from Nature is a time and resource consuming activity. Collection, identification of the biological material, extraction, primary pharmacological screening, bioguided fractionation, dereplication of active components, structure elucidation of active components, supply… takes months of intensive efforts.

The specific challenges faced by a pharmaceutical company, the strategic choices and general processes will be presented. Recent results about inhibition of Tubulin Carboxypeptidase activity by natural products in oncology will be disclosed.

PL-13] RECENT RESULTS IN PLANTS-BASED DRUG DISCOVERY IN MADAGASCAR

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In our bioprospecting program, the raw material is sourced through two approaches: (i) the biodiversity-based approach, and (ii) the ethnobotany-based approach. In the first approach, which has been financed by the French Institution CNRS since March 2005, we have concentrated our collecting activities in areas that may harbour high concentrations of plant species in order to maximize the taxonomic diversity of the plant samples collected. By March 2007, a cumulative total of 1200 plant samples, *i.e.* leaves, stem barks, roots, fruits, seeds, combined leaf and twig, etc.; from approximately 550 species, were collected. Extracts have been subjected to biological screening including *in vitro* cellular tests (antiplasmodial, cytotoxicity), and enzyme-based assays to cite GSK3, BCI-XL, DYRK1A and AChE, and others. In the second approach, we have targeted diseases recommended by the WHO/AFRO, including malaria and diabetes with its complications. In malaria, a new morphinan alkaloid named tazopsine isolated from *Strychnopsis thouarsii* was found to be active in the hepatic stage of the malaria parasite. A more active synthetic derivative is now in the advanced stage of pharmacological investigation. Concerning diabetes and its complications, two medicinal plants have been identified as having antidiabetic activities using the reverse pharmacology approach, and the results were confirmed by *in vivo* rodent models. The lesson learned from these programs tells us that bioprospecting is a highly complex and challenging endeavour. It requires the amalgamation of diverse factors including scientific expertise, individual and group motivation, respect for culture differences, trust, common sense and efficient Internet communication.

PL 14 THE DISCOVERY OF BIOACTIVE MOLECULES FROM EAST AFRICAN FLORA AND FAUNA

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11Du Pont Agricultural Products, P.O. Box 1300, NY, USA

The use of natural products as agrochemicals, veterinary and human medicine cannot be over-emphasized. Examples include pyrethrins, azadiractin, quinine, artemisinin, penicillins, tetracycline, vancomycin, erythromycins, avemectins, vinblastin, vincristin, and taxol among many others. Over the last 18 years, we have been investigating East African flora and fauna for the discovery of bioactive molecules that can be used in pest control and medicine. Examples of bioactive molecules from mammals, arthropods and plants; including their synthesis (in some) cases and structure activity relationships will be discussed. The examples will include plant derived anti-plasmodial compounds, taste modifiers, kairomones, repellents, larvicides and IGRs; insect pheromes and scorpion toxins.

PL 15 CULTIVATED AND WILD PLANTS FROM CONGO BASIN: RAW MATERIALS FOR A LOCAL PRODUCTION OF COSMETICS AND PHYTOMEDICINES.

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After the Amazon Basin, the Congo Basin forest is the second largest tropical forest in the world. This forest hosts a wealth of biodiversity including many species of wild plants. It is distributed as follows in six countries: 17,7% in Gabon, 12,4% in the Republic of Congo, 11,80% in Cameron, 3,40% in the Central Africa Republic, 1,3% in Equatorial Guinea and 53,6% in the Democratic Republic of Congo.

Besides wild plants, which need to be used in a sustainable way, there are also in this region interesting cultivated plants.

Some of the wild as well as the cultivated plants of this region can serve as sources of raw materials for the local production of cosmetics and phytomedicines.

The author will give examples of plants rich in carbohydrates, in vegetable oils, in essential oils and bioactive substances and will show how they can be used in the small and middle local production of cosmetics and phytomedicines.

Other plants of this region can be used to produce biofuels, source of the energy needed by the small created industries.

It will furthermore be emphasised that this development will be a real success if an alliance is established between the local traditional knowledge and the classical knowledge.

PL 16 PRESERVING AND STUDYING FOREST BIODIVERSITY - ON THE TRACKS OF UGANDAN CHIMPANZEES TOWARDS NEW BIOACTIVE MOLECULES

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Wild animals have to cope with secondary compounds, which are often toxic when ingested in large amounts. However, the latter may possess beneficial biological activities when consumed in the appropriate dose. Bioactive secondary compounds have recently been isolated from plant parts rarely ingested by wild chimpanzees (*Pan troglodytes schweinfurthii*) from Kibale National Park, Uganda, suggesting a likely self-medicative behaviour. For example, bioguided fractionation of the leaves' extract of *Trichilia rubescens* (Meliaceae) provided 2 new limonoids, trichirubines A and B, and novel oleanane-type triterpene saponins were isolated from extract of leaves and bark of *Albizia grandibracteata* (Fabaceae). Significant inhibitory actions were detected for limonoids against *Plasmodium falciparum* in culture and for saponins against tumoral KB and MCF7cell lines *in vitro*. Other Meliaceae are currently investigated for their antiparasite properties. Among the ingested plant parts by chimpanzees, at least 20% of them are reported as remedies in literature on African ethno-medicine. We recently developed a partnership between French and Ugandan institutions (Museum National d'Histoire Naturelle, France- Institut de Chimie des Substances Naturelles, France- Makerere University, Uganda- Uganda Wildlife University, Uganda) to implement the knowledge on phytochemistry and biodiversity of Ugandan plants, using traditional medicine and chimpanzee behaviour as guides towards new molecules. Studying and preserving the interactions between humans, animals and flora may be of major interest for the human health and the planet welfare in the future.

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ABSTRACTS FOR SHORT LECTURES (SL)

[SL-1A] THE IMPORTANCE OF PLANT TAXONOMY IN DRUG DISCOVERY

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Investigations in drug discovery requires proper documentation so that those who want to use results of the investigations can repeat the same process whether this is for a pharmacology student or a pharmaceutical enterprise. For medicinal plants, documentation and keeping proper reference collections of voucher specimens are essential parts of research in drug discovery. Inevitably, these activities have to be supported by taxonomic studies that result in proper identification and naming. With the correct botanical name further relevant information can be sought elsewhere while with the reference specimens one can be sure to have the right comparison in the future. This paper puts emphasis on the importance of taxonomy and herbaria in drug discovery.

[SL-2A]ROTENOLOIDS AND A SPIROHOMOOXAROTENOID: NEW SUBCLASSES OF ISOFLAVONOIDS FROM *DERRIS TRIFOLIATA*

Abiy Yenesew[1,*] Solomon Derese[1], John T. Kiplagat[1], Eluid K. Mushibe[1], Martha Induli[1], Jacob O. Midiwo[1], Jacques M. Kabaru[2], Matthias Heydenreich[3], Martin G. Peter[3],

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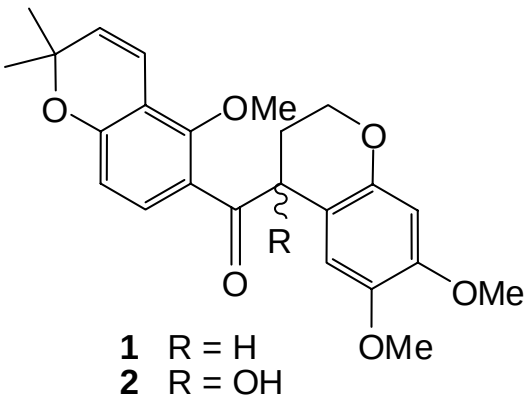
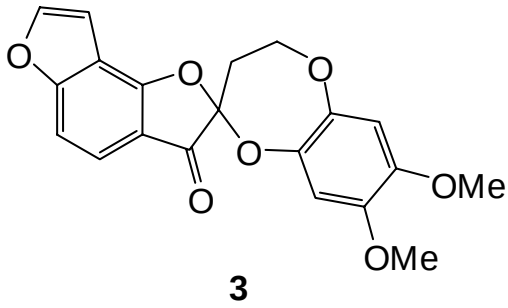
In Kenya, the genus *Derris* is represented by *Derris trifoliata* Lour. In our phytochemical investigation of this plant, we have isolated two rotenoloids [7a-methyldegulol, (**1**) and 12a-hydroxy-7a-*O*-methyldeguelol (**2**)] and a spirohomooxarotenoid [13-spiro-13-oxo-elliptone (**3**)], representing new sub-classes of isoflavonoids. The structures of these unique compounds as well as other constituents (including **4**) of this plant will be presented. Further more, we have tested the various parts of this plant against the larvae of *Aedes aegypti*. The seeds are the most active with LC_{50} value of 0.7µg/ml at 24 hours against the 2nd instar larvae. The seeds were also tested against the 3rd and 4th instar larvae of *Aedes aegypti* and showed potent activities. Rotenoids were identified as the active components in these extracts, with rotenone being the most potent larvicidal compound.



1 R = H
2 R = OH



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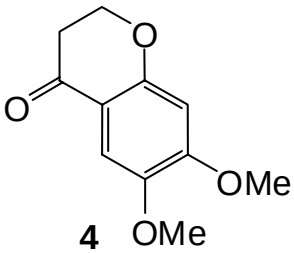

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REFERENCES

A. Yenesew, Eluid K. Mushibe, Martha Induli, Solomon Derese, J.O. Midiwo, Jacques M. Kabaru, Matthias Heydenreich, Andreas Koch , Martin G. Peter (2005). 7a-*O*-Methyldeguelol, a modified rotenoid with an open ring-C, from the roots of *Derris trifoliata.* Phytochemistry 66, 653-657**.**

A. Yenesew**,** J.T. Kiplagat, S. Derese, J.O. Midiwo, J.M. Kabaru, M. Heydenreich, M.G. Peter (2006). Two unusual rotenoid derivatives, 7a-*O*-methyl-12a-hydroxydeguelol and spiro-13-homo-13-oxaelliptone, from the seeds of *Derris trifoliata*. Phytochemistry, 67, 988-991.

[SL-3A] ROLE OF LC/MS IN THE SEARCH FOR NATURAL PRODUCTS

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New-Caledonia and French Guyana are French Territories characterized by very rich native flora with a high degree of endemicity. For many years, we have developed different programs of research aimed to isolate and characterize novel secondary metabolites with various biological activities.

Over the past decade, the advent of routine HTS and other robotized technologies has been one of the most important change to the drug discovery process and is considered today almost ordinary. We have developed three years ago a rapid method to detect, isolate and analyze new bioactive compounds. This method, which combined standardized HPLC fractionation and robotized biological screening, rely on the selection of plant extracts followed by the usual complete structural analysis of compounds contained in the active fraction(s).

In this frame, this presentation is aimed to show how the LC-MS can be a method of choice to detect and characterize analogues present some times in minute quantities. This methodology is particularly useful and informative whether it is for known molecules (dereplication) or new compounds. To illustrate these different aspects, typical examples, chosen from endemic species to New-Caledonia and French Guyana flora, will be exposed.

[SL-4A]CHEMISTRY AND BIOLOGICAL STUDIES ON *BOLUSANTHUS SPECIOSUS, ERYTHRINA ABYSSINICA, ERYTHRINA LATISSIMA* AND *ERYTHRINA LYSISTEMON*.

R. R. T. Majinda, G. Bojase-Moleta, C. C. W. Wanjala, B. F. Juma, M. Chacha, E. Paul, and F. Machumi

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The genera Bolusanthus and Erythrina belong to the family Fabaceae (formerly Leguminosae) and sub-family Papilionoideae.

Detailed phytochemical investigation of four Botswana medicinal plants *viz Bolusanthus speciosus*, *Erythrina abyssinica*, *E. latissima* and *E. lysistemon* led to the isolation over one hundred secondary metabolites. These metabolites fall within the classes, alkaloids, flavonoids, arylbenzofurans, pterocarpans, phenylpropanoids, Cinnamate esters, lignans, chalcones and sesquiterpenes.

The flavonoids, arylbenzofurans, and chalcones displayed varying degrees of antibiotic activity against Gram-positive, Gram-negative bacteria and fungi. A lot of these compounds also exhibit strong radical scavenging properties against DPPH radical.

Some of the Erythrina alkaloids displayed weak radical scavenging properties, while others showed competitive enzyme inhibition activity on Rb influx stimulated nicotine from KXα3β4R2 cells. Yet others showed significant activation of the Caspase-3 enzyme, a indicator that they may have potential as cancer chemotherapeutic agents.
Work by other authors on some of the compounds also showed other important biological activities such as antiplasmodial, and anti-HIV.

References:

1. **R. R. T. Majinda***, C.C.W. Wanjala and B. F. Juma (2005). Bioactive non-alkaloidal constituents from the genus *Erythrina*. In: *Studies in Natural Products Chemistry*; Utta-ur-Rahman, Ed; Elsevier Science B. V. Amsterdam, Vol **32,** 821-853.
2. F. Machumi, G. Bojase-Moleta, R. Mapitse, I. B. Masesane, **R. R. T. Majinda*** (2006). Radical scavenging flavonoids from *Erythrina abyssinica*. *Natural Product Communications* **1**,289-292.
3. B. F. Juma and **R. R. T. Majinda*** (2006). Constituents of *Erythrina lysistemon*: their brine shrimp lethality, antimicrobial and radical scavenging activities. *Natural Product Communications* **1**, 103-107.
4. M. Chacha, G. Bojase-Moleta and **R. R. T. Majinda*** (2005). Antimicrobial and radical scavenging flavonoids from the stem wood of *Erythrina latissima*. *Phytochemistry* **66**, 99-104.
5. B. F. Juma and **R. R. T. Majinda*** (2004). Erythrinaline alkaloids from the flowers and the pods of *Erythrina lysistemon* and their radical scavenging properties. *Phytochemistry* **65**, 1397-1404.
6. P. Erasto, G. Bojase-Moleta and **R. R. T. Majinda*** (2004). Antimicrobial and antioxidant flavonoids from the root wood of *Bolusanthus speciosus*. *Phytochemistry* **65**, 875-880.
7. C. C. W. Wanjala , G. Bojase, B. F. Juma, B. A. Gashe and **R. R. T. Majinda*** (2002) Erythrinaline alkaloids and antimicrobial flavonoids from *Erythrina latissima*. *Planta Medica* **68**, 640-642.
8. G. Bojase, C. C. W. Wanjala, B. A. Gashe and **R. R. T. Majinda*** (2002). Antimicrobial flavonoids from *Bolusanthus speciosus. Planta Medica* **68**, 615-620.
9. **R. R. T. Majinda***, B. M. Abegaz, M. Bezabih, B.T. Ngadjui, C.C. W. Wanjala, L. K. Mdee, G. Bojase, A.B.silayo, I. Masesane, S. O. Yeboah (2001). Recent results from natural products research at the University of Botswana. *Pure and Applied Chemistry* **73,** 1197- 1208.
10. G. Bojase, C. C. W. Wanjala and **R. R. Majinda*** (2001). Two new isoflavonoids from *Bolusanthus speciosus*. *Bulletin of the Chemical Society of Ethiopia* **15**, 131-136.
11. G. Bojase, C. C. W. Wanjala and **R. R. Majinda*** (2001). Flavonoids from the stem bark of *Bolusanthus speciosus*. *Phytochemistry* **58**, 837-841.
12. Cornelius C. Wanjala and **R. R. Majinda*** (2001). Isoflavone glycosides from the root wood of *Erythrina latissima*. *Journal of AOAC International* **84**, 451-453.
13. Cornelius C. Wanjala and **R. R. Majinda*** (2000). A new isoflavone from the stem bark of *Erythrina latissima*. *Fitoterapia* **71**, 400-405.
14. Cornelius C. Wanjala and **R. R. Majinda*** (2000). Two novel glucodienoid alkaloids from *Erythrina latissima* seeds. *Journal of Natural Products* **63**, 871-873.

[SL-5A]COMPLEX POLYSACCHARIDES FROM *SOLANUM ACULEASTRUM* – ARE THEY IMPLICATED IN WOUND HEALING?

