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

BY

GOLOLO SECHENE STANLEY

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Supervisor: **Prof Leseilane J. Mampuru**

Co-Supervisors: **Prof Kobus Eloff**

Dr Peter Masoko

Mr Matlou P. Mokgotho

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.

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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
$CHCl_3$	:	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	:	*p*-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_f	:	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.