

**BIOLOGICAL ACTIVITY ANALYSES OF THE CRUDE  
EXTRACT OF *Senna* species: STRUCTURE ELUCIDATION OF A  
COMPOUND WITH ANTIOXIDANT ACTIVITY**

**BY**

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**Submitted in fulfilment of the requirements for the degree of**

*Master of Science*

**In the Department of Biochemistry, Microbiology and Biotechnology**

**School of Molecular and Life Sciences**

**Faculty of Science and Agriculture**

**University of Limpopo**

**South Africa**

**SEPTEMBER 2008**

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## DECLARATION

I declare that the dissertation hereby submitted to the University of Limpopo for the degree Master of Science in Biochemistry has not been previously submitted by me for the degree at this or any other University, that it is my own work in design and in execution, and that all materials contained therein have been duly acknowledged.

Signed: .....

Date: .....

## **DEDICATION**

This Master of Science dissertation is dedicated to my late grandfathers, Khampane and Frans Gololo, who left us a rich heritage of traditional medicine and the rest of the Gololo family for their invaluable support throughout this study.

## ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and appreciation to:

My Supervisor and mentor: Prof L.J. Mampuru for his faith in my capability, his patience and guidance throughout the study.

My co-supervisors: Prof K. Eloff, Dr P. Masoko and Mr P. Mokgotho for their mentoring and for being more than supervisors.

Members of the Phytomedicine programme at Onderstepoort Campus, University of Pretoria, especially Mr Moraba Meela for assisting with compound isolation.

Dr Igwe: for assisting with the compound isolation.

Prof Abegaz: for structural analysis of the isolated compound.

The Medicinal Plant Research Group at the University of Limpopo (Turfloop campus).

Mr Nkhuna M.J and his family: for always being there for me.

Prof P.W. Mashela and family: for being a source of inspiration and his forever preparedness to lend a helping hand.

Prof N.M. Mokgalong: for finding time to listen to my frustrations in his always hectic schedule.

My parents, especially my Mom, my grandmother, uncles, brothers, sisters, cousins and nephews for without their support I would not have attained my goals regarding this study.

Mr Lesetja William Gololo: for his mentoring during my quest for knowledge about medicinal plants.

National Research Foundation (NRF): for financial assistance.

University of Limpopo Research Office: for the administration duties regarding my scholarship.

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## List of Abbreviations

ATCC	:	American Type Culture Collection
BEA	:	Benzene: Ethanol: Ammonium hydroxide (90:1:1, v/v/v)
CEF	:	Chloroform: Ethyl acetate: Formic acid (5:4:1, v/v/v)
CA4DP	:	Combrestatin A-4 disodium phosphate
CHCl <sub>3</sub>	:	Chloroform
DCM	:	Dichloromethane
DMSO	:	Dimethylsulfoxide
DNA	:	Deoxyribose nucleic acid
DPPH	:	2, 2- diphenyl-1- picrylhydrazyl
EtoAc	:	Ethylacetate
FBS	:	Foetal bovine serum
HPLC	:	High performance liquid chromatography
INT	:	<i>p</i> -iodonitrotetrazolium violet
IR	:	Infrared
IUPAC	:	International union of pure and applied chemistry
MeOH	:	Methanol
MICs	:	Minimum inhibitory concentrations
MS	:	Mass spectrometry
NCEs	:	New chemical entities
NMR	:	Nuclear magnetic resonance
PDA	:	Photodiode array
PSN	:	Penicillin, streptomycin, neomycin



R <sub>f</sub>	:	Retardation factor
RPMI-1640	:	Roswell Park Memorial Institute 1640
SEE	:	Serial exhaustive extraction
TAE	:	Tannic acid equivalents
TLC	:	Thin layer chromatography
UV	:	Ultraviolet
v/v	:	Volume per volume
WHO	:	World Health Organisation

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## ABSTRACT

*Senna* species, a member of the Fabaceae family (subfamily Caesalpinaceae), is widely used traditionally to treat a number of disease conditions such as sexually transmitted diseases and some forms of intestinal complications. In this study the roots of *Senna* species, collected from Zebediela region of the Limpopo province (R.S.A), were ground to a fine powder and extracted with acetone by cold/shaking extraction method. The phytochemical composition of the extract was then determined by thin layer chromatography (TLC). The chromatograms were visualised with vanillin-sulphuric acid and *p*-anisaldehyde reagents. The total phenolic content of the extract was determined by Folin-Ciocalteu method and expressed as TAE/g of dry plant material. The extract was assayed for the *in vitro* anticancer activity using Jurkat T cells. The antioxidant activity was evaluated using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay and the antibacterial activity determined by both bioautographic and the microtiter plate methods. The acetone extract of the roots of *Senna* species inhibited the growth of Jurkat T cells in a dose- and time-dependent manner. The extract was shown to possess free radical scavenging activity and antibacterial activity against *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli* and *Staphylococcus aureus* with MIC values of 0.16, 0.078, 0.078 and 0.16 mg/ml, respectively. A compound with free radical scavenging activity was isolated from the acetone extract of the roots of *Senna* species through bioassay-guided fractionation. The isolated compound was identified as 1, 3-diphenol-2-propen-1-one. Thus, the study has systematically shown the biological activity of the roots of *Senna* species and the isolation and identification of the bioactive compound.