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Natural products research and its main focus on the study of conventional natural products such as terpenoids, phenolics and alkaloids, is largely inspired by the fact that these compounds are often responsible for biological activity in a variety of medicinal plants. In this regard biological activity is often viewed in the context of anti-microbial properties of organic extracts. However, recent studies have revealed that aqueous extracts can contribute much in biological activity although not in the same context as conventional natural products. Thus, aqueous extracts which are usually rich in polysaccharide structures have been shown to have such important biological activities as immune modulatory, wound-healing, anti-oxidant, anti-tumour and hypolipidemic activities among others. [See for example, references 1-5] The fruit of *Solanum aculeastrum* has been used in the context of traditional medicine by the Xhosa tribe in South Africa to promote rapid healing of the navel in newly born babies. Hence the main objective of this study was to investigate the polysaccharide structures contained in the fruit of this plant. Following successive extraction of the fleshy part of the fruit with methanol and cold water, the freeze-dried aqueous extract was fractionated by partial precipitation involving the gradual addition of acetone to an aqueous solution of the extract. The polysaccharide fractions were then examined for monosaccharide composition and linkage using conventional methodologies such as hydrolysis and methylation analysis. The generated data indicated that the plant material was rich in pectic and glucan-type polysaccharides. Similar polysaccharide structures have been reported as constituents in other plants with similar ethnomedicinal uses. Interestingly, when the methanol extract was tested for antimicrobial activity against common microbes such as Staphylococcus aureus, Pseudomonas aeruginosa and Candida albicans, no activity was detected.

References:

1. Inngjerdingen et al, *Phytochemistry* 68 (2007) 1046-1058
2. Yang et al, *Carbohydrate Polymers* 59 (2005) 101-107
3. Wu et al, *Life Sciences* 78 (2006) 622-630
4. Trombetta et al, *Phytomedicine* 13 (2006) 352-358
5. Sudheesh and Vijayalakshmi, *Food Chemistry* 67 (1999) 281-286

[SL-6A]NATURAL PRODUCTS COMPOUNDS FROM TWO TANZANIAN ENDEMIC PLANTS

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[b]*Natural Products Research Group, School of Chemistry, University of KwaZulu-Natal, 4041, Durban, SA*
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(jmagadula@yahoo.co.uk)

In our systematic search for new bioactive compounds from endemic plants from Tanzania, we have now examined the stem bark of *Teclea amaniensis* Engl. (Rutaceae), a small tree endemic to the Amani Nature Reserve, Tanga region and the root bark of *Baphia puguensis* Brummitt (Fabaceae), a small tree endemic to the Pugu Forest Reserve, Coast region. Neither phytochemical work nor ethnomedical usage has been reported from these plants. The dichloromethane extract of the stem bark of *Teclea amaniensis* has yielded two novel furoquinoline alkaloids and a novel acridone alkaloid, together with other three known alkaloids, dictamnine, kokusaginine and evoxanthine and two known triterpenoids, lupeol and lupeol acetate while phytochemical work from the ethyl acetate extract of the root bark of *Baphia puguensis* gave two new flavanones together with other three known compounds, erythrisenegalone, 3-methoxy-8,9-methylenedioxypterocarp-6-ene and alkyl *trans*-4-hydroxy-3-methoxycinnamate. We hereby report the isolation and structure elucidation of the novel compounds using NMR and MS techniques.

[SL-7A]SYNTHETIC TRANSFORMATION OF SELECTED FLAVONOIDS

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Chemistry Department, University of Nairoi, Kenya

Chalcones, flavanones and other flavonoids have been shown to have varied anti-plasmodium activity. In this work, chalcones were synthesized from corresponding flavanones (figure 1) extracted from S*enecio roseiflorus, Erythina abysinica and Polygonum senegalense*, using conventional organic reagents and green chemistry approach.

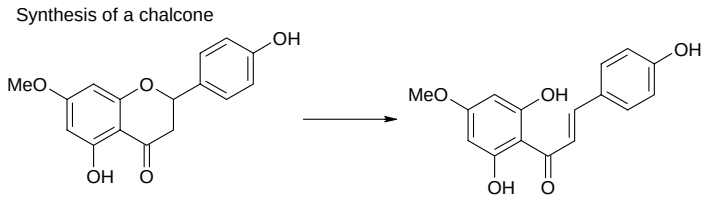

Figure 1

Dihydrochalcones were converted to homoisoflavones using the Kostanecki reaction (Figure 2).

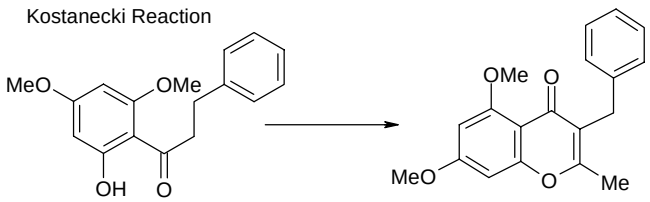

Figure 2

Further characterization and bioassay on the synthetic derivatives is currently underway.

[SL-8A]AZADIRON LIMONOIDS FROM *TURRAEA CORNUCOPIA*

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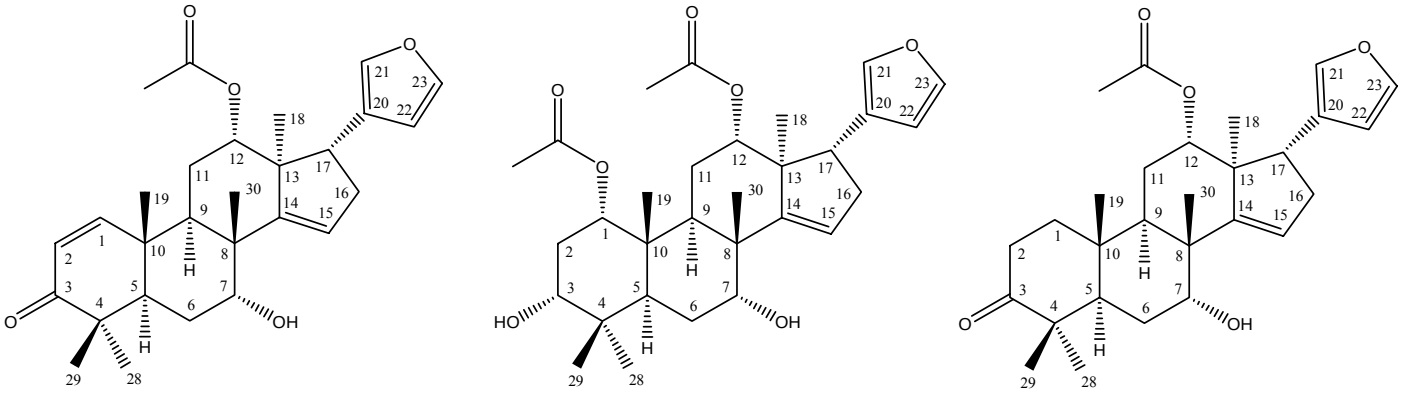
[b]International Centre of Insect Physiology and Ecology (ICIPE) P.O. Box 30772, Nairobi, Kenya

Analysis of methanolic extracts of the root bark of *Turraea cornucopia* by column chromatography and HPLC-UV yielded two novel limonoids, 12α-acetoxy-7-deacetylazadiron (**1**) and 1α,12α-diacetoxy-7-deacetyl-1,2-dihydro-3α-hydroxyazadiron (**2**) along with the known 12α-acetoxy-7-deacetyl-1,2-dihydroazadiron [mzikonone (**3**)]. The relative stereochemical structures of compounds **1-3** were established on the basis of NMR spectroscopy.



1 **2** **3**

[SL-9A]SCREENING FOR ANTIMICROBIAL ACTIVITY ON SECONDARY METABOLITES FROM *PSIADIA PUNCTULATA*

Onemus M. Wanjau[a], Josphat Matasyoh[a] and Simon M. Mahungu[b]

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Psiadia punctulata (DC) Vatke is an East African species that thrives within the dry savannah regions. Its leaves, especially when young, are covered by a gummy exudate. The leaves are used locally as soup ingredients for the treatment of colds and fevers. The Kikuyu name for the plant is "Mwenda thigo", a reference that suggests revitalization of sexual desire. Existence of an exudate on the leaf-surface has previously elicited phytochemical screening, leading to the isolation of methoxylated flavonoids and diterpenoids. This research has been directed at isolating the relatively polar compounds from the leaves and screening them for antimicrobial activity against selected laboratory test micro-organisms. Column chromatography of the acetone leaf wash, using hexane:ethyl acetate solvent mixtures eluted a fraction which showed growth inhibition for both gram positive and gram negative pathogens.

[SL–10A]ANTI-PLASMODIAL AND CYTOTOXICITY STUDIES OF FUERSTIA AFRICANUM T.C.E. FRIES (LAMIACEAE)

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[b] Department of Chemistry, School of Pure & Applied Sciences, Kenyatta University, P.O Box 43844, Nairobi 00100, Kenya

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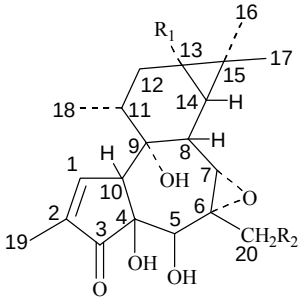
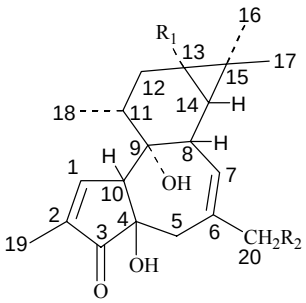
*pkirira@kemri.org

This study was carried out to obtain safe anti-malarial compounds from *Neoboutonia macrocalyx* (Mututunki), a plant used by traditional healers in Meru (Kenya) for anti-malarial therapy. The extracts from the stem bark of this plant were investigated for anti-malarial activity *in vitro* using D6 & W2 *Plasmodium falciparum* isolates and *in vivo* using *P. berghei*. Cytotoxicity assay was then carried out to determine the safety profile of this plant. Safe and active fractions were further purified using chromatographic techniques. The chemical structures of the isolated compounds were established through UV, IR, MS, ^{1}H, ^{13}C, COSY, and 2DNMR spectroscopic data. The fractions of this plant were determined to be active *in vitro* (IC_{50} < 100 µg/mL) and *in vivo* (chemosuppression > 60 %). Cytotoxicity assay suggested safety of the plant extracts *in vitro* (SI > 10). Chromatographic fractionation of the petroleum ether and dichloromethane extracts yielded a known compound, 12-deoxy-5β-hydroxy-13-tetradecanoylphorbol-6α,7α-oxide (**1**) together with three new tigliane-type diterpenoids; 6α,7α-epoxy-4β,5β,9α-trihydroxy-13α-hexadecanoate-20-dodecanoate-1-tiglien-3-one (**2**), 4β,9α,20-trihydroxy-13α-pentanoate-1,6-tigliadien-3-one or 12-deoxyphorbol-13-pentadecanoate (**3**) and 4β,9α-dihydroxy-20-hexadecanoate-13α-dodecanoate-1,6-tigliadien-3-one (**4**). These results demonstrate potential of plants in the search of anti-malarial agents. Rockefeller Foundation and SIDA/SAREC through Inter-University Council for East Africa (IUCEA) supported this study.



1. $R_1 = CH_3(CH_2)_{12}CO_2$, R_2 = OH

2. $R_1 = CH_3(CH_2)_{14}CO_2$, $R_2 = CH_3(CH_2)_{10}CO_2$



3. $R_1 = CH_3(CH_2)_{13}CO_2$, R_2 = OH

4. $R_1 = CH_3(CH_2)_{14}CO_2$, $R_2 = CH_3(CH_2)_{10}CO_2$

[SL-11A] ANTIMICROBIAL COMPOUNDS FROM BERRIES OF *HARRISONIA ABYSSINICA*, (SIMAROUBACEAE)

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Department of Chemistry, Egerton University, P.O. Box 536-20107, Njoro, Kenya

Plants are a potential source of antimicrobial compounds. In this research, a plant from the family Simaroubaceae, *Harrisonia abyssinica*, traditionally used to treat a number of diseases was used. The berries of *Harrisonia abyssinica* was extracted using a mixture of methanol and dichloromethane solvents. The extract was screened for antimicrobial activity and fractionated by column chromatography. The fractions were subjected to similar test (antimicrobial), and compounds with activity were isolated. Two novel acetophenones were isolated and they were found to exhibit potent antimicrobial activity. Spectroscopic analysis, spectrometric analysis and antimicrobial tests will be presented.

[SL-12A]BIODIESEL FROM RENEWABLE PLANT RESOURCES

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This study involved bioprospecting for promising local plant seeds (conventional and non-conventional) and identifying promising candidates for biodiesel production. A variety of oil extraction techniques were investigated ranging from solvent extraction, mechanical pressing and biotechnological approach using enzymes. The oil contents and other physico-chemical parameters were determined to evaluate potential uses. The base catalyzed transesterification process yielded glycerol and a mixture of methyl esters. Various biodiesel formulations were prepared and properties such as density, cetane number, viscosity, flash point and other parameters done and compared with International biodiesel specifications. Sulfur content of the biodiesel was determined to assess potential environmental effects. Performance tests were done by combustion of the biodiesels obtained from *Croton megalocarpus* in compressed ignition diesel engines. The results demonstrate that biodiesel from *Croton megalocarpus* is a viable motor fuel in diesel engines.

[SL-13A]ANTIOXIDANTS IN UGANDAN FRUITS AND VEGETABLES

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Several studies indicate that a plant-based diet protects against the development of some serious diseases. It is assumed that the antioxidant content in food is an important reason for this protection. Experiments indicate that single antioxidants administered through supplements may have little or no effect. Dietary plants contain several hundred antioxidants many of which are believed to act in a synergistic way to protect the body against oxidative stress. Berries, fruits, spices and some nuts have proved to be excellent sources of antioxidants. In this preliminary study several fruits, some seeds and leafy vegetables from Uganda have been analysed for total antioxidant activity using the FRAP (Ferric reducing ability of plasma) assay. We have analysed three samples of dietary plants from three different parts of Uganda. Our results demonstrate that there is a large variation in antioxidant content between the samples analysed. The plants with highest content in decreasing order were found to be: African black olive (*Canarium sweinfurthii),* pomegranate, guava, java plum (Syzygium cuminii), small sweet banana, tamarind, mango and citrus fruits. In this study leafy vegetables like spider herb (*Cleome gynandra),* amaranth and *Solanum macrocarpon* have approximately the same activity as citrus fruits. Foods that are consumed in big quantity can be a good source of antioxidants even if the content of antioxidants of each fruit is not so high. We believe that a better knowledge and more information about plants with high antioxidant activity can be of importance for an improved health situation.

Key words: antioxidants, dietary plants, FRAP assay

[SL-14A]ANTI-PLASMODIAL FLAVONOIDS FROM *ERYTHRINA*

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[2]Institute fur Organische Chemie und Strukturanalytik, Universitat Potsdam, Am Neuen Palais10, D-14469 Potsdam, Germany.
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The eradication of malaria in tropical and subtropical countries has been unsuccessful. Out of the 300 to 500 million people who suffer from malaria annually 0.5 to 2.5 million die with 90% of the deaths occurring in Africa. The chemotherapy and prophylaxis of the disease has been undermined by the resistance by the number one malaria causing parasite *Plasmodium falciparum* against first line antimalarial drugs, consequently many of the currently prescribed drugs are becoming ineffective. Hence to curb the high malaria mortality in the developing world there is need for cheap and potent prophylaxis and treatment alternatives.

Some *Erythrina* species of Kenya are used traditionally for the treatment of malaria, and they are known to elaborate flavonoids. *In vitro* antiplasmodial study shows that the flavonoids and isoflavonoids of these plants have been found to be responsible for their traditional antimalarial uses. In this presentation, the anti-plasmodial activities of these flavonoids will be discussed.

[SL-15A]BIOACTIVITY TESTING OF SECONDARY METABOLITES FROM SELECTED MARINE NATURAL PRODUCTS ALONG THE KENYAN COAST.

