

## 6.1. Introduction

## CHAPTER 6

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## 6.1. Introduction

Traditional healing practices and treatment of diseases using herbal remedies featured significantly in the health of millions of people for a long time (Martin, 1995). Among the sources of new drug development, plant based medicine is the most widely used one (Zhu, 1999). About 64 % of the world's population use plants as drugs, hence, the combined effect of such people make the consideration of plants as potential leads in drug development a viable choice. Furthermore, greater success has been achieved when plant selection was based on their traditional use (Farnsworth, 1990) (Farnsworth, 1990). Approximately, 80 % of South Africa's black population living in rural areas depend upon traditional medicine to treat their common ailments (Jager & Van Staden, 1995). According to Salie (1996), the indigenous people of the Western Cape use traditional medicines mainly from plants belonging to the Asteraceae family (Salie *et al.*, 1996). A number of *Helichrysum* species have been reported to have medicinal value (Watt & Breyer-Brandwijk, 1962; Tomas-Barberan *et al.* 1990; Meyer & Afolayan, 1995; Dilika, *et al.*, 1997; Mathekga & Meyer, 1998).

Some South African Amaryllidaceae species are also used in traditional healing practices (Watt & Breyer-Brandwijk, 1962). The plant family is known for its rich alkaloid content (Tanahashi *et al.*, 1990). This group of compounds has shown activity in a number of biological activities including

antitumour, antiviral, antimalarial and acetylcholinesterase inhibitory activity (Tanahashi *et al.*, 1990; Cakici, *et al.*, 1997; Campbell, *et al.*, 1998).

(Asteraceae) and *Scopione disticha* and *Scadoxus*

Tropical forests and other important areas of vegetation are rapidly disappearing. This and other factors make establishing the discovery methods for rapid isolation and identification of bioactive natural products an urgent need (Samuelsson, 1992; Hostettmann *et al.*, 1997). The destructive harvesting of bulbs used in traditional healing practices in South Africa (Mander, 1997), also poses a high threat as some might become extinct before the scientific basis of their use is investigated and perhaps verified.

## 6.2. Antibacterial activity of linoleic- and oleic acids isolated from

### *Helichrysum pedunculatum* used during circumcision rites

The crude extracts of *H. pedunculatum* were reported for their antibacterial activity in a previous study (Meyer & Dilika, 1996). The bioassay-guided fractionation using direct bioautography on TLC led to the isolation of linoleic- and oleic acids. The two acids were active against *Bacillus subtilis*, *Micrococcus kristinae* and *Staphylococcus aureus* with the MIC varying between 0.01 and 1.0 mg/ml. Linoleic acid additionally inhibited the growth of *B. cereus* and *B. pumilus*. None of the Gram-negative bacteria was inhibited by these fatty acids. Furthermore, the two acids showed a synergistic effect against *S. aureus*, a bacterial species commonly implicated in hospitalised circumcised patients.

### 6.3. Centrifugal partitioning chromatographic isolation of bioactive compounds from *Helichrysum pedunculatum* (Asteraceae) and *Boophone disticha* and *Scadoxus multiflorus* (Amaryllidaceae) using receptor binding assays

*H. pedunculatum* leaf extract was found to be active in both adenosine and opiate receptor binding assays. Centrifugal partitioning chromatography was used to fractionate the ethanolic leaf extract of *H. pedunculatum*. Bioassay-guided fractionation on adenosine A<sub>1</sub> and opiate receptor binding assays resulted in the isolation of linoleic acid. Fractions containing linoleic acid were eliminated from the first stages of separation as this compound is regarded as a false positive (non-competitive inhibitor) in this assay (Ingkaninan *et al.*, 1999). This makes the identification of active compounds from such extracts difficult (Zhu *et al.*, 1996; Zhu & Li, 1999). This might be due to the interactive mechanisms between plant constituents found in the crude extract. The presence of this compound might however validate the use of the herb in pain relief and as an antibiotic.

### 6.4. Preliminary investigation of *Boophone disticha* and *Scadoxus multiflorus* for acetylcholinesterase inhibitory activity

Age related diseases, for example Alzheimer's disease (AD), are gradually becoming a problem especially in the western world as the population continues to grow older. Acetylcholinesterase inhibition seems to show

symptomatic improvement in some clinical trials in the treatment of Alzheimer's disease (Enz *et al.*, 1993; Nordberg & Svensson, 1998). Ethanollic extracts from bulb material of *Boophane disticha* and *Scadoxus multiflorus* showed an inhibitory effect on the AChE enzyme assay at concentrations of 0.1 mg/ml.

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### 6.5. Acetylcholinesterase inhibitory activity of galanthamine isolated from *Scadoxus multiflorus*

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The genus *Narcissus* is known for the possession of compounds with AChE inhibitory activity (Nordberg & Svensson, 1998). This is mainly due to the presence of galanthamine (GAL), an alkaloid already undergoing clinical trials for the treatment of Alzheimer's disease. GAL has been isolated from a number of species in this genus.

*Medica* 64: 97-93.

Ethanollic extracts of *S. multiflorus* were further purified as it showed more activity compared to the other tested bulb extracts. Bioassay-guided fractionation using the AChE inhibitory activity method of Ellman. (1961), led to the isolation of galanthamine (Ellman *et al.*, 1961). This compound might also account for the pain killing effect of the bulb material as used during the traditional circumcision ritual.

In conclusion, the use of plants as dressings in the traditional male circumcision is not a coincidence. The indications of antibacterial activity and

pain management of the herbs analysed in this study have showed this. However, precautions should be taken into account during the ritual as is the case in any surgery. There is also a need for regulating the cultural practice to ensure continuity and sustainable utilization of the natural resources.

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*Strobilanthus* (Amaryllidaceae) are also applied as a dressing in both fresh and dry forms, to wounds, depending on

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