GENERAL NEWS

To make biofuel, cut the lignin: Researchers disable key protein, make plant sugars easier to access (ScienceNews, Aug 2013)

By crippling a single protein, researchers can grow plants that have 36 percent less lignin, the sturdy plant-wall molecule that makes chewing up plants for biofuel production so difficult. The researchers knocked out the enzyme caffeoyl shikimate esterase, a worker in lignin’s assembly line in a small flowering plant. Lignin production dropped and the plant’s sugars became easier to access, the researchers report in Science… Read more.

Cancer-causing herbal remedies: A potent carcinogen lurks within certain traditional Chinese medicines (The Scientist, Aug 2013)

Plants of the Aristolochia genus have for centuries been used in Chinese herbal remedies, but they contain a naturally carcinogenic compound that causes mutations in the cells of people who consume them, according to two studies published in Science Translational Medicine this month. The papers reveal that the compound, called aristolochic acid, causes more mutations than two of the best-known environmental carcinogens: tobacco smoke and UV light… Read more

Eco-friendly battery charged by ancient plant extract (Inside Science TV, June 2013)

New York chemists are developing a new sustainable battery that foregoes the highly mined metal Cobalt. The plant root extract Purpurin, historically used as a red dye, acts as an electrode and is compatible with Lithium, allowing its incorporation in a green, fully disposable battery… Watch the video here

RECENTLY PUBLISHED BOOKS

Nutraceuticals and Health: Review of Human Evidence

This book focuses on the role of nutraceuticals in human health, disease prevention, health promotion, and as an adjunct to disease treatment. This crucial epidemiological focus will address whether, and what kinds of, evidence exist to support a role for nutraceuticals in disease prevention and treatment. Cutting-edge summaries highlight both the biological and epidemiological findings of relevant studies of nutraceuticals in health and disease.

Biotechnology in Agriculture and Food Processing: Opportunities and Challenges

An instructive and comprehensive overview of the use of biotechnology in agriculture and food production, this book discusses how biotechnology can improve the quality and productivity of agriculture and food products. It includes current topics such as GM foods, enzymes, and production of various types of food ingredients. Combining coverage of agriculture and food processing, the book highlights the range of biotechnology applications from "farm to fork." Biotechnology has been recognized as one of the key technologies for increasing economic growth. The book provides a better understanding of how biotechnology applications can reduce production costs, improve productivity, and enhance product quality in the agro food processing sector.
Caron Griffiths joins the SABINA network as the new VRE facilitator

We are pleased to welcome Caron Griffiths, a recent Masters graduate from University of Pretoria, as the new facilitator for the VRE platform. We asked her to answer a few questions to introduce herself to the network.

Where are you from?
I was born and grew up in Pretoria, and decided to stay here for my studies. I make up for it by taking opportunities to travel in my spare time!

What did you study, and why?
I’ve always been fascinated by some variation of the question “How does it work?” and picking all sorts of puzzles apart. I chose to study biochemistry for my undergraduate and postgraduate degrees - it’s an in depth approach to answering that question of how everything works! I’ve had some great opportunities along the way, like being able to spend time in a research lab in Paris, and being able to do my Masters in Biochemistry with UP and the CSIR in Pretoria. My research focused on super-resolution microscopy to study mechanisms of transcriptional regulation in the malaria-causing parasite, Plasmodium falciparum.

One of the challenges I experienced during my Masters was a difficulty in managing, organising and analysing large amounts of information and datasets. So I’ve decided to take a hiatus from formal studies to explore opportunities to gain more computational skills and experience in knowledge management and data analysis. I’m happy to be joining the VRE network and take opportunities to learn, help and apply my skills!

What interests you about working on the VRE?
I’m fascinated by the different approaches people take to research, and am quite excited by the research culture that the VRE initiative is encouraging. I think open communication, co-operation and collaboration between researchers are important in the advancement of research, along with knowledge sharing through many different platforms, including open access publishing. The internet and emerging technologies like blogs, forums and social networks present intriguing options to make this possible and for young scientists to help each other, work together and drive research in the directions it needs to go. I’m excited to be part of the VRE and to help develop models to make this possible.