Wanjala C. W.[1] and Kweyu Polycarp[2]

[1]Kigali Institute of Science and Technology
[2]Jomo Kenyatta University of Agriculture and Technology

The search for new pharmaceuticals continues to demand the greatest efforts. Despite tremendous advances in medical science, there are no comprehensive cures for HIV or AIDS, some forms of cancer, influenza, arthritis and other inflammatory conditions including viral and fungal diseases. Currently, a bout half of the medicines prescribed is derived from natural sources such as terrestrial plants and micro-organisms. In addition, many drugs now produced by total synthesis were originally derived by modification or partial synthesis of natural products. Few marine natural products are currently used medicinally and in clinical trials. Marine natural products comprise the greatest unexploited source of potential pharmaceuticals. Due to the unusual diversity of chemical structures isolated from marine organisms, there is great interest in activity guided isolations of marine natural products.

This research focused on selected marine sponges collected from the Indian Ocean along the Kenyan Coast, as possible sources of potential bioactive marine natural products. Their organic extracts were tested against selected strains of bacteria and fungi for bioactivity and extracts exhibiting activity subjected to bioassay guided fractionation.

Active compounds were isolated and purified by a combination of chromatographic techniques while structural elucidation of pure compounds was achieved by spectroscopic techniques including Mass spectroscopy, Infrared spectroscopy, Nuclear magnetic resonance spectroscopy, Ultra-violet spectroscopy together with classical method of melting point determination.

[SL-16A]PHYTOCHEMICAL ANALYSIS AND *IN VITRO* ANTIMICROBIAL EVALUATION OF CRUDE EXTRACTS OF A SELECTED MEDICINAL PLANT USED IN ETHNOPHARMACOLGY AND ETHNOVETERINARY

C. J. D. Obbo[1], A. Kyomugisha[1] , Millijoan Randrainariverlojosia[2], Dulcie Mulholland[3]

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Microbial diseases continue to be a major cause of morbidity and mortality throughout the developing world. Ethnopharmacology has on its part contributed a lot to the discovery of many important plant derived drugs. And in the past 25 years or so, a number of significant advances have been recorded, with potential to make major contributions to the control of microbial diseases, in the

face of escalating drug resistance. Drug resistance itself remains a major factor, compounding the ever increasing difficulty in controlling infectious microbial diseases. Yet up to now there has been a very small increase in the range of existing therapeutic antimicrobial drugs of veterinary and medical importance. A preliminary phytochemical analysis and *in vitro* antimicrobial evaluation of the diethyl ether, ethanol and aqueous extracts of a species in the Genus *Albizia* (Mimosacae), traditionally used in the treatment of microbial infections in ethnoparmacology and ethnoveterinary, was performed against selected fungal, bacterial and plasmodial strains. The crude ethanol extract of the root gave an activity value that was at least 50% as strong as Nystatin and Gentamycin, the reference drugs used in the assays and an IC_{50}, of < 50µg/ml, as compared to Chloroquine and artemisinin standard drugs. This paper presents preliminary results of an on-going study and highlights the potential of this genus in the control of microbial infections.

Key words: Phytochemical, antimicrobial, drug-resistance, in vitro, crude extracts.

[SL-17A]HERBALCOMBINATION THERAPY IN TREATMENT OF MALARIA: AN INVESTIGATION OF *IN-VITRO* ANTIPLASMODIAL ACTIVITY OF CHLOROQUINE-HERBAL EXTRACTS COMBINATION

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Malaria is an infectious disease caused by protozoa of the genus *plasmodium* and is transmitted by female anopheles mosquito. Malaria is responsible for approximately 2.5 million deaths annually, 90% of which are in Africa. The disease is a major economic burden in most of sub-Saharan Africa. Cases of the disease have been on the increase due to resistance to common drugs by both the parasite and the vector.

Combination therapy is the simultaneous use of two or more blood schizonticidal drugs with independent modes of action and different biochemical targets in the parasite. If two drugs are used with different modes of action, and therefore different resistance mechanisms, then the per-parasite probability of developing resistance to both drugs is very low. This is particularly powerful in malaria treatment, because combination of drugs greatly lowers the probability of emergence of resistance..

Herein, we will report the response of *P. falciparum* to a range of organic extracts from the roots of *Lippia javanica* (Burm F.) Spreng), a herb that is used for treatment of malaria in the Lake Victoria Region, and in combinations with chloroquine.

In vitro testing of combinations against chloroquine-resistant (W2) strain of *P. falciparum* was carried out. Parasite susceptibility testing employed the semi automated micro dilution technique. Fifty percent inhibitory concentrations (IC_{50}s) were calculated for each drug/compound alone and for drugs in fixed combinations of their respective IC_{50}s (1:1, 3:1, 1:3, 4:1, 1:4, and 5:1) ratios. These data were used to calculate fractional inhibitory concentration (FIC).

The Combination ratios that showed synergistic response and those that showed antagonistic response will be discussed. The results obtained suggest that a 1:3 chloroquine- extract ratio is the most potent combination since the activities of both combination constituents are enhanced by up to twenty percent.

[SL-18A]ETHICS IN ETHNOBIOLOGY RESEARCH

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Discovery of drugs from African plants has depended heavily on indigenous knowledge of traditional healers, herbalists and the local communities among whom they work. Ethnobiological research among these communities has thus involved both getting information on medicinal plants and obtaining plant materials for research and product development. However, such communities that are seen as critical to drug discovery have not always been treated equitably. Many times their knowledge and materials have been used in commercial ventures without their consent and with no proper benefit-sharing mechanisms in place. Moreover, their individual or collective rights have been affected. Equitable considerations and respect should be accorded to these communities that are mostly responsible for continued custody and conservation of plant biodiversity that is to provide the medicinal future. This paper dwells on the principles and guidelines in the Code of Ethics developed over the two decades for ethnobiological research so as to address some of these concerns.

[SL-1B]BIO-PROSPECTING FOR ANTILEISHMANIAL, LARVICIDAL AND INSECTICIDAL AGENTS FROM KENYAN PLANTS

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Aim: This study sought to identify new compounds from plants that have antileishmanial, larvicidal and insecticidal properties.

Methods: *Leishmania major* promastigotes or amastigotes were incubated in RPMI culture medium in the absence or presence of several concentrations (1pg/ml to 1mg/ml) of test extracts. The 50% lethal dose (LD50), infection of macrophages and nitric oxide production was determined. In this study, an attempt was also made to control phlebotomine sand flies (*Phlebotomus duboscqi)* under laboratory conditions using extracts from locally available plants.

Results: Crude extracts from several locally available plants from families which included Leguminaceae, Compositae, Fabaceae, Liliaceae and Euphorbiaceae, were tested. All in all, extracts from Aloe *kedogensis, Albizia coriaria*, *Maytenus putterlickoides* and *Warbugia ugandensis* were found to have antileishmanial activities**.** *Warbugia* was found to be the most efficacious plant extract against *L. major* promastigotes.The following plants namely, *Tarchonanthus camphoratus* (leaves), *Acalypha fruticosa* (leaves), Moskill (Pyrethrum product), *Tagetes minuta* and Pyrethrum (Pymos), tested on laboratory-reared *P. duboscqi* were shown to have insecticidal activities although pymos was found to be the most efficacious.

Discussion and Conclusions: These results indicate that further testing of these plant extracts should be continued for leishmaniasis control and should hence be fractionated and compounds isolated and tested for anti-leishmanial, larvicidal and insecticidal activities, respectively.

[SL – 2B] *TODDALIA ASIATICA:* A POTENTIAL SOURCE OF ANTIMALARIALS AND MOSQUITO REPELLENT COMPOUNDS SUATABLE FOR MALARIAL CONTROL.

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Malaria remains a terrible killer disease in tropical Africa due to development of drug resistance of *Plasmodium falciparum* and expensive insecticides which may be used for therapeutic and insect vector management while the ethnobotanical uses of *Toddalia asiatica* attracted us to investigate the potentials of this plant for the management of malaria.

The ethnobotanical (Beentje,H.J.1994) ,phytochemical (Buckingham J. 1994) and pharmacological (Okech-Rabbah H.A. et al 2000) and larvicidal (Korir E,2002) information led us to find that *Toddalia asiatica* has two compounds with invitro antiplasmodial activity against *Plasmodium falciparum* and two essential oils with repellent activity against adults of mosquito besides several essential oils with larvicidal activity against mosquito larvae of *Anopheles gambiae*.This paper discusses the bioassay assisted isolation of these active ingredients from the root bark and leaf extracts of the plant and subsequent analysis of their chemical structures.

REFERENCES.

Beentje, H.J. (1994) Kenya Trees, Shrubs and Lianas. National Museums of Kenya. Nairobi. pp370.

Buckingham ,J. (Ed.) (1994). Dictionary of Natural Products. Vol. 7. Types of Species Index.. Chapman and Hill. London, Glasgow.p843.

Korir, E. (2002). Kenyatta University Thesis. Phytochemical Investigation of Larvicidal activity of *Toddalia asiatica* and *Ethebergia capenses*

Okech-Rabah H.A., Mwangi, J.W., Lisgarten J., Mberu E.K. A New Antiplasmodial Coumarin from *Toddalia asatica* roots. *Fitoterapia*. 2000. 71 636-640.

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[SL-3B] INSECTICIDAL ACTIVITY OF 3-ACETYL MORALDEHYDE AND AGAURIASTERONE FROM *AGAURIA SALICIFOLIA*.

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Bioassay guided chromatographic separation of a methanolic extract of *Agauria salicifolia* led to isolation of 3-acetyl moraldehyde (**1**) and aguariasterone (**2**), whose structures were elucidated using spectroscopic data (UV, IR, and NMR) and melting points. Insecticidal activity was done using adult *Phaedon cochleariae* (Mustard beetle) at concentration of 1, 0.1, and 0.01% at a dose of 1.00 µg per insect of the compound. Compounds **1** and **2** were found to be active with LD_{50} values of 0.04 and 0.15 µg, respectively.

[SL-4B]ANTHOCYANINS FROM SELECTED PLANT SPECIES IN UGANDA

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Anthocyanins comprise a diverse group of intensely colored pigments responsible for the appealing and often spectacular orange, red, purple and blue colours of many fruits, vegetables, cereals, grains, flowers, leaves, roots and other plant storage organs. The most common food colorants that have been used worldwide are synthetic ones some of which are deemed to be carcinogenic. Because of this, the safety of synthetic colorants has been questioned in the past years, and this has significantly increased the interest in natural colorants as food colour additives such as anthocyanins. Today, interest in anthocyanin pigments has also intensified because of their possible health benefits. Apart from imparting color to plants, anthocyanins also have an array of health-promoting benefits, as they can protect against a variety of oxidants through a various number of mechanisms. They are therefore potent antioxidants and may also be chemoprotective. This paper presents the analysis of anthocyanins from selected Ugandan plant species. Some of these plant species could be potential sources of anthocyanins for use in both the food and pharmaceutical industries.
Key words/phrases: Food colorants; antioxidants; Anthocyanins; Ugandan plant species.

[SL-5B]ESSENTIAL OILS OF *OCIMUM BASILICUM* L. AND *OCIMUM GRATISSIMUM* L. FROM KENYA: COMPOSITION, ANTIRADICAL AND ANTIMICOTOXICOGENIC ACTIVITY

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Although are widely used in East Africa as medicinal plants, little work has been carried out on the constituents and biological activity. This work investigated the constituents and biological activity of essential oils of *Ocimum basilicum* L. and *Ocimum gratissimum* L. from different locations in Kenya. The oil of both leaves and flowering tops of *Ocimum basilicum* from Sagana contained mainly linalool (more than 95%), while that of leaves from Kariti contained geranial (49.6%) and neral (30.9%) as the main constituents. The flowering tops and leaves from Yatta contained mainly camphor (32.6 and 31.0%, respectively) and linalool (28.2 and 29.3% respectively). Eugenol was the main constituent in the essential oil of *Ocimum gratissimum* leaves from both Sagana (95.5%) and Yatta (70.1%). However, the oil of the flowering tops had significantly less eugenol. Cis-ocimene was the main component (34.1%) of the oil of flowering tops from Yatta. The oils of *O. basilicum* and *O. gratissimum* from different locations showed chemical variation and some antifungal activity. *Ocimum gratissimum* oil exhibited strong free radical scavenging capacity and antimicotoxicogenic property, which can be attributed to its high eugenol content.

KEY WORDS: *Ocimum* species, composition, antifungal, antiradical, antimicotoxicogenic

[SL-6B]THE ANTIBACTERIAL BIOACTIVITY OF SOME MEDICINAL PLANTS USED IN REPRODUCTIVE HEALTH CARE FROM WESTERN UGANDA

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Bacterial infections in rural Western Uganda, particularly in women, are treated using herbal medicines. The ethanolic crude plant extracts of *Tetradenia riparia, Tithonia diversifolia* and *Geniosporum rotundifolium,* some of the medicinal plants used traditionally in treating bacterial infections were tested for their activity against microorganisms. Test organisms used were three species of gram-positive bacteria, namely, *Staphylococcus aureus, Bacillus pumilus* and *Bacillus subtilis*, and gram-negative bacteria *Escherichia coli* and *Pseudomonas aeruginosa* were used for the bioassay. Disk diffusion method was used to carry out the antimicrobial tests and the inhibitory concentrations of both the MIC and IC_{50} of the herbal extracts were calculated. *Tetradenia riparia, Tithonia diversifolia* and *Geniosporum rotundifolium* showed promising results as antibacterial potential drugs. Thus, plants used in traditional medicine for particular ailments are sometimes potential leads in drug discovery and development.

Key words: antibacterial, medicinal plants, scientific validation, Indigenous knowledge

[SL-7B]SCREENING FOR ANTIMICROBIAL PRINCIPLES FROM SOME TRADITIONAL HERBAL MEDICINES IN KENYA

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In the continuing search for potential bioactive natural products from traditional herbal medicines used among Kenyan communities, 27 plant extracts from 10 different medicinal plant species belonging to 8 families were investigated for their antibacterial and antifungal properties. The plants were selected based on their ethno-medicinal use against microbial infections. The antimicrobial activity of the plant extracts was tested by the disk diffusion method. Of the plant extracts tested, 25 extracts showed varied levels of antibacterial activity against *Staphylococcus aureus.* In addition, 19 of these extracts showed antifungal activity against *Candida albicans*. No extract exhibited exclusive antifungal activity. Autobiography of the chloroform and methanol extracts that had shown marked antimicrobial activity, exhibited *11 spots* with thin layer chromatography retention factor values similar to microbial growth zones of inhibition on the bioautograms. The results may explain the traditional use of the studied species for the treatment of various microbial diseases. Further bioassay guided fractionation to isolate and characterize the respective bioactive components is being pursued.

[SL-8B]EFFECTS *PRUNUS AFRICANA* AND *MAYTENUS HETEROPHYLLA* EXTRACTS ON MICROBIAL

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Prunus africana and *Maytenus heterophylla* are used in traditional medicine to treat several diseases in Kenya. The aim of the study was to investigate antimicrobial activity of different parts of *Prunus africana* and *Maytenus heterophylla* used in traditional medicine. The stem barks and root barks were extracted with various solvents, and tested against different bacteria; *Staphylococcus aureus* (ATCC 25923), *Enterococcus faecalis*, *Pseudomonas aeruginosa* and *Eschericia coli* (ATCC 25922). The fungal strains used in this study were *Candida albicans* (ATCC 90028), clinical isolates of *Candida krusei*, *Cryptococcus neoformans, Microsporum gypseum* and *Trichophyton mentagrophytes* were also tested. Minimal Inhibitory Concentration (MIC) values of each active extracts and fractions were determined. The results obtained show strong activity of the methanol extract and its fractions of the two plants against bacteria and fungi used as test organisms. The study demonstrated a correlation between

their use in traditional medicine use and in-vitro antimicrobial activity of extracts indicating that the traditional knowledge is important.

[SL-9B]VALIDATION OF SOME MEDICINAL PLANTS OF GADUMIRE SUB-COUNTY, UGANDA: THE EFFICACY OF PLANTS USED TO TREAT DIARRHOEA AND SKIN DISEASES

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Traditional medicine (TM) is widely used in Uganda for the treatment of ailments. However, it is held in contempt by some because of doubts about its efficacy and safety. This research was carried out in Gadumire Sub-County of Uganda, with the aim of validating the efficacy of the herbal medicines used to treat diarrhoea and skin disease ailments. The plant species used in the treatments were identified during a focus group discussion and key informant interviews. Thereafter drugs made from these plants were administered to the community members. The patients' progress was monitored. The plant species used to treat the above diseases, how they were collected, prepared and dispensed are described here. Patients taking the herbal medicines perceived good improvement in their conditions, indicating that the herbal drugs were effective for diarrhoea and skin disease ailments. Generally the community members indicated that they self medicate using herbal plants or that they seek treatments from private clinics for the treatment of diarrhoea and skin disease ailments.

