

Herbal Remedies Session

Anti-inflammatory properties of *Albuca setosa* and its possible mechanism of action

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Albuca setosa is used for the treatment of wounds, articulation problems and rheumatoid arthritis. *A. setosa* called *inqwebeba* in Xhosa is a member of the Hyacinthaceae family. It is distributed in the Eastern Cape Province of South Africa where its traditional usage is very extensive. In this study, we characterized the anti-inflammatory response of *A. setosa* on inflammation induced by carrageenan, dextran, histamine, serotonin, arachidonic acid and xylene. The extract was administered orally at the doses of 150 and 300 mg/kg. The extract of *A. setosa* at both doses significantly inhibited ($P < 0.01$) the formation of the carrageenan-induced rat paw edema in the first, second and the third hour of inflammation (peak of inflammation) by 52, 55, 43 and 68%, 84 and 85% for 150 and 300 mg/kg, respectively. Concerning inflammation induced by dextran and inflammatory mediators such as histamine, serotonin and arachidonic acid, the effect of *A. setosa* was significant ($P < 0.01$) mostly during the first and the second hours of inflammation by a maximum of inhibition of 61, 83, 50 and 47%, respectively. Results also showed that water leaf extract of *A. setosa* significantly inhibited ($P < 0.05$) topical edema in the mouse ear induced by xylene for 150 mg/kg by 44% but was not dose dependent. The results obtained suggest that the water leaf extract of *A. setosa* is endowed with effective anti-inflammatory activity mediated via either inhibition of phospholipase A2 (PLA2) activity or cyclooxygenase cascade and by blocking the release of vasoactive substances like histamine, serotonin and kinins.

Key words: *Albuca setosa*, inflammation, carrageenan, dextran, histamine, serotonin.

Gene regulation by *Sutherlandia frutescens*, a South African anti-diabetic medicinal plant, in an insulin resistant liver cell culture model of type 2 diabetes

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Sutherlandia frutescens is a herbal plant with known anti-diabetic properties. However, the mechanism of action of *S. frutescens* is not known. An *in vitro* model of insulin resistance (IR) and type 2 diabetes (T2D) was developed in human Chang liver cells to investigate the action of *S. frutescens* at the molecular level. *S. frutescens* reversed IR in the Chang

Scientific Research and Essays

model and gene targets of *S. frutescens* were identified from 84 genes analyzed using the human diabetes RT2Profiler™ PCR array. Chang liver cells cultured to 70% confluence in RPMI1640 containing 10% fetal calf serum (FCS) were exposed for 24 h to MCB201 medium; MCB201 containing 0.1 μM insulin and 1 mM fructose; or containing 0.1 μM insulin, 1 mM fructose and 12.5 μg/ml *S. frutescens*. RNA was extracted from each culture, reverse transcribed, the resultant cDNA amplified using the RT2Profiler™ PCR array and the data analyzed using RT2 Profiler PCR array data analysis template software to calculate fold-changes in gene expression. Twenty eight (28) genes regulated by *S. frutescens* were identified. Genes involved in vesicle transport were significantly down-regulated by IR and up-regulated by *S. frutescens*. Other genes were not significantly altered by IR, but were significantly regulated by *S. frutescens*. These included transcription factors, signalling molecules and enzymes involved in inflammation, oxidative stress, metabolic regulation and insulin signal transduction. In conclusion, current therapeutic applications of *S. frutescens* include anti-diabetic, anti-inflammatory, anti-cancer and wound healing activities. The genes identified as potential molecular targets of *S. frutescens* could explain these activities. Specifically, the anti-diabetic activity of *S. frutescens*, may involve regulation of glucose, lipid and oxidative stress pathways in the liver. Genes that up-regulate flux through the glycolysis and pentose phosphate pathways were activated, along with genes in the insulin signalling pathway and inhibitors of gluconeogenesis. Genes playing a role in β-oxidation and lipid transport that could protect against cellular accumulation of lipids were also up-regulated.

Key words: *Sutherlandia frutescens*, gene regulation, anti-diabetic activity.

Traditional herbal medicine use in HIV+ patients on antiretrovirals

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South Africa is among the most severely impacted by the HIV pandemic, with approximately 5.2 million people living with HIV and 1,000 AIDS-related deaths occurring daily. An estimated 80% of the African population use traditional herbal medicine (THM) as source of primary health care to treat conditions ranging from minor pains to chronic conditions. Limited information exist about the use of THM among patients with HIV/AIDS receiving anti-retroviral treatment (ART) in South Africa, and if it is a common practice, little is known about how it is being used and how the use of THM may affect patient outcomes. This cross sectional study design utilized quantitative methods to collect data in two provinces of South Africa - urban township in Cape town and rural district in KwaZulu Natal. One hundred (100) participants were recruited from HIV clinics administering antiretroviral (ARV). Questions focusing on the perceptions, knowledge and attitudes of patients about the use of traditional medicine (TM) and ARV were administered. Statistical analyses were performed using SAS 9.1.3. The study showed that only 16% of the patients used THM with ARVs. However, most of them (79%) reported using THM prior to a diagnosis of HIV. The most popular herbal remedy used was Ubhejane because it is believed to effectively treat all bodily conditions. Family expectations, privacy and confidentiality were some of the influences responsible for using THM. Most popular reasons for TM use was to either gain strength, increase appetite, relieve symptoms of numbness, ulcers, and bad dreams. This study provides important insight into the treatment modalities selected by patients with HIV/AIDS in South Africa who are receiving ARV. There is a need to better understand the use of THM with conventional medicine for HIV/AIDS prophylaxis and/or treatment.