What do you do for fun?
I’m a big fan of a good cup of coffee with good company. I also read a lot, and enjoy traveling and amateur photography. I’m not very sporty, but I run and dance - when I’m not recovering from injuries!

SABINA NEWS

In vitro anti-hyperglycemia properties of the aqueous stem bark extract from Strychnos henningsii (Gilg)


(Link to article) $39.95

Strychnos henningsii (SH) is a plant commonly used in southern African traditional medicine for the management of diabetes mellitus. Previous in vivo studies showed that a stem bark extract improves glycemic control in a diabetic animal model, however the mechanism of action has not been elucidated. The present study therefore investigated various in vitro models known to target glucose homeostasis and its direct complications. The plant extract was found to stimulate both basal and insulin stimulated glucose uptake in differentiated 3T3-L1 cells but not in Chang liver cells. The effect on 3T3-L1 cells appears independent of PPARγ as the extract did not stimulate adipogenesis. Although SH extract was inhibitory toward intestinal alpha glucosidase, the physiological relevance is doubtful based on the recommended dosages. The extract strongly inhibited protein glycation which, at least in part, may be explained by the antioxidant and phenolic content of this plant. Cytotoxicity in Chang liver cells yielded an IC value of 130.0 µg/mL raising concern that continual exposure to this herbal remedy may initiate hepatotoxicity. The finding from this study suggests that SH extract may attenuate hyperglycemia through enhanced peripheral tissue glucose utilization.
Phytochemical analysis of plant extracts is an increasingly important field of analytical chemistry. In the case of medicinal plants usually traded in a dried and crumbled form, phytochemical analysis serves the purpose of authentication of herbal material and protects patients against adulteration. Due to an unknown composition of plant extracts and an inherent difficulty in selecting proper phytochemical standards, a phytochemical approach has been developed known as fingerprinting. This approach circumvents tedious identification of individual constituents of plant extracts and instead, focuses on a comparison of the whole chromatograms in order to trace similarities and dissimilarities among the plants. In this study, we present the results of a comparison of six plant species belonging to three genera of the Lamiaceae family (i.e. *Salvia*, *Thymus*, and *Draecocephalum*), a plant family recognized for their curative properties by traditional medicines in many regions of the world. As phenolic acids and flavonoids play crucial role in many curative processes, we employed TLC and HPLC to fingerprint the selectively extracted six phenolics fractions for the six plants. The obtained results highlight the flavonoid aglycons (FA) fraction which most distinctly discriminates among the individual plant species, while the remaining five fractions are the carriers of less vital information. The chromatograms derived by means of TLC and HPLC for the fraction of flavonoid aglycons can be considered as marker fingerprints, able to distinguish among closely related plants belonging to different genera of the Lamiaceae family.
**Inhibition of HIV-1 enzymes, antioxidant and anti-inflammatory activities of *Plectranthus barbatus***


This study aimed to investigate the HIV-1 inhibitory, anti-inflammatory and antioxidant properties of *P. barbatus* and thereby provide empirical evidence for the apparent anecdotal success of the extracts. Ethanolic extract of *P. barbatus* leaves was screened against two HIV-1 enzymes: protease (PR) and reverse transcriptase (RT). Cytotoxicity of the extract was determined through measuring tetrazolium dye uptake of peripheral blood mononuclear cells (PBMCs) and the TZM-bl cell line. Confirmatory assays for cytotoxicity were performed using flow cytometry and real-time cell electronic sensing (RT-CES). The free radical scavenging activity of the extract was investigated with 2,2-diphenyl-1-picrylhydrazyl while the anti-inflammatory properties of the plant extract were investigated using a Th1/Th2/Th17 cytokometric bead array technique. *P. barbatus* extract inhibited HIV-1 RT and the 50% inhibitory concentration (IC50) was 62.0 µg/ml. The extract demonstrated poor inhibition of HIV-1 RT. Cytotoxicity testing presented CC50 values of 83.7 and 50.4 µg/ml in PBMCs and TZM-bl respectively. In addition, the extract stimulated proliferation in HIV negative and positive PBMCs treated. RT-CES also registered substantial TZM-bl proliferation after extract treatment. The extract exhibited strong antioxidant activity with an IC50 of 16 µg/ml and reduced the production of pro-inflammatory cytokines indicating anti-inflammatory potential. This is the first demonstration of the in vitro anti HIV-1 potential of *P. barbatus* including direct activity as well as through the stimulation of protective immune and inflammation responses. The low cytotoxicity of the extract is also in agreement with the vast anecdotal use of this plant in treating various ailments with no reported side-effects.