Key word: Traditional medicine; Validation; Efficacy; Health seeking behaviour.

[SL-10B] THE FORESTS BENEATH THE TREES OF EAST AFRICA: ETHNOMYCOLOGY, USAGE AND PRIORITIZATION FOR DOMESTICATION OF INDIGENOUS EDIBLE AND MEDICINAL MUSHROOMS THE LAKE VICTORIA BASIN

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Indigenous mushrooms are eaten in many places in East Africa region. Most of them are however eaten as products of the wild. Few studies have been undertaken to document, much less domesticate them. With the pressure on land therefore due to increasing population pressure, the indigenous mushroom species may be faced with extinction, especially since they are dependent on termites for their growth. There is a great wealth of knowledge among the local people on mushrooms. This knowledge originates from the uses of the mushrooms. Based on the assessments captured during focus group discussions, there is a wide variety of mushrooms that are of socio-economic significance which require detailed pharmacological and nutritional study.

Of the mushrooms that are eaten in the Lake Victoria basin, the most highly ranked in all the three countries was *Termitomyces microcarpus*. It is the most generally known mushroom. Most of the people eat mushrooms because of their perceived medicinal value. In this regard also *T. microcarpus* and *Ganoderma lucidum* were most cited for their medicinal value. In the case of *T. microcarpus* the use in the treatment of measles featured most in all study sites. The knowledge of poisonous mushrooms, however, is limited, with less than 50% of the respondents reporting them. Among the reasons for non-consumption of mushrooms the most commonly cited were totems, and the perception that mushrooms grow in dirty places; hence the justification for efforts at domesticating them in order to assure consumers of a quality product. Spraying of termistes was also reported as the commonest cause of biodiversity loss in the region. This is of particular importance because agricultural activities are likely to intensify in the near future, with the consequence that most mushrooms are likely to disappear. The persons who most often eat mushrooms are children, women and the sick. This lends credence to need for further studies on these mushrooms because women and children are often the disadvantaged groups in many of the societies in this region. *Termitomyces microcarpa* and *Ganoderma lucidum* are the priority mushrooms for domestication in the region.

[SL-11B]CHEMOTAXONOMIC STUDY AND ANTIMICROBIAL ACTIVITY OF SELECTED *ALOE* SPECIES GROWING IN KENYA

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Extracts from plants in the genus *aloe* have been extensively used by pharmaceutical and cosmetic industries. *Aloe* species have long been known as medicinal plants. We started a detailed screening of *aloe* species growing in Kenya with the aim of identifying their antimicrobial activities and unique constituents which may be used as markers for possible chemotaxanomic significance. We now report the preliminary results from this investigation of antimicrobial activities of extracts from *A. volkensii, A. kedongensis, A. turkanensis, A. ngongensis, A. fibrosa, A. scrabifolia* and *A. dawei.*

Aloe leaves were cut into segments prior to grinding in a blender. The resulting slurry was sequentially extracted with hexane, ethyl acetate, chloroform, and methanol. The solvents were removed by rotor evaporation under vacuum to give four extracts for each species. The extracts were screened for antimicrobial activity against both Gram positive (*Staphylococcus aureus*, *Bacillus ssp*.) and Gram negative (*Escherichia coli*, *Salmonella typhi, Klebsiella pneumoniae, Proteus mirabilis, pseudomonas aerigunosa*) bacteria and a pathogenic fungus *Candida albicans*. The ethyl acetate and chloroform extracts of the species under study showed pronounced antibacterial and antifungal activities. These extracts were analyzed by thin layer chromatographic analysis (TLC) and their retention values (R_f) compared with those found in literature. To the best of our knowledge nothing concerning the chemical composition and biological activity of the *aloe* species under study has been reported.

[SL-12B]MEDICINAL PLANTS USED TO TREAT FOWL DISEASES IN UGANDA WITH PARTICULAR REFERENCE TO MBALE, RAKAI AND MBARARA DISTRICTS

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Medicinal Plants used to treat fowl diseases in Mbale district (Eastern Uganda), Rakai district (Central Uganda) and Mbarara district (Western Uganda) were studied. Field studies in the districts were carried out in the period January to June, 2005.

At the beginning of the study in the districts, the district authorities i.e. LCV Chairman, Chief Administrative Officer (CAO) , Resident District Commissioner (RDC), District Veterinary Officer (DVO), District Agricultural Officer (DAO), Heads of relevant NGOs, etc, were informed about the purpose of our presence in the district. i. e. to study the Medicinal Plants used to treat fowl diseases.

Two plant species; i.e. *Capsicum frutescens* (Pilipili), and Cannabis sativa (Nzaye) were used in the three districts/regions of Uganda while four plant species; i.e. *Nicotiana tobaccum* (Etaaba), *Aloe* sp (Rukaka), *Vernonia amygdalina* (Omubirizi) and *Tagetes mihuta* (Kanuka) were used in two districts of Rakai and Mbarara.

The commonest fowl diseases/pests treated include: cough; diarrhoea; swollen eyes; mites; worms and lice; Newcastle (NCD); prophylaxis; listlessness and coccidiosis (CCD).

The commonest way of preparation and administration of the medicine is by crushing the plant material; adding water and administering the concoction orally. Leaves formed the most dominant part of the plant that is used for medicine.

ABSTRACT FOR YOUNG SCIENTIST COMPETITION

[YS – 1] ANTIACETYLCHOLINESTERASE ACTIVITY OF ESSENTIAL OILS FROM SIX MEDICINAL PLANTS FROM BURKINA FASO

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In this investigation, we screened six essential oils from Burkina Faso for their acetylcholinesterase inhibitory activity. The chemotype of most active essential oils were also determined as well as their inhibitory mechanism. Using in vitro bioassay, the best antiacetylcholinesterase activities were recorded for the essential oils of *Eucalyptus camaldulensis* (IC_{50} = 18.98 µg/ml) and *Ocimum canum* (IC_{50} = 36.16 µg/ml). Their chemotype have been related to the 1,8-cineole one through GC/MS analysis. These essential oils were ten to twenty fold less active than Galanthamine HBr (IC_{50} = 0.19 µg/ml) used as positive control. Both essential oils demonstrated a linear mixed non competitive inhibition through kinetic studies on eel AChE in presence of ATCI as substrate. The anticholinesterase activity of essential oils was discussed in regard with their chemical composition. The antiacetylcholinesterase activity recorded for the essential oils of *Eucalyptus camaldulensis* and *Ocimum canum* justify their insecticidal properties and motivate further studies in regard with their therapeutic uses in Alzheimer diseases.

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[YS – 2] CONSTITUENTS OF ALLELOPATHIC ROOT EXTRACTS OF *DESMODIUM UNCINATUM*

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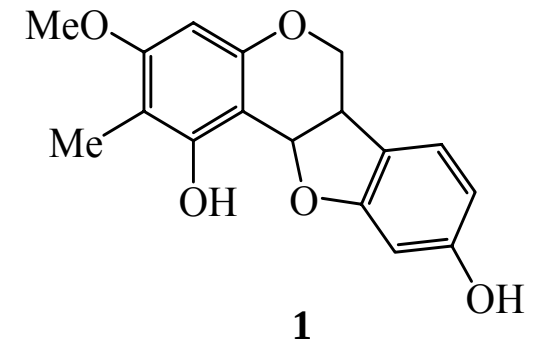
Plants produce many biologically active compounds that affect the growth and development of other organisms. The fodder legumes *Desmodium uncinatum* and *D. intortum* suppress the growth of *Striga hermonthica* (witch-weed) via an allelopathic mechanism that involves *Striga* germination stimulants and post-germination growth inhibitors. In this study, the root extracts (dichloromethane, acetone and methanol) from *D. uncinatum* were investigated for *Striga* germination stimulation and post-germination radicle growth inhibition activities. The less polar (dichloromethane) extract showed high *Striga* germination stimulation activities but did not show any post-germination radicle growth inhibition activities at the same concentration. On the other hand, the polar (acetone and methanol) extracts were found to exhibit high post-germination radicle growth inhibition activities.

Chromatographic separation of the root extracts of *D. uncinatum* yielded three new isoflavonoids; a pterocarpan, (1,9-dihydroxy-3-methoxy-2-methylpterocarpan (named uncinacarpan, **1**) and two isoflavanones, 5,7-dihydroxy-2',3',4'-trimethoxy-6-(3-methylbut-2-enyl)isoflavanone (named uncinanone D, **2**) and 5,4'-dihydroxy-7,2'-dimethoxy-6-methylisoflavanone (named uncinanone E, **3**). In addition a rare pterocarpan, 3,9-dihydroxy-1-methoxy-2-(3-methylbut-2-enyl)pterocarpan (edudiol), a flavone-*C*-glycoside, vitexin and three abietane diterpenes, 7-oxo-15-hydroxydehydroabietic acid, 7α-hydroxycallitrisic acid and 7,15-dihydroxy-8,11,13-abietatrien-18-oic acid were identified. The isolated compounds were characterized by use of a combination of spectroscopic techniques (UV, IR, MS, 1D- and 2D-NMR) and by chemical derivatization. None of the isolated compounds showed potent *Striga* germination stimulation or post-germination radicle growth inhibition activities.



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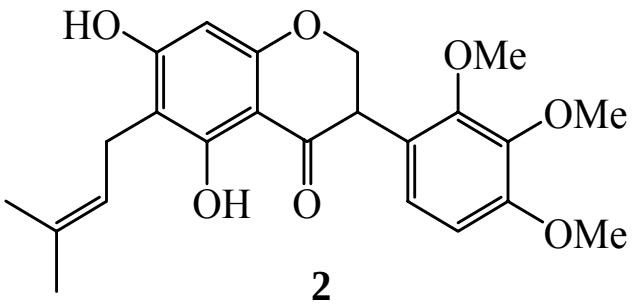

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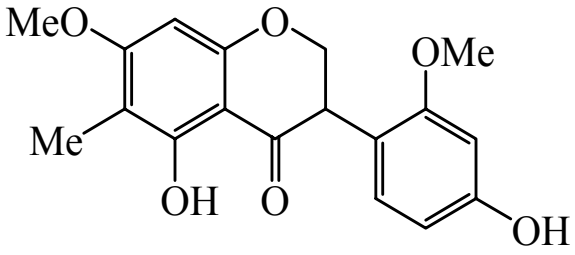

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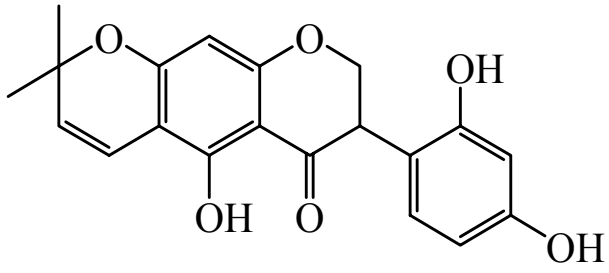

4

[YS 3] BIOASSAY-GUIDED ISOLATION OF ANTIMALARIAL PROTOBERBERINES AND APORPHINE ALKALOIDS FROM *ANNICKIA KUMMERIAE*

Hamisi M. Malebo[1,2], Wenzler Tanja[1], Monical Cal[1], Sauda M. Swaleh[2], Ahmed Hassanali[3], Isaiah O. Ndiege[2], Urs Séquin[4], Daniel Häussinger[4], Matthias Hamburger[5] and Reto Brun[1]

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[2]*Department of Chemistry, Kenyatta University, P.O. Box 43844, Nairobi, Kenya.*
[3] *International Centre for Insect Physiology and Ecology, P.O. Box 30772, Nairobi, Kenya.*
[4]*Institute of Organic Chemistry, University of Basel, St Johanns Ring 19 , Basel, Switzerland.*
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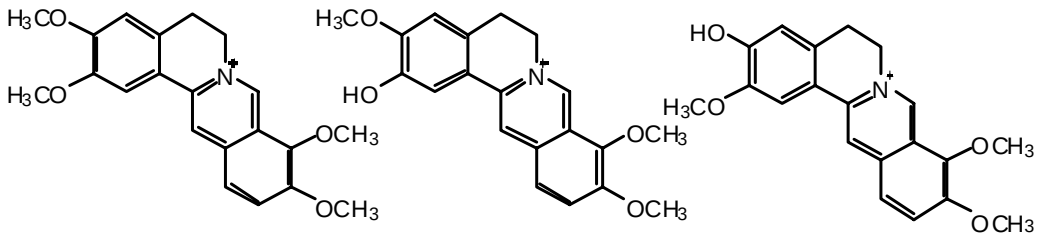
Malaria has remained a serious endemic disease in sub-Saharan Africa, Asia, Latin America and Oceania, with almost 40% of the world's population living in areas whereby the disease is endemic. Malaria causes mortality of about 2.7 million people each year. Because of the worsening problems of drug resistance, there has been an urgent need for the discovery of a new chemical class of antimalarial agents. In our on-going research program on antimalarial natural products we have screened a number of Tanzanian medicinal plants for their antimalarial activities. Among these, an extract from the leaves methanolic extract of *Annickia kummeriae* possessed significantly high antimalarial activity against *Plasmodium falciparum* (K1, a multidrug-resistant strain), with a 50% inhibitory concentration (IC_{50}) of 0.15 µg/ml and low cytotoxicity activity against rat myoblast L-6 cells with IC_{50} value of 15.6 µg/ml (selectivity index (SI) values of 104). Therefore, bioassay-guided chromatographic fractionation was carried out to identify fractions with even higher activity with favourable SI. Bioassay-guided isolation attempts from bioactive fractions possessing significantly higher antimalarial activity led to the isolation of six alkaloids antimalarial which were identified using spectroscopic methods to be; palmatine (**1**) (IC_{50} = 0.075 µg/ml), jatrorrhizine (**2**) (IC_{50} = 0.24 µg/ml), columbamine (**3**) (IC_{50} = 0.16 µg/ml), (-)-tetrahydropalmatine (**4**), lysicamine (**5**) (IC_{50} = 3.01 µg/ml), and trivalvone (**6**) (IC_{50} = 1.83 µg/ml). In this paper, detailed bioassay-directed chromatographic isolation of antimalarial compounds and spectroscopic elucidation of chemical structures will be presented and discussed.



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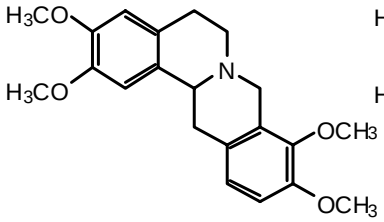

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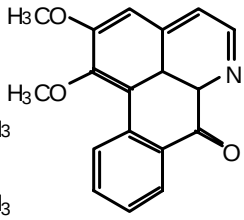

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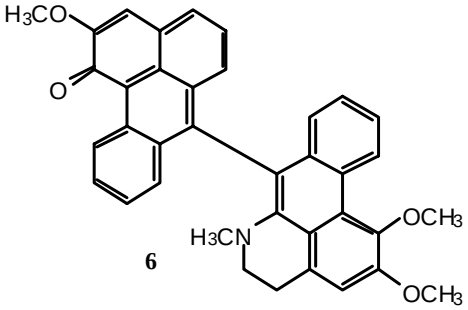

6

[YS–4] PHYTOCHEMICAL AND BIOACTIVITY EVALUATION OF *COMMICARPUS PLUMBAGINEUS* STANDL. (NYCTAGINACEAE) USE IN REPRODUCTIVE HEALTH CARE IN UGANDA.