Key words: HIV, traditional herbal medicine, Ubhejane, antiretroviral (ARV).

Correlation of the phosphodiesterase 4 inhibitory activity of *Artemisia afra*, *Leonotis leonorus* and *Mentha longifolia* plant medicines and their flavonoid contents

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Artemisia afra, *Leonotis leonorus* and *Mentha longifolia* are traditionally used for the treatment of asthma. Pharmacological studies have shown that they possess respiratory smooth muscle relaxant properties. However, little is known about the mechanisms by which they produce this effect. This study investigates the phosphodiesterase 4 (PDE4) inhibitory potential, total phenolic, total and individual flavonoids levels of these plants. Freeze-dried aqueous extracts of the three plants were tested for their PDE 4 inhibitory activity using the Biomol Green™ Phosphodiesterase assay method. The half maximal inhibitory concentrations (IC₅₀) were estimated using the Graphpad Prism 4 Program. The total flavonoid content (TFC) was determined by the aluminium chloride method and the total polyphenolic content (TPC) by the Folin-Ciocalteu method. Luteolin and/or apigenin aglycone levels in the plant extracts were determined by a validated high performance liquid chromatography (HPLC) assay. The aqueous extracts of the plants demonstrated a significant and dose-dependent PDE4 inhibition. The PDE4 inhibitory activity was in the order: *A. afra* > *L. leonorus* > *M. longifolia*. The levels of TPC, TFC, luteolin and hesperetin differed between the plants. There was no correlation between the TFC and the PDE4 IC₅₀ of the plant extracts ($r = -0.18$, p value = 0.46), but a significant correlation was observed between the TPC, luteolin and hesperetin levels and the PDE4 IC₅₀ ($r = 0.82$, p value < 0.0001, $r = 0.724$, p value = 0.023, respectively) suggesting that flavonoid and phenolic compounds may possibly contribute to the plants activity. The three plants possess PDE4 inhibitory activity which may correlate with the TPC and the individual flavonoid markers, luteolin and hesperetin, levels. Further studies are required to investigate whether the *in vitro* PDE4 inhibitory activity of the plant species also occur *in vivo*.

Key words: Flavonoid, *Artemisia afra*, *Leonotis leonorus*, *Mentha longifolia*, phosphodiesterase 4 (PDE4) inhibitory activity.

Home-remedies for common illnesses in Eastern Cape, South Africa: Focus on medicinal plants

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Scientific Research and Essays

There is a prevalence of primary dependence on traditional medicines among the African communities in the Eastern Cape Province of South Africa. Traditional healers in effect serve as primary health care givers to about 80% of the rural communities. About 60% of the population seeks health advice and treatment from traditional healers before visiting a medical doctor. The aim of this study was to facilitate the verbal communication of indigenous knowledge on treatment of common illnesses through the use of medicinal plants from village elders to first year medical students. The information gathered was on (a) commonly used medicinal plants for common illnesses; (b) the part of the plant used; (c) the preparation; and (d) the dosage. The data showed that the most common illnesses and medicinal plants used for their treatment were the following: For diabetes, Ikhala (*Ale ferox*, 26 reports), Ingcelwane (*Bulbine natalensis*, 6 reports), iNongwe (*Hypoxis hemerocallidea*, 6 reports), potolofiyi (*Opuntia echios*, 1 report) and Mthewenkwe (1 report) were used. To heal wounds, Iqwili (*Alepidea amatymbica*, 54 reports), Isicwe (*Helichrysum italicum*, 45 reports) iNongwe (13 reports), uMathunga (1 report) and lenkonyane (*Emex australis*, 1 report) were used. For constipation, Iqwili (54 reports), Ikhala (20 reports), Impepho (*Helichrysum odoratissimum*, 18 reports), Isivimbampuzi (*Tulbaghia violacea*, 8 reports) and Inkalane (*Aloe striatum*, 1 report) were used. For cold and flu, uMhlonyane (*Artimisia afra*, 18 reports), Intelezi (*Aloe tenuior*, 7 reports), *Thymus serpyllum* (1 report), Inongwe (10 reports), Ifennel (*Foeniculum vulgare*, 1 report), Ubutsha (1 report) Ujinja (*Zingiber officinate*, 1 report) and isivimbampuzi (8 reports) were used. For menstrual pains, iNongwe (10 reports), Isiphepheto (*Siphonochilus aethiopicus*, 1 report) and Ntolumane (1 report) were used. As immune boosters Umgwali umciwele (*Sutherlandia frutescence*, 15 reports) and Inongwe (10 reports) were used. There is a great need for medical students to understand the common health problems in the community around them and the medicinal plants used to treat these problems. This will enable them to understand the kind of patients who consult them and the contexts and circumstances where they come from.

Key words: Home remedies, traditional medicines, medicinal plants.