**A fraction of stem bark extract of Entada africana suppresses lipopolysaccharide-induced inflammation in RAW 264.7 cells**


*Entada africana* is a plant used in African traditional medicine for the treatment of stomach-ache, fever, liver related diseases, wound healing, catalar and dysentery. This study aimed at evaluating the anti-inflammatory activity of fractions of the stem bark extract of the plant using lipopolysaccharide (LPS)-induced inflammation in RAW 264.7 macrophages model. The crude extract was prepared using the mixture CH2Cl2/MeOH (1:1, v/v) and fractionated by flash chromatography to obtain five different fractions. The effects of the fractions on the cells viability were studied and their inhibitory activity against LPS-induced nitric oxide (NO) production screened. The most active fraction was further investigated for its effects on reactive oxygen species (ROS) production, the expression of inducible nitric oxide synthase (iNOS), pro-and anti-inflammatory cytokines (IL1β, TNFα, IL6, IL10 and IL13), and the activity of the enzyme p38 MAPK kinase. The fractions presented no significant effect on the viability of macrophages at 100 µg/ml after 24h incubation. The CH2Cl2/MeOH 5% (Ea5) fraction was found to be the most potent in inhibiting NO production with a half inhibition concentration (IC50)=18.36 µg/ml and showed the highest inhibition percentage (89.068%) in comparison with Baicalin (63.34%), an external standard at 50 µg/ml. Both Ea5 and Baicalin significantly (P<0.05) inhibited the expression of TNFα, IL6 and IL1β mRNA, attenuated mRNA expression of inducible NO synthase in a concentration-dependent manner, stimulated the expression of anti-inflammatory cytokines (IL10 and IL13), and showed a 30% inhibition of the activity of p38 MAPK kinase. The results of the present study indicate that the fraction Ea5 of *Entada africana* possesses potent in vitro anti-inflammatory activity and may contain compounds useful as a therapeutic agent in the treatment of inflammatory related diseases cause by over-activation of macrophages.

**Use of weeds as traditional vegetables in Shurugwi District, Zimbabwe**

Maroï, A, *Journal of Ethnobiology and Ethnomedicine*, 9 (60), 2013

Most agricultural weeds are usually regarded as undesirable and targeted for eradication. However, weeds are useful to human beings as food and traditional medicines. Few studies have been done to document the uses of weeds as traditional vegetables. This study was therefore, done to document indigenous knowledge related to the diversity and use of agricultural weeds as traditional vegetables in Shurugwi District, Zimbabwe, emphasizing their role in food security and livelihoods of the local people. A total of 21 edible weeds belonging to 11 families and 15 genera, mostly from *Amaranthaceae* (19%), *Asteraceae* and *Tiliaceae* (14.3%), *Caparpaceae*, *Cucurbitaceae* and *Solaneaceae* (9.5% each) were identified. The study confirms findings from similar studies conducted elsewhere that rural households engage in harvesting of wild edible vegetables and other non-timber forest products (NTFPs) as a survival strategy. Based on their potential nutritional and medicinal value, edible weeds could contribute in a major way to food security, basic primary health care and balanced diets of rural households and possibly urban households as well.