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[2]*South African Herbal Science and Medicine Institute, University of the Western Cape, Private bag X17, Bellville 7535, South Africa.*

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Medicinal plants are the oldest known health care products that have been used for generations and are important for pharmacological research and drug development (www.topics.developmentgateway.org/population accessed 24th/10/2005; Tadeg *et al.*, 2005; Leyon *et al*., 2005). Plant products are frequently considered to be less toxic and freer from side effects than synthetic ones (Pari and Satheesh, 2004). *Commicarpus plumbagineus* is important medicinally and used to treat a variety of diseases. However, no scientific validation on the claimed cure of diseases by *C. plumbagineus* had been carried out, and as such the chemical profile and bioactivity had remained unknown. The research reported herewith was carried out in order to improve reproductive health care delivery or motherhood programs, management of feminine diseases and upgrade herbal medicine through scientific validation and evidence-based research on bioactivity. Thus, the leaf and stem of *C. plumbagineus* were collected, dried and extracted with diethyl ether, ethanol and water. The tests carried out on the extracts included; uterine motility, phytochemical analysis and antimicrobiology. Uterine motility results showed that the leaf aqueous extract caused uterine relaxation at 10% through to 100% and the stem caused uterine relaxation at 80% through to 100%. However the stem caused contraction at 10% through to 40%. Phytochemical results showed the presence of saponins, glycosides, sugars, oleanolic acid, terpenoids, steroids, phytosterols, carboxylic acid and nitrogen containing compounds. Antimicrobial tests showed that the plant was inactive at 50% on both *Candida albicans* and *Staphylococcus aureus*.

[YS–5] CLEITENOLIDE AND CLEITODIENOL: NOVEL BIOACTIVE AND OTHER CONSTITUENTS OF *CLEISTOCHLAMYS KIRKII*

Stephen Samwel,[a] Stephen J.M. Mdachi, [a] Mayunga H.H. Nkunya, [a]
Beatrice N. Irungu,[a] Mainen J. Moshi[b], Brian Moulton [c] and Brian S. Luisi [c]

[a]Department of Chemistry, University of Dar es Salaam, P.O. Box 35061, Dar es Salaam, Tanzania; [b]Institute of Traditional Medicine, Muhimbili University College of Health Sciences, P.O. Box 65001, Dar es Salaam, Tanzania; [c]Department of Chemistry, Brown University, Box H, 324 Brook Street, Providence, RI 02912, USA

(-)-5- Acetoxy-6-(1-benzoyloxy-2-acetoxyetheyl)-pyr-3-en-2-one (Cleistenolide) and (-)-2,6-diacetoxy-5-hydroxy-cyclohex-3-enylidenemethyl benzoate (cleistodienol) were isolated as novel antimicrobial and cytotoxic constituents of *Cleistochlamys kirkii* (Annonaceae), together with (*Z*)-(+)-5-(2,3-dihydroxy-propylidene)-5*H*-furan-2-one and its acetyl and benzoyl derivatives, (-)-1,6-desoxy-β-senepoxide, pinocembrin and polycarpol. Structural determination was achieved based on spectroscopic and other physical data. The structure of cleistenolide was confirmed by single crystal X-ray crystallographic analysis.

Keywords: *Cleistochlamys kirkii*; Annonaceae; Cleistenolide; Cleistodienol; Antimicrobial; Cytotoxicity

[YS-6] ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES OF THE AQUEOUS EXTRACTS OF *MAYTENUS SENEGALENSIS, STEREOSPERMUM KUNTHIANUM* AND *TRICHILIA EMETICA* USED IN THE TREATMENT OF DYSMENORRHOEA IN MALI.

R. Sanogo [a,b], D. Diallo[a,b] A. Maiga [a,b], N. De Tommasi[c], R. De Pasquale[d]

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[a]*Faculty of Medicine, Pharmacy, Odontostomatology, University of Bamako, Mali;*
[c]*Dipartimento di Scienze Farmaceutiche, Università di Salerno, Via Ponte Don Melillo, 84084 Fisciano (SA), Italy;*
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The use of traditional herbal remedies is commonly encountered in rural and urban areas in Mali. Traditional medicine is one of the surest means to achieve total health care coverage for the Africa's population. In Mali, more than 80 percent of the population depends upon traditional medicine and medicinal plants for primary health care. Our project is a contribution to the pharmacological and toxicological studies of three medicinal plants used in the treatment of dysmenorrhoea in Mali. The principal goal of the project is to propose improved traditional prescription developed with extracts of the three plants for the health care of the Malian population, especially women. Earlier, we presented the ethnobotanical information on the three plants: *Maytenus senegalensis* Lam. (Celastraceae), *Stereospermum kunthianum* Cham. (Bignoniaceae) and *Trichilia emetica* Vahl. (Meliaceae) [1]. Preliminary phytochemical analysis of the aqueous extracts revealed the presence of coumarins, tannins, polysaccharides, leucoanthocyans, saponins glycosides etc. Recently, we studied the analgesic and anti-inflammatory activities of aqueous extracts of leaves, bark and roots of these plants. Investigations were carried out on acetic acid-induced writhing (pain) and hind paw oedema in mice. Results showed the decoctions 10% to possess significant anti-nociceptive and anti-inflammatory activities at the dose of 25ml/kg administrated orally in mice compared to control group ($P<0.05$, test *t*-Student). The best analgesic activity was found with the leaves of *M. senegalensis*, *S. kunthianum* and *T. emetica*, respectively 72.06, 84.63 and 75.05% of protection against pain. These data corroborate the traditional use of these plants in treatment of dysmenorrhoea.

Acknowledgements. This project is supported by grants International Foundation for Science (IFS) N° F/3771-1 (Dr. Rokia Sanogo)

Reference:

[1] Sanogo R. and Diallo D. (2005) Study of three plants traditionally used in Mali in the treatment of dysmenorrhoea (I): Ethnobotanical information on *Maytenus senegalensis*, *Stereospermum kunthianum* and *Trichilia emetica* (Poster N°437, GA conference, Florence, August 2005)

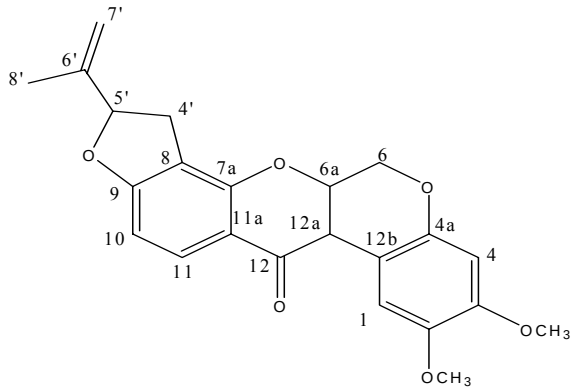
Key Words: 1. Dysmenorrhoea; 2 *Maytenus senegalensis;* 3. *Stereospermum kunthianum; 4. Trichilia emetica; 5. A*nalgesic and anti-inflammatory activities.

[YS-7] EXTRACTIVES OF M*ILLETTIA FERRUGINEA, TEPHROSIA VOGELLII* AND *TEPHROSIA PENTAPHYLLA* AGAINST THE BEAN WEEVIL *ZABROTES SUBFACIATUS* (BOHEMAN*)*

[a]Bekele Jembere, [b]Jane Namukobe, [b]Benard T. Kiremire and [c]Ermias Dagne

[a]Department of Biology, Addis Ababa University, P.O Box 1176, Addis Ababa, Ethiopia.
[b]Department of Chemistry, Makerere University, P.O Box 7062, Kampala, Uganda.
Email: jnamukobe@chemistry.mak.ac.ug
[c]Department of Chemistry, Addis Ababa University, P.O Box 1176, Addis Ababa, Ethiopia.

The powder and different extracts from seeds and aerial parts of *Millettia ferruginea*, *Tephrosia vogellii and Tephrosia pentaphylla* were tested for insecticidal activity against the bean weevil, *Zabrotes subfaciatus*. The seed powder from *M. ferruginea* and *T. Vogellii* caused 100% mortality. Among the different extracts, the acetone extract were the most active causing 100% mortality for *M. ferruginea* and *T. vogellii,* and 63% for *T. pentaphylla*. Using both chromatographic and spectroscopic methods, the active compound against this pest was confirmed to be rotenone.



Structure of Rotenone

Key words/phrases: Insecticidal activity, *Millettia ferruginea, Tephrosia vogellii, Tephrosia pentaphylla, bean* weevil, *Zabrotes subfaciatus,* rotenone

[YS – 8] TOXICITY OF CRUDE EXTRACTS, FRACTIONS AND BLENDS FROM TWO TANZANIAN PLANTS TO *ANOPHELES GAMBIAE* S.S LARVAE

Ester Innocent,[a,c] Nicholus K. Gikonyo,[a,d] Cosam C. Joseph,[b] Mayunga H.H. Nkunya [b], and Ahmed Hassanali[a]

[a] *The International Centre of Insect Physiology and Ecology, P.O. Box 30772-00100, Nairobi, Kenya*.
[b] *Department of Chemistry, University of Dar es Salaam, P.O. Box 35061, Dar-es-Salaam, Tanzania.*
[c] *Institute of Traditional Medicine, Muhimbili University College of Health Sciences, P.O. Box 65001, Dar es Salaam, Tanzania.*
[d] *Department of Pharmacology & Complimentary/Alternative Medicine, Kenyatta University, P.O. Box 43844-00100, Nairobi, Kenya*

Extracts from different parts of two Tanzanian plant species *viz. Steganotenia araliacea* Hochst. (Apiaceae) and *Lantana viburnoides* subsp. *viburnoides* var. *kisi* (A. Rich.) Verdc. (Verbenaceae)] were analysed for their larvicidal effects against *Anopheles gambiae* s.s. The crude extracts that had highest larvicidal activity were the dichloromethane extract of the root bark of *S. araliacea* (LC_{50} of 89.63, 18.08 and 7.68 ppm in 24, 48 and 72 h, respectively) and the dichloromethane extract of the root bark of *L. viburnoides* (LC_{50} of 126.63, 14.07 and 8.49 ppm in 24, 48 and 72 h, respectively) ($p<0.05$). Bioassay guided fractionation of these two crude extracts, resulted in some fractions that had similar or high activities (by Dunnett's test) that were confirmed by subtraction bioassays. High larvicidal potency of the two plant species suggests that they can be developed and be utilized in monitoring *An. gambiae s.s* population in their semi-purified forms.

[Y S - 9] BIOACTIVE TERPENOIDS AND OTHER CONSTITUENTS OF TWO *HUGONIA* SPECIES

Lilechi D. Baraza[a†], Mayunga H.H. Nkunya[†], Cosam C. Joseph[†], Joan J.E. Munissi [†], Ludger Wessjohann[‡], Nobert Arnold[‡] and Porzel Andrea[‡]

[a]*Department of Chemistry, Catholic University of Eastern Africa, P.O. Box 62157, 00200, Nairobi, Kenya*

[†]*Department of Chemistry, University of Dar es Salaam, P.O. Box 35061, Dar es Salaam, Tanzania*

[‡]*Department of Bioorganic Chemistry, Leibniz-Institute of Plant Biochemistry,Weinberg, 3D-06120 Halle (Saale), Germany*

The rosane diterpenoids hugorosenones 18-hydroxyhugorosenone, 3-deoxy-18-hydroxyhugorosenone and the podocarpanoid 12-hydroxy-13-methylpodocarpa-9,11,13-trien-3-one were isolated as fungitoxic constituents of *Hugonia castaneifolia* root bark extracts (against the fungus *Cladosporium cucumericum* Ell. Et Arth.), in addition to the previously isolated weakly active di-podocarpanoids hugonone A and hugonone B, and non-fungitoxic 2β,3β-dihydroxy-1(10),15-rosadien-2-one, sesquiterpenoids 4α-methoxy-10-himachalen-5β-ol, 2-hydroxyhenpentacont-2-enal, tetracosyl-(*E*)-ferrulate and caryophyllene oxide. On the other hand, a new cytotoxic himachalene sesquiterpenoid 4α-methoxy-5,9-oxahimachal-9-ene (hugonianene A) which also exhibited moderate activity against *Anopheles gambiae* mosquito larvae after 24 h at a concentration of 0.237 mg/ml and at 48 and 72 h contact time was isolated as the major constituent of the cytotoxic root bark extract of *Hugonia busseana*, together with the rosane diterpenoids 18-hydroxyrosane and hugorosediol, an inseparable mixture of 12-methoxy-13-methylpodocarpa-8,11,13-trien-3,7-dione and 12-methoxy-13-methylpodocarpa-1,8,11,13-tetraen-3,7-dione, and the di-podocarpanoid hugonone B that was previously obtained from *H. castaneifolia*. This presentation will describe the isolation, structural determination and biological activity of compounds from the two *Hugonia* species, and comparison of the Chemistry of these plants with other *Hugonia* species.

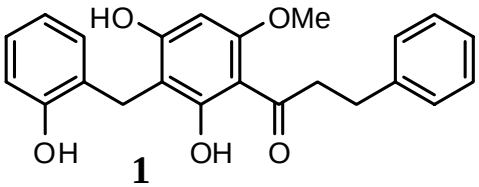
[YS-10]ANTIMICROBIAL ACTIVITIES OF UVARETIN AND ITS DERIVATIVES

Ivan Gumula[M]; Cosam C. Joseph[N], and Mayunga H. H. Nkunya [N]

[M] *Department of Chemistry, Kyambogo University, P. O. Box 1 Kyambogo, Kampala, Uganda; ivangdaniel@yahoo.com*

[N] *Department of Chemistry, University of Dar es salaam, P .O. Box 35061, Dar es Salaam, Tanzania*

Chemical investigations of the dichloromethane extract of the stem bark of *Uvaria acuminata* (Annonaceae) from coastal Tanzania yielded uvaretin (**1**) and the pyranoflavonoid isochamuvaritin (**2**) as the major metabolites from this plant species, whose structures were determined based on spectroscopic data. In attempts to prepare C-acetyluvaretin through an $AlCl_3$ mediated trans acetylation reaction, 4',2"-*O*-diacetoxyuvaretin, (**3**) 2"-*O*-acetoxyuvaretin (**4**) and acetyl 6-(2-acetoxy-benzyl)-3-benzyl-5-hydroxy-2-methyl-4-oxo-4*H*-chromen-7-ylate (**5**) were obtained as the only major reaction products. Both 4',2"-*O*-acetoxyuvaretin and 2"-*O*-acetoxyuvaretin exhibited weak antibacterial, antifungal and cytotoxic activities than those displayed by uvaretin, thus indicating the influence of OH groups to the antimicrobial and cytotoxic activities of *C*-benzyl dihydrochalcones.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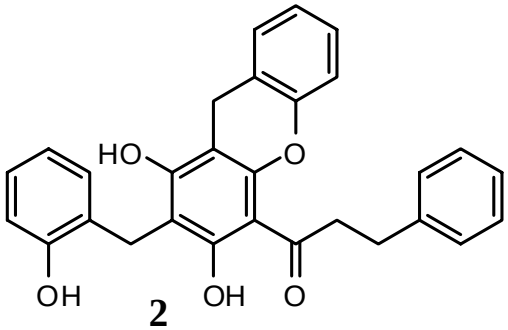
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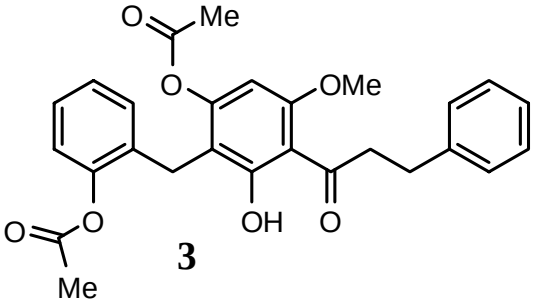
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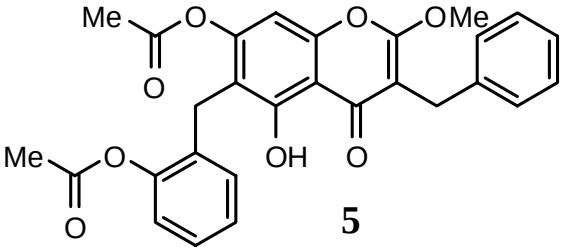
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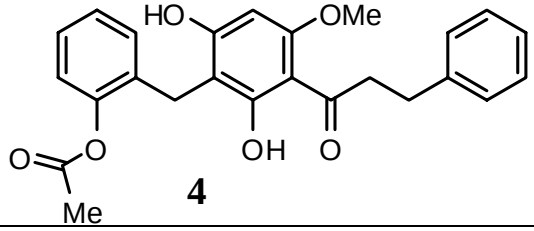
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ABSTRACTS FOR POSTER SESSION (PS)

[PS-1] HOMOISOFLAVANOIDS AND XANTHONES FROM THE BULBS OF *DRIMIOPSIS BURKEI* BAKER

Bipa, J. D[1]., Abegaz, B. M.[2], Hiza, C.[3] and Lebatha, P. D.[4]
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[2]Chemistry Department, University of Botswana, P/bag 00704, Gaborone, Botswana.
[3]P.O. Box 65210, Dar es Salaam, Tanzania.
[4]Botany department, Potchefstroom University, P/bag x 6001, Potchefstroom 2520, South Africa.

Drimiopsis burkei Baker (Hyacinthaceae) is locally known as *Thejane* in Botswana. Decoction made from the mucilaginous exudates of this bulbous plant is traditionally used to treat stomach upsets. Its genus *Drimiopsis* has approximately 15 species confined to Africa south of Sahara excluding the rain forests [1, 2] with atleast 9 species in Southern Africa. Worldwide only one species, *D. maculata* has been chemically studied [3, 4]. Phytochemical investigation of *D. burkei* led to isolation and characterization of two major classes of secondary metabolites: homoisoflavanoids (12) and xanthones (5), others were norlignan (1) and nucleosides (2). Structure elucidation of these compounds was based on spectroscopic analysis.

1. Lebatha, P. D.; Spies, J. J. and Buys, M. H., Miscellaneous note on chromosome studies on African plants, 19 (Hyacinthaceae), new chromosome counts of three *Drimiopsis* taxa, *Bothalia*, **33** (1), 135-137 (2003).
2. Stedje, B., A revision on the genus *Drimiopsis* (Hyacinthaceae) in Africa, *Nordic Journal of Botany*, **14**, 45-50 (1994).
3. Mulholland, D. A.; Koorbanally, C.; Crouch, N. R. and Sandor, P., Xanthones from *Drimiopsis maculata*, *Journal of Natural Products*, **67**, 1726-1728 (2004).
4. Koorbanally, C.; Crouch, N. R. and Mulholland, D. A., Scillascillin-type homoisoflavanone from *Drimiopsis maculata* (Hyacinthaceae), *Biochemical Systematics Ecology*, **29**, 539-541 (2001).

[PS-2] FOUR DITERPENENOIDS FROM THE RESIN OF *BOSWELLIA PAPYRIFERA*

Milkyas Endale[2] and Ermias Dagne[1]

[1] Department Of Chemistry, Faculty of Science, Addis Ababa University
P.O. Box 1176, Addis Ababa, Ethiopia
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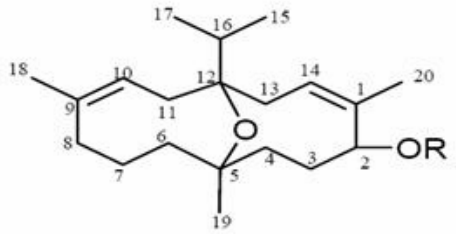
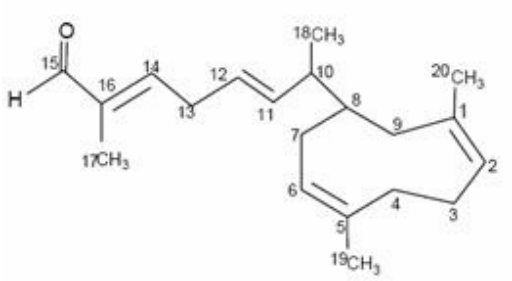
An Investigation on the resin of Boswellia papyrifera (Del.) Hochst. yielded the known cembrenoid diterpene incensole (1) and a new cembrenoid diterpene Incensole acetate (2), a unique marker for Boswellia papyrifera resin, together with two new diterpenoids 1,5-dimethyl-8-(1,6-dimethyl-2,5-heptadiene-7-al)-1,5-cyclononadiene (3) and 1, 5-dimethyl-8-(1,6-dimethyl-3,5-heptadiene-7-al)-1,5-cyclononadiene (4). The structures were determined on the basis of spectroscopic data including two-dimensional NMR spectral data and by chemical transformation



1: R=H, **2**: R=-OAc



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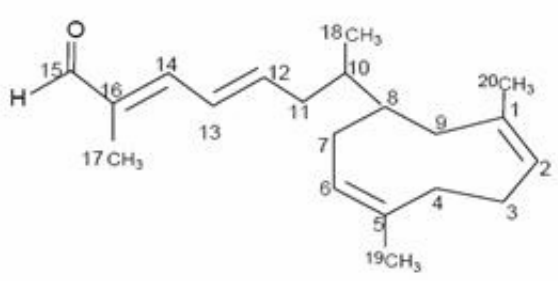

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Key Words: Cembrene, Incensole, *Boswellia papyrifera*

[PS-3] SREENING FOR ANTIMICROBIAL AND LARVICIDAL SECONDARY METABOLITES FROM *GARDENIA VOLKENSII* FRUITS AND *MEYNA TETRAPHYLLA* LEAVES (RUBIACEA)

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Chemistry Department; Egerton University
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The use of traditional medicine from plants is on the increase in developing countries due to the high cost of commercially made drugs. In this research, antimicrobial and larvicidal activities of secondary metabolites from two species of the family Rubiaceae are being investigated.

The *Gardenia volkensii* fruits and *Meyna tetraphylla* leaves were collected from Baringo District in Kenya, dried, ground and extracted using hexane, dichloromethane and methanol solvents consecutively. The crude extracts were fractionated by column chromatography. They were further fractionated and purified using repeated column chromatography and different solvent systems. One pure compound GV2 from *Gardenia volkensi* fruits and three pure compounds, MT2, MT3, and MT5 from *Meyna tetraphylla* leaves were extracted from dichloromethane extracts. A poster of the spectroscopic analysis of the above compounds will be presented.

[PS-4] A NOVEL EPIMER OF POWELLINE FROM *CRINUM MOOREI* (AMARYLLIDACEAE)

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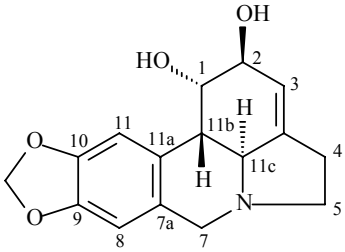
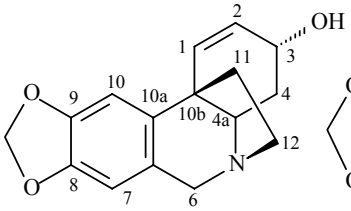
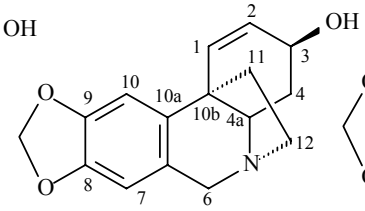
Crinum moorei was one of three *Crinum* species reported to be the most frequently used herbal ingredients in Zulu livestock medicines[1]. Bulb decocotions of the plant was used in the treatment of retained placentas, to remedy weight loss in stock, to enable the production of healthy calves, and to bolster low milk production[1]. Pooley[2] further documented the human use of *C. moorei* in treating urinary tract infections. Together with the known compounds lycorine (**1**), crinine (**2**), vitattine (**3**), crinamidine (**4**), undulatine (**5**) and powelline (**6**), a novel isomer of powelline has been isolated, and accorded the trivial name *epi*-powelline (**7**). The current contribution adds vittatine and *epi*-powelline, both of the haemanthamine type to the twenty six compounds identified previously from *C. moorei*. Vittatine has earlier been found in *Sternbergia lutea*[3] and *C. bulbispermum*[4], both amaryllids. The current joint finding of vittatine and *epi*-powelline in *C. moorei* has interesting biosynthetic significance in that methoxylation of vittatine at C-7 on the aromatic ring would lead to *epi*-powelline.



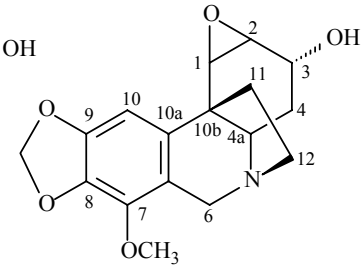
lycorine (1)



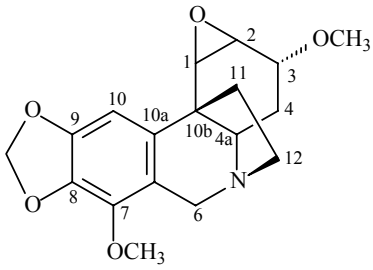
crinine (2)



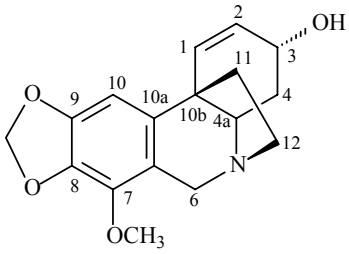
vittatine (3)



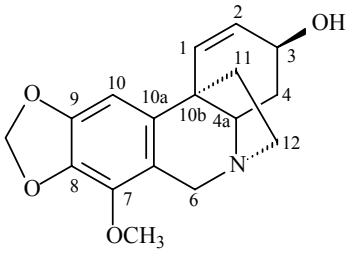
crinamidine (4)



undulatine (5)



powelline (6)



epi-powelline (7)

References:

1. Cunningham AB, Zondi AS (1991) Institute of Natural Resources Investigational Report No. 69. University of Natal, Pietermaritzburg, pp 26
2. Pooley E (1998) A Field Guide to Wild Flowers. KwaZulu-Natal and the Eastern Region. Natal Flora Publications Trust, Durban, pp 630. ISBN 0-620-21500-3
3. Pabuccuoglu et al. (1989) Journal of Natural Products **52**, 785-791
4. El-Moghazi AM and Ali AA (1976) Planta Medica **30**, 369-374

[PS-5] POSSIBLE DETOXICATION OF COBRA VENOM BY EXTRACT FROM ALCHORNEA LAXIFLORA (EUPHORBIACEAE) FROM D.R.CONGO.

Chifundera Z. Kusamba

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Envenomation in rural tropical areas is a serious public health problem. More than 5400 cases of snake bite were annually recorded with a mortality rate of 14% in DR Congo. Due to many disadvantages of use of antivenom sera imported from western countries, indigenous plants constitute one of alternative means for the treatment of snake bites. Accordingly, from ethnobotany surveys conducted between 1988 and 2004, more than 109 antivenomous plants used in the Congolese traditional medicine were recorded. During the biological assays we found that a lethal dose of venom from *Naja melanoleuca* (Elapidae) was detoxicated by extract from *Alchornea laxiflora* (Euphorbiaceae). The experiment was carried out on animal model using wild rat, Lophuromys flavopunctatus (Muridae). A dose of 5mg/Kg of crude methanolic extract has protected the rats against the LD_{50} that was estimated to 0.043mg/Kg. A mixture of alkaloids and tannins are pointed out as antivenomous principles. Laboratory work is in progress to isolate and identify the phytochemical that is responsible for the antivenomous activity.

[PS-6] ANTISICKLING ACTIVITY OF SOME CONGOLESE PLANTS

Tshimankinda P. Mpiana[a], Virima Mudogo[a*], Sha-Tshibey D. Tshibangu[a], Mihigo O. Shetonde[a], Koto-Te-Nyiwa J.P. Ngbolua[b] and Mavinga B. Mbala[a]

[a]*Department of Chemistry, Faculty of Science, Université de Kinshasa, P.O.Box: 190 Kinshasa XI, D.R. Congo*

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Each year, over 300,000 children are born affected by drepanocytosis and half of them die before the age of 5 years[1]. Drepanocytosis, also known as sickle cell anaemia, is a genetic disease due to a mutation in position 6 within the β chain of haemoglobin whereby glutamic acid is replaced by valine[2]. Antisickling activity of two Congolese plants (*Ocimum basilicum, Hymenocardia acida*) was evaluated using Emmel test[3]. The ratio of normalisation (RN) of drepanocytes and the minimal concentration of normalisation (MCN) have been determined. Anthocyanin extracts from each plant exhibited significant activities. *O. basilicum* crude ethanolic extract displayed MCN at 2.5 mg/ml and had RN of 87 % while its anthocyanin extract displayed MCN at 0.2 mg/ml and RN of 96 %. *H. acida* crude aqueous extract displayed MCN at 156.25 mg/ml and had RN of 80 %. Thus, our findings support and justify the claims of Congolese traditional healers. They also suggest a possible correlation between the chemical composition of these plants and their uses in traditional medicine. Studies on the stability of two isolated anthocyanins showed that these compounds are stable below 100°C, but are temperature and time dependent above 100°C [$k = 0.95\ h^{-1}$ for *H. acida* compound- and $k = 1.09\ h^{-1}$ for *O. basilicum* compound, at 100°C]. Studies on photochemical stability of the anthocyanin extracts and structural elucidation of isolated compounds are in progress.

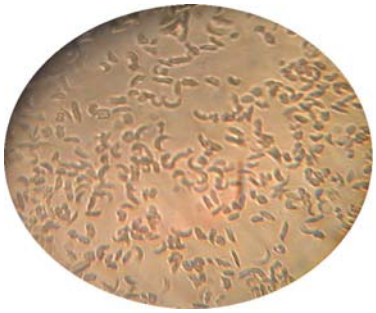

Fig.1. Morphology of drepanocytes of non-traited SS blood (ordinary view 100x).

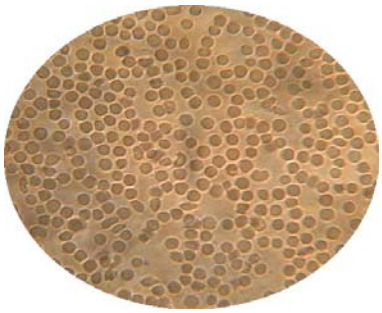

Fig. 2. Morphology of drepanocytes traited with anthocyanins extract *O. basilicum* 0.2 mg/ml (ordinary view 100x)

References

1. Girot, R., Begué, P., Galactéros, F., (**2003**). *La drépanocytose*, Hors collection, Paris, 322

2. Gentilini, M., (**1986**). *Médecine tropicale*, Flammarion, Paris.

3. Mpiana, P.T., Tshibangu, D.S.T., Shetonde, O.M., Ngbolua, K. N., (**2007**). *Phytomed*., **14**, 192-195

[PS-7] THE SEARCH FOR NATURAL PLANT COMPOUNDS THAT ACT AS CHEMOMODULATORS OF THE RV0194, AN ATP BINDING CASSETTE (ABC) TRANSPORTER FROM *MYCOBACTERIUM TUBERCULOSIS*

Sarudzai Muyambo[a], Ros Chapman[b], David B. McIntosh[b], Berhanu Abegaz [c] and **Stanley Mukanganyama** [a]

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Tuberculosis epidemic has dramatically grown in Zimbabwe and in the rest of the world coupled with the HIV pandemic. The presently available drug regimes comprise 4-5 drugs administered in combination of 6-9 months (DOTS regimen). Although these drugs are available, rise in multidrug resistant tuberculosis (MDR) cases is a cause for concern in public health as these cases are complicated to treat than the susceptible strains of *Mycobacterium tuberculosis* particularly in immunocompromised patients. There are several mechanisms of multidrug resistance in TB and one of them involves over expression of the efflux pumps, which facilitate efflux of the drugs from the tubercular cell. The inhibition of such pumps would help restore the susceptibility of *Mycobacterium tuberculosis* to the DOTS drugs. A strain of *Corynebacterium glutamicum* was transfected with pEX-k99 plasmid that possessed an insert that codes for the Rv0194 ABC efflux pump from *Mycobacterium tuberculosis*. This strain was used as a model for *Mycobacterium tuberculosis*. Natural plant compounds coded Ma8, CA2GC, IXLE1B and IXLE2FA isolated from *Mammea africana*, *Chrysophyllum albidum* and *Ixora coccinea* respectively were tested for their efficacy as anti-TB drugs as well as inhibitors of the Rv0194 pump from *Mycobacterium tuberculosis*. The minimum inhibitory concentrations (MIC) of the plant compounds in transfected *C. glutamicum* and plain *C. glutamicum* (no insert) were determined using a microdilution method and the MICs were compared with MICs of standard anti-TB drugs. Ciprofloxacin, streptomycin, erythromycin, ethambutol and isoniazid were the five standard drugs for TB treatment whose MICs were determined in this study. Isoniazid found to be the least potent against all the strains used in the study (MIC > 128 mg/L). The four natural compounds studied were found to be potent anti-TB drugs with Ma8 extracted from *Mammea africana* being the most potent with MIC 4 mg/L and 8 mg/L for the induced recombinant *C. glutamicum strain* and the strain not induced respectively. The MICs for CA2GC, IXLE1B and IXLE2FA were 8 mg/L, 32 mg/L and 32 mg/L against the induced recombinant strain respectively. A fluorimetric method will be used to determine if the plant compounds are potential inhibitors of the Rv0194 ABC pump by determining the efflux of ciprofloxacin (a flouroquinolone) after treatment of the bacterial cells with the plant compounds.

[PS-8] IN VITRO ANTIMICROBIAL ACTIVITY AND PHARMACEUTICAL POTENTIAL OF METABOLITES OF A MARINE ASCOMYCETEOUS FUNGUS ISOLATED FROM THE COAST OF DAR ES SALAAM.

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The objective this project was to evaluate in vitro antimicrobial activity of fungi collected off the coast of Dar Es Salaam. A total of 100 marine isolates of ubiquitous fungi, belonging to the phyla Ascomycota and Deuteromycota, were collected and cultivated on malt extract broth and aquatic yeast broth. The fungi were isolated from the marine sediments and waters off the coast of Dar es Salaam in the ecologically rich areas of the mangrove ecosystem. This paper reports on the preliminary investigations of one of these fungi, an ascomycetes. Extracts were obtained by liquid-liquid extraction using ethyl acetate as the solvent. A total of fifty extracts were screened for antibacterial potency, five of them showed production bioactive metabolites. Preliminary finding of the fungus reported in this paper showed it to be very active against *Staphylococcus aureus* and *Escherichia coli.*

[PS-9] ANTIBACTERIAL, AND ANTIFUNGAL ACTIVITIES OF *ACACIA MELLIFERA*

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Acacia mellifera (Leguminosae) is a subtropical medicinal plant that is widely used in traditional African medicines against various diseases. Four extracts of its stem bark were examined for antibacterial and antifungal activity using the agar disk-diffusion method against six bacterial strains: [*Streptococcus pneumonie* (ATCC 25923), *Crytococcus neoformans*, *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 35218), *Escherichia coli* (ATCC 25922) and *Staphylococcus aureus* (ATCC

25923)] and four fungal strains [*Candida albicans, Candida krusei, Microspurum gypseum* and *Trichophyton mentagrophytes*]. Some of these extracts were found to be active against some bacterial and fungal strains and were further fractionated to give twelve pure compounds. The methanolic and methanol in 50% dichloromethane extracts exhibited a superior level of antibacterial and antifungal activity. It was active against *Staphylococcus aureus*, *Microspurum gypseum*, and *Trichophyton mentagrophytes*. Activity guided fractionation lead to isolation of two active compounds: 3-(Z)-*cis* coumaroylbetulin and 30-hydroxylup-20 (29) en-3β-ol against Staphylococcus *aureus*, *Microspurum gypseum*, *Trichophyton mentagrophytes* and *Pseudomonas aeruginosa*. These results may partly explain and support the use of *A. mellifera* stem barks for the treatment infectious diseases in traditional Kenya medicine.

[PS-10] COMPARATIVE PHARMACOGNOSY OF NIGERIAN *STACHYTARPHETA CAYENNENSIS* AND *STACHYTARPHETA INDICA* LEAVES

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The genus *Stachytarpheta* (Verbenaceae) has been used ethnomedically worldwide for various health purposes e.g. antidiabetic, abortifacient, etc. *S. cayennensis* and *S. indica* are identical species, growing in the tropics and used interchangeably in many countries' herbal medicine systems. Studies on the macro- and micro-morphology of *Stachytarpheta cayennensis* (L.C.Rich) Vahl and *Stachytarpheta indica* Vahl, growing in Nigeria were carried out on the leaves for their comparative identification, differentiation and authentification. Some distinct diagnostic differences in their physical characteristics were also observed. *S. indica* is a herb, while *S. cayennensis* is an erect shrub. Both have opposite leaves, woody towards base. Micro-morphologically, Stomata Index is higher in *S. cayennensis* than in *S. indica and* stomatal shape on abaxial surface is elliptic in *S. indica,* but circular in *S. cayennensis.* The glandular trichomes are sparsely distributed, but with higher occurrence in *S. cayennensis* than in *S. indica.* The unicellular prickle-like eglandular trichomes are present in *S. indica*, but absent in *S. cayennensis*, a striking distinctive character for differentiating the two species. The average acid-insoluble and water-soluble ash values of *S. indica* are lower than those of *S. cayennensis,* indicating that the amounts of silica (sand and siliceous earths) and mucilage content present is lower in *S. indica* and *S. cayennensis* respectively. Both species have the regular unicellular, eight bicellular and multicellular eglandular trichomes. Comparative phytochemical screening of the methanol extracts showed the presence of phenolic compounds, flavonoids and saponins, but free and combined anthraquinones absent in both species.

[PS-11] CHEMICAL INVESTIGATION OF SURFACE COMPOUNDS FROM *DODONAEA ANGUSTIFOLIA*.

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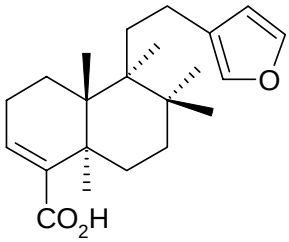
Department of Chemistry, University of Nairobi,
P. O. Box 30197, Nairobi.

The leaves of *Dodonaea angustifolia* are used for relief of pain and fever as well as for treatment of microbial infections. The leaves of this plant are extensively covered by an exudates (upto 10% W/W of dry material), especially when young. Phytochemistry investigation of the leaf exudates resulted in the isolation of three diterpenes (e.g. **1**) and seven flavonoids (e.g. **2**). In this presentation the isolation and characterization of these compounds will be discussed.



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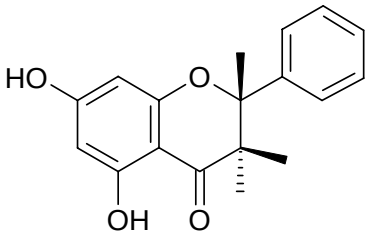

2

[PS-12] ANTIPLASMODIAL FLAVONOIDS FROM THE STEM BARK OF *ERYTHRINA ABYSSINICA*

Martha Induli [a], Abiy Yenesew[a], Solomon Derese[a], Jacob O. Midiwo[a], Matthias Heydenreich[b], Martin G. Peter[b], Hosea Akala[c], Julia Wanguie[c], Pamela Liyala[c], Norman C. Waters[c]

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[b]Institut für Chemie, Universität Potsdam, P.O. Box 60 15 53, D-14415 Potsdam, Germany
[b]United States Army Medical Research Unit-Kenya, MRU 64109,APO, AE 09831-4109
martha_induli@kirdi.go.ke

The stem bark of *Erythrina abyssinica* (Fabaceae) was extracted with ethyl acetate and tested for anti-plasmodial activity against the chloroquine-sensitive (D6) and the chloroquine-resisitant (W2) strains of *Plasmodium falciparum.* The extract showed significant activity with IC_{50} values of 7.9 ± 1.1 and 5.3 ± 0.7 μg/ml, respectively.

The extract was subjected to chromatographic separation, which led to the isolation of fourteen compounds. The structures of these compounds were determined using NMR (^{1}H, ^{13}C, HMBC, HMQC, NOESY and COSY), MS, and UV spectroscopy. Among these were a new chalcone, 3,4,2',4'-tetrahydroxy-5-prenylchalcone (trivial name 5-prenylbutein) (**1**) and a new flavanone, 7,4'-dihydroxy-3'-methoxy-5'-prenylflavanone (trivial name 5-deoxyabyssinin II) (**4**). The remaining compounds were six known flavanones (abyssinin III (**5**), abyssinones IV (**6**) and V (**7**) and sigmoidins A (**8**), B (**9**), C (**10**), and E (**11**)), two chalcones (homobutein (**2**) and licoagrochalcone A (**3**)), a pterocarpene (3-hdroxy-9-methoxy-10-prenylpterocarpene (**12**)), an isoflavene (7,4'-dihydroxy-2', 5'-dimethoxyisoflav-3-ene (**13**)) and a long chain cinnamyl ester derivative (hexacosyl ferrulate (**14**)).

Among the known compounds, this is the first report on the occurrence of homobutein (**2**) from the genus *Erythrina*, while sigmoidin E (**11**) is reported here for the first time from *E. abyssinica*. Licoagrochalcone A (**3**), 3-hydroxy-9-methoxy-10-prenylpterocarpene (**12**), 7,4'-dihydroxy-2', 5'-dimethoxyisoflav-3-ene (**13**) and hexaosyl ferrulate (**14**) have also been identified for the first time from the stem bark of this plant.

The compounds isolated in this study were tested for *in vitro* anti-plasmodial activities against the chloroquine-sensitive (D6) and the chloroquine-resistant (W2) strains of *P. falciparum*. Activities were observed in the different classes of flavonoids, with the flavanones exhibiting the highest activities against both strains of *P. falciparum*.

In addition, the radical scavenging activities of the crude ethyl acetate extract and the major compound in this extract, abyssinin III (**5**), together with quercetin (standard) were assessed against DPPH, using the UV absorbance spectrophotometer. The crude extract and the major compound showed activity with EC_{50} values of 19.22 and 8.08 μg/ml, respectively.

[PS-13] BIOACTIVITY OF CAPPARIDACEAE PLANTS

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This research was undertaken to make bioguided fractionation and nutritional assessment of selected Capparidiaceae plant species grown in Eritrea. The Capparidaceae family offers plant species with very wide traditional uses in medicine and nutrition. Herbal preparations from Capparidaceae plants are highly utilized by traditional healers for the treatment of various disease conditions (cancer, malaria, jaundice, arthritis, wound healing, dermatological diseases and gastrointestinal problems).

Six Capparidaceae plants used in the traditional medical practices of the society were tested *in vitro* against selected bacterial (*E.coli* and *B.subtilis*) and fungal (*C.albicans* and *A.niger*) strains. *Boscia angustifolia, Boscia salicifolia, Cadaba farinosa* and *Cleome gynandra* afforded methanol extracts with significant activities against bacteria and fungi . The methanol extracts of *Maerua oblongifolia* and *Capparis tomentosa* were found to have weak *in vitro* anti-bacterial and anti-fungal activities. Plant extracts (*Boscia angustifolia, Boscia salicifolia* and *Cleome gynandra*) with strong inhibitory effects on the growth of bacteria and fungi were subjected to TLC screening and chromatographic fractionation. Anti-bacterial and anti-fungal tests were made on the fractions and those fractions, which resulted in strong inhibitory effects on the *in vitro* growth of bacteria and fungi, were studied by GC/MS to characterize the compounds responsible for the bioactivity. In this research the fraction of *Cleome gynandra* which was found to have a strong anti-bacterial and anti-fungal effect was studied by GC/MS spectrometry and it afforded a terpenoid

compound, designated as Cleogynolic acid, which is close in structure to Cleogynol, a compound isolated from an Indian Cleome species. A nutritional assessment was undertaken in this research to give an insight on the potential use of these plants as a source of food. It was found that the Capparidaceae plants have significantly higher crude protein, fat and carbohydrate content than other brows plants. This preliminary nutritional assessment may justify the use of some of these plants as vegetables and emergency food sources. The Capparidaceae plants were also found to have considerable amount of zinc. *Boscia angustifolia, Boscia salicifolia, Cadaba farinosa, Capparis tomentosa, Cleome gynandra* and *Maerua oblongifolia* have zinc concentrations of 19.55 µg/g, 9.80 µg/g, 17.40 µg/g, 16.70 µg/g, 18.40 µg/g and 21.75 µg/g respectively. Low plasma zinc level is correlated with the pathogenesis of many disease conditions. The relatively high zinc level of the Capparidaceae plants may explain some of the traditional medical use of these plants.

[PS-14] UNIQUE ROTENOIDS FROM THE SEEDS OF *DERRIS TRIFOLIATA*

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Dried and ground seeds of *Derris trifoliata* were extracted with methanol by cold percolation for 24 hrs at room temperature. The methanol extract showed good larvicidal activity against the 2nd instar larvae of *Aedes aegypti* with LC_{50} value of 2.68 ± 1.1 µg/ml. Chromatographic separation of this extract led to the isolation and characterization of five compounds, namely: 13-spiro-13-homo-13-oxaelliptone, 7a-*O*-methyl-12a-hydroxydeguelol, 6,7-dimethoxy-4-chromanone, 6a,12a-dehydrodeguelin, rotenone and tephrosin. 13-Spiro-13-homo-13-oxaelliptone and 7a-*O*-methyl-12a-hydroxydeguelol are new compounds representing unique isoflavonoid skeleta. 6,7-Dimethoxy-4-chromanone is a rare natural product being reported here only for the second time in nature. 6,7-Dimethoxy-4-chromanone was tested against 2nd instar mosquito larvae of *A. aegypti* with LC_{50} value of 13.37 ± 2.2 µg/ml while rotenone the main compound which crystallized from the crude showed the highest activity of 0.68 ± 1.1 µg/ml.

[PS-15] A NEW FLAVONOID WITH ANTIPLASMODIAL ACTIVITY FROM THE ROOT BARK OF *ERYTHRINA ABYSSINICA*

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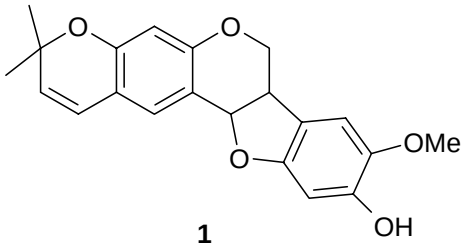
From the acetone extract of the root bark of *Erythrina abyssinica,* a new pterocarpan (**1**) was isolated. In addition, several known flavonoids including erycristagallin and shinterocarpan A were identified. The structures were determined on the basis of spectroscopic evidence. The crude acetone extract and the isolated compounds obtained from this plant showed antiplasmodial activities.



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[PS – 16] SEARCH FOR ANTIFUNGAL COMPOUNDS FROM SUBMERGED CULTURES OF BASIDIOMYCETES AGAINST PYTOPATHOGEN FUSRIUM OXYSPORIUM F. SP. LYCOPERSICI

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The control of soil borne pathogens is a major challenge facing agricultural production especially in horticulture. The genus *Fusarium* is one of the most injurious and causes diseases that are found in a number of plants: cereals, grasses, legumes and horticultural crops. *Fusarium oxysporium* f. sp. *Lycopersici* being a soil borne is the most prevalent and damaging disease of the tomato worldwide. Soil fumigants have proven to be effective in controlling these pathogens but there is growing concern about their environmental and health effects as well as the costs. Therefore, alternative fungicides especially use of naturally occurring compounds offers a great potential for the control of crop pathogens. Higher fungi especially basidiomycetes are producers of bioactive compounds that can be applied in crop protection. It is this regard that this research screens for antifungal compounds from fungal strains which were collected from different ecological niches in indigenous forest in Kenya. Crude extracts of 400 strains of basidiomycetes were screened against the crop pathogen *F. oxysporium*. One basidiomycete was selected and its crude extracts gave strong positive antifungal activity. It is expected that novel antifungal compound(s) that can qualify as control agents of *F. oxysporium* with minimum impact on environment will be obtained. Poster presentation of the results will be displayed.

[PS-17] CHARACTERIZATION AND ANALYSIS OF SOME NATURAL DYES FROM SELECTED PLANTS IN UGANDA

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The present study focussed on identification of some natural dyes from selected plant species in Uganda as possible substitutes for synthetic dyes. It was possible through qualitative chemical analysis to identify the phytochemical compounds that characterize the natural dyes from the selected plant species. The chemical analysis tests were done according to establishsd procedures.

Dyes were extracted from the roots, barks, leaves, and seeds of selected plant species and the dyeing behaviours of the colour components on cotton fabric samples were evaluated. The dyeing was carried out with and without the use of mordants and the fastness properties were determined. Colour measurement of the fabric shades was carried out using the Gretag MacBeth 2180 Colour- Eye reflectance spctrophotometer found at Sadolin Paints(U) ltd.

The colour measurements were recorded in CIE tristimulus values and converted to CIELAB coordinates. The colour coordinates of the dyed samples were found to lie mainly in the yellow-red quadrant of the colour space diagram.

Key words: Colour coordinates, Dye plant species, Chracterization, Qualitative chemical analysis.

[PS-18] ANTI-PLASMODIAL EFFECTS OF SURFACE ACCUMULATED FLAVONOIDS OF *GARDENIA TERNIFOLIA* AERIAL PARTS

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The aerial parts of *Gardenia ternifolia* are coated with shiny resinous material rich in flavonoid aglycones. Various parts (leaves, root, and stem bark) of this plant have been reported by traditional healers as a remedy against malaria fever. The crude acetone wash of the aerial parts showed good anti-plasmodial activity of IC_{50} values 1.06µg/ml and 0.94µg/ml against chloroquine-resistant (W2) and chloroquine-sensitive (D6) strains of *Plasmodium falciparum*, respectively. Bioassay guided chromatographic separation of the crude extracts afforded four flavonoids and two steroids {quercetin-4',7-di-O-methylether(**1**), naringenin-7-O-methylether(**2**), 4',5-Dihydroxy-6,7-dimethoxyflavanone (**3**), kaempferol-7-O-methylether (**4**), stigmasterol (**5**), β-sitosterol (**6**)}. Naringenin-7-O-methylether (**3**) was the most potent anti-plasmodial principle with an activity of 2.75µg/ml against W2 and 4.80µg/ml against D6. The structures were determined on the basis of spectroscopic evidences.

Key words

Gardenia ternifolia, Rubiaceae, aerial surface exudates, naringenin-7-O-methylether, quercetin-4', 7-O-dimethylether, kaempferol-7-O-methylether, anti-plasmodial, IC_{50}.

[PS-19] EXTRACTED AND PURIFIED DRUG STABILITY: THE USE OF CYCLODEXTRINS AS A STABILIZING AGENT

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After extraction and purification of natural and synthetic active ingredients in medicinal chemistry, the idea of stabilisation is necessary for longer shelf-life. The decomposition of active ingredient reduces their efficiency and may also lead to toxicological effect. One of the most important compounds which have ability to stabilise these active ingredients with a possibility of synergistic effect is cyclodextrins. In addition to aforementioned benefits, cyclodextrins also increases the solubility of otherwise insoluble active ingredient in water. These compounds are cyclic compounds which has a hydrophobic cavity. This cavity facilitates the process of partial or full inclusion the active component. The various methods of making an inclusion are: simple physical mixing, kneading, co-grinding and freeze drying methods.

[PS-20]ACARICIDAL ACTIVITY OF *TEPHROSIA VOGELII* EXTRACTS ON NYMPH AND ADULT TICKS

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Botanical pesticides exist within nearly all vector disease endemic communities of the world. Natural/ botanical tick control methods offer several advantages over synthetic tick control including environmental preservation since they have shorter residual periods with rapid action. T*ephrosia vogelii* a shrubby, leguminous, and woody plant is one of the potential candidates to provide affordable botanical acaricides. However, its effectiveness in the control of *Acarina* has not been fully explored in developing countries. *Tephrosia vogelii* plant materials were collected from two selected sites, one on a higher altitude than the other. The air-dry plant material was crushed into powder; and extracted with a known volume of solvent. The mixture was left to stand for seven days with daily stirring for at least two hours. Extracts from shoot, cortex, and roots have an average yield of 0.06g, 0.05g, and 0.015g per one gram of plant raw material respectively. Shoot and cortex plant parts accumulate relatively high amounts of the active ingredients in *Tephrosia* compared to the roots; probably explaining why leaves (shoot) are preferred by the local farmers for effective pest control. Methanol, Petroleum ether, and Chloroform yield 0.0875g, 0.0142g, and 0.0172g per one gram of plant raw material respectively, indicating a significantly valuable yield when methanol is used for extraction than any of the other two solvents or water. All extracts killed 100% of the exposed ticks but variations where noted in the time taken to achieve 100% exposed tick death. Petroleum ether, Chloroform, Methanol and Water extracts killed 100% of the ticks in an average time of 8.3 min, 9.7 min, 10.3 min and 1.3 days respectively; implying that ticks are more susceptible to the active ingredient extracted using petroleum ether relative to the other solvents. *Tephrosia* crude extracts can potentially, therefore, be used to effectively control ticks in the Ugandan animal production systems. Photosynthesis and plant respiration seem to have an effect on the production and storage of the active ingredients in *Tephrosia* with the more effective active ingredients being found in the early morning.

[PS-21] USE OF THE VARIATION PICKING TEST-X-RAY FLUORESCENT SPECTROSCOPIC TOOL TO MAP NUTRACEUTICAL DENSE BIODIVERSITY ON WOMEN SMALLHOLDER FARMS OF IKUMBYA AND MAKUUTU, IGANGA DISTRICT, UGANDA

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A study was carried out to screen and map nutraceutical dense staples of women smallholder farms of Ikumbya and Makuutu sub counties in Iganga district, Uganda. X-ray Fluorescent Spectroscopic (XRF) analysis was used to determine the mineral profile and content of plant germplasm and soils collected from the farmers. The "variation picking test" (VPT) minerals were consistently measured in an increasing concentration order with potassium as highest, followed by calcium, manganese, iron, zinc and strontium as lowest concentrated mineral in plant germplasm and soils. Plant biodiversity on the women small hold farms was evidenced by the VPT minerals which occurred in all the various plant species and soil samples measured in the same increasing concentration order. Biodiversity was further confirmed based on the VPT minerals which occurred in any one plant species or farmers respective soil samples. Traditional food staples utilised by the women smallholder farmers were predominantly from Amaranthaceae, Basellaccae, Cappariadceac, Cucurbitaceae, Diosoreaccae and Solanaceae families. Legumes, vegetables (both leafy and fruit) and root crops emerged as the predominantly consumed staples, mushrooms and a number of medicinal plants inclusive for the long and short rain seasons. The ***kibanja*** land use type, which is closet to the farmer's house, was the main land use pattern appearing in the study sites. Further work on developing products with high nutria-metric grades for use in the communities, will be done on the screened food groups to obtain products with therapeutic properties.

[PS-22]INDIGENOUS KNOWLEDGE AND USES OF THE WILD MUSHROOMS OF MID-WESTERN UGANDA

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This paper describes the indigenous mycological knowledge of the people of Mid-western Uganda. Standard participatory rural appraisal techniques were used to capture the indigenous knowledge and uses of wild mushrooms. Background information as well as indigenous uses of mushrooms was obtained from 90 villagers in the age groups of above 30 years old, selected randomly, including herbalists. A free-listing technique was used to get the number of mushrooms and to determine their significance in the region. A total of 16 mushroom species were mentioned. All the mushrooms mentioned are used as natural source of food, but some can also be used as source of income, medicine and for culture. This paper also presents the medical conditions, gender roles, ecology, preservation, preparation and storage of mushrooms. From the medicinal and cultural perspective, only *T.microcarpus* is the most important in the area while for income generation both *T.aurantiacus* and *T.microcarpus* are involved. This study emphasizes the need to quickly document indigenous knowledge about the edible and medicinal mushrooms. This is because it was found that respondents below the age of 45 years had scanty knowledge of the ethnomedicinal uses and many mushrooms species were unknown to them. On the other hand, some respondents above 60 years were resistant to give full ethnomedicinal information on the uses of mushrooms for curing some ailments though they had the highest number of respondents that gave full information. Therefore, the results of this study underscore the need to conduct a nationwide survey on the indigenous uses of mushrooms because it can serve as a basis for intensive studies into the therapeutic effects of many mushrooms of ethnomedicinal importance. Upon further studies and trials, products from such medicinal mushrooms can then be incorporated into the health management programs.

Keywords: Indigenous knowledge, Mid-western Uganda, PRA techniques, Free-listing technique, wild mushrooms, gender roles and ecology

[PS-23]ANTIMALARIAL, ANTITRYPANOSOMAL AND ANTILEISHMANIAL ACTIVITY OF SOME SELECTED MEDICINAL PLANTS FROM TANZANIA

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The antimalarial, antitrypanosomal and antileishmanial activity of 25 crude extracts obtained from seven Tanzanian medicinal plants have been evaluated *in vitro* against K1 strain of *Plasmodium falciparum*, *Trypanosoma brucei rhodesiense* and *Leishmania donovani*, respectively. Seventeen out of 25 crude extracts showed good antimalarial activity (IC_{50} values between 0.04 and 5.0 μg/ml), five out of 25 revealed mild antitrypanosomal activity (IC_{50} values between 2.3 and 2.8 μg/ml) and all of the 25 crude extracts were inactive against *Leishmania donovani*. Medicinal plants; *Annickia* (*Enantia*) *kummeriae* (Annonaceae) *Artemisia annua* (Asteraceae), *Pseudospondias microcarpa* (Anacardiaceae), *Drypetes natalensis* (Euphorbiaceae), *Maytenus senegalensis* (Celastraceae) and *Neurautanenia mitis* (Papilonaceae) crude extracts were the most promising ones against K1 strain of *Plasmodium falciparum* with the IC_{50} values between 0.04 and 2.1 μg/ml and selectivity indices values in between 29.2 and 2,250 μg/ml. This is the first report of *in vitro* antiprotozoal and cytotoxicity activity of *A. kummeriae*, *P. microcarpa,* and *D. natalensis*. The exhibited high antimalarial and moderate antitrypanosomal activity render these plants to be candidates for bioassay-guided isolation of bioactive compounds which could serve as new lead structures for antimalarial and antitrypanosomal drug development programs.

[PS-24]MEDICINAL PLANT UTILISATION TO ALLEVIATE HIV/AIDS RELATED DISEASES IN KASESE DISTRICT

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In Sub-Saharan Africa, Traditional Medicine (TM), where plants and plant products play a major role, remains the first line of care for the vast majority of the people from both the urban and rural areas, for reasons of preference, access or affordability. In Uganda, as in many countries of the region, it has been estimated that the density of the healers is around 1 per 100 inhabitants compared with a ratio of 1 western trained doctor to 20,000 or more. With the recognition of the HIV epidemic in 1985, traditional Medicine practitioners (TMPs) started to see an increasing number of patients presenting with AIDS related symptoms. To TMPS, these symptoms appeared no different from those they had been treating for generations. Treatment and improving the life of people living with HIV/AIDS is done by TMPs using Biodiversity resources; the plants. The TMPs are numerous and have extensive experience of traditional healing. The plants that they use are mainly harvested in the Rwenzori Mountains and this has led to reduced supply of indigenous medicinal plants in the region. There is notable environmental crisis all over the region as a result of biodiversity destruction, which has led to reduced quality of water, poverty, famine and diseases. One of the ways of poverty reduction and environmental restoration is to identify the significance of the medicinal plants in economics, health care and biodiversity. This will lead to promotion of the sustainable supply of important plants in the region. A field study using semi-structured interviews, questionnaires, direct observation and walks in the wild plant medicine collection areas reveals the contribution medicinal plants play in the economics, health and biodiversity of the people of Kasese District.

Key words: Traditional medicine, HIV/AIDS, Traditional Medical Practitioners, Medicinal plants, Biomedical Practitioners, Biodiversity, Health care, economics.

[PS-25]EFFECTS OF *HYMNOCARDIA* ON HAEMATOLOGY ON WISTAR RATS

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The number of people using medicinal plants has been rapidly increasing because they are cheap and accessible. These medicinal plant products are sold over the counter and are not registered. Therefore, national health authorities are beginning to express concern over the safety and efficacy of these products. *Namge*, a herbal formulation that is claimed to alleviate Immune Suppression Syndrome related diseases, cancer, chronic debilitating diseases, has *Hymenocardia acida* (Embaluka) as a major component in its preparation. Here the aqueous extract of the stem-bark is investigated for its acute toxicity and sub acute toxicity on wistar rats. Blood samples were taken and analysed for WBC, and other hematological data. At a dose of 5000mg/kg, the extract did not show any acute toxicity and with the observation of the animal rights, according to the OCDE up and down procedure, the dose of 5000mg/kg was taken as the LD50. Three groups of 5 rats each were subjected to sub acute testing with doses of 1000mg/kg and 2000mg/kg for the two groups and the third acting as a control. Hematological evaluations show that there is no significant difference in the values between the control and the test animals. The extract was found neither toxic nor causing a significant effect on the weight and feeding habits of the rats.

[PS-26] INTERGRATING MEDICINAL PLANTS AS NUTRITIONAL SUPPLEMENTS IN MANAGEMENT OF HIV/AIDS AND OTHER OPPORTUNISTIC INFECTION

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Medicinal and nutritional plants are vital in health care management, but little documentation and scientific validation has been done to find out the efficacy of such plants. These plants have potential of being adopted into agricultural crops and commercialized for wide scale use at national level if potency was assured and nutritional analysis conducted. This study is focusing on integrating medicinal plants which are used as nutritional supplements in immuno-compromised patients including HIV/AIDS patients to improve their health and boost the immunity of such patients. Although HIV/AIDS has a social predicament to the economy some medicinal plants and nutritional plants have shown that they can improve the quality of life and some of these plants have an economic value if they are processed and used on a wide scale. Some of these medicinal plants can be used as nutritional supplements and they provide the required mineral compounds needed by the normal body to function and hence promoting the well being of people who are immuno-compromised as the case with HIV/AIDS, expectant mothers, children and people suffering from malaria.

However, in Uganda we lack proper documentation and scientific validation of these medicinal and nutritional plants used by the local population. This project therefore, will produce a documentation of medicinal plants used as medicinal with nutritional values; validate the medicinal and nutritional values of indigenous plants; and initiate propagation and domestication of medicinal plants as well training the population on techniques of seed/planting materials multiplication of indigenous medicinal plants used in the management of HIV/AIDS and other opportunistic infections. Product development will be central in this project so as to add value on African medicinal and nutritional plants and to easily access them for wider community. These plants will be recommended for integration into agricultural systems as on farm crops so as to improve the quality of the herbal products and biodiversity conservation.

[PS-27]ANTIPARASITE ACTIVITY OF THE BARK OF *CELTIS AFRICANA* (ULMACEAE) EATEN BY WILD CHIMPANZEES IN UGANDA : ISOLATION AND STRUCTURE OF ACTIVE METABOLITES

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In order to provide a better knowledge of potential self-medicating behaviours in chimpanzees and to investigate chemical diversity of Ugandan forests, according to field observations, we collected and screened plants for their antiparasite activities. Identification of bioactive compounds were previously reported as a result of observing the feeding behaviour of chimpanzees from a wild population in Uganda (Kibale National Park).[1,2] Bark of *Celtis africana* (Ulmaceae), unusually ingested by chimpanzees, was collected and extracted by ethyl acetate. This crude extract exhibited significant *in vitro* antimalarial activity (IC_{50} : 10 µg/ml). Bioassay-directed fractionation provided fractions with potent activity against chloroquine resistant *Plasmodium falciparum* (IC_{50} < 5 µg/ml). From one of these fractions, four amides were isolated and their structure determined by spectroscopic methods (mainly NMR and ESI-TOF MS). They were identified as the *trans* and *cis*-isomers of *N-p*-coumaroyltyramine and as the *trans* and *cis*-*N*-*p*-coumaroyloctopamine, that latter rarely occurs in plants. Structural elucidation and biological activities of these compounds will be discussed in this communication.

Keywords : Zoopharmacognosy, Ulmaceae, *Plasmodium falciparum*, *cis*-*N*-p-coumaroyloctopamine.

[1] Krief S. *et al. J. Nat. Prod.* 2005**,** *68,* 897-903

[2] Krief S. *et al. Antimicrob. Agents Chemother.* 2004, 48, 8, 3196-3199