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Phytochemical Analyses and Brine shrimp (*Artemia Salina*) Lethality Studies on *Syzygium cordatum*

(Hoscht ex. Krauss)

By

Herbert Chiguvare

(201108127)

Dissertation in fulfilment of the requirements for the degree

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Alice

Supervisor : Dr O Oyedeji

Declaration

I declare that this thesis that I hereby submit for the award of the degree of

Masters of Science in Chemistry

is my original work apart from the acknowledged assistance from my supervisors. It has not been submitted to any other university other than the University of Fort Hare (Alice).

Candidate……..on this …….day of……..

Signature……

Supervisor……on this …….day of……..

Signature……..…..

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Conference and Publications

Conferences

1. Chiguvare H, Oyedeji O, Oyedeji AO **(2012**): Bioactive Isolates of *Syzygium cordatum* Hoscht ex C. Krauss. Oral Presentation at the 2012 Walter Sisulu University Joint International Research Conference, 22 - 24th August, 2012, East London, South Africa.
2. Chiguvare H, Oyedeji O, Oyedeji AO **(2012**): Isolation of Triterpenoids from the leaves of *Syzygium cordatum* Hochst. ex C Krauss and its Cytotoxicity Assay. Oral presentation at South African Chemical Institute (SACI) Eastern Cape Province Annual Regional Conference, East London, 12th October, 2012.

Publications

1. Isolation of Triterpenoids from the leaves of *Syzygium cordatum* Hochst ex C Krauss and its Cytotoxicity Assay. Manuscript submitted to Natural Product Research (2012).
2. Essential oil content and composition of the leaves of *Syzygium cordatum* Hochst. ex C Krauss. Manuscript submitted to Journal of Essential Oil bearing Plant (2012).

Award

1. Awarded 2nd Best Presenter: SACI Eastern Cape Province Regional Annual Conference, East London (2012) Isolation of Triterpenoids from the leaves of *Syzygium cordatum* Hochst. ex C Krauss and its Cytotoxicity

Abstract

Syzygium cordatum Hoscht ex. C Krauss, also known as water berry, is normally used by the people of South Africa for respiratory ailments including tuberculosis, stomach complaints, treatment of wounds and as emetics. An extract of the leaves can be used as a purgative for diarrhoea treatment. The leaves of *Syzygium cordatum* Myrtaceae were obtained from the Eastern Cape Province of South Africa, air dried and sequential solvent extraction was done to obtain various non volatile crude extracts.

The volatile extract, that is the essential oil was extracted from the leaves using hydrodistillation and analysis of compounds was done by GC/MS for composition. 32 compounds were obtained from the fresh leaves and 18 compounds were obtained from the dry leaves. The fresh oil contains β-caryophyllene (11.8%) and caryophyllene oxide (11.1%) as the main sesquiterpene component. α-Pinene(5.0%) was the only monoterpene compound identified in the fresh oil in substantial amount. The dry leaves oil had α-copanene (17.0%), β-Caryophellene (26.0%), cubenol (6.5%) and caryophellene oxide (14.2%) as the dominant constituent of the oil. Summary of the classes of compounds in the oil revealed that the chemical profile of both oils were dominated by sesquiterpenoid compounds. This is the first time that terpenoids compounds are being identified in both the fresh and dry leaf oil of *S. cordatum*.

Hexane leaf extract was selected due to the interest in the terpenoid compounds. Column chromatography of the hexane crude gave five (5) of which two are fully reported. The isolates were fully elucidated using spectroscopic methods to be β-Sitosterol (HC3) and Friedela-3-one (HC1A/HC1D). Cytotoxicity analysis was carried out on the crude using the Brine shrimps assay. Isolates 1C and1D showed significant lethality using the brine shrimps assay with lethality values (LC50) of 4.105mg/ml for HC1C and 4.11mg/ml for 1D/1A respectively.

List of Abbreviations

Mb	Mobile phase
R_f	Retardation factor
NMR	Nuclear magnetic resonance
COSY	Correlation spectroscopy
NOESY	Nuclear Overhauser enhancement spectroscopy
HSQC	Hetero nuclear single quantum correlation
HMBC	Hetero nuclear multiple quantum correlation
DEPT	Distortionless electron by polarisation transfer
$CDCL_3$	Deutriated Chloroform
2D-NMR	2 Dimension Nuclear Magnetic Resonance
1D-NMR	1 Dimension Nuclear Magnetic Resonance
FTIR	Fourier Transform Infrared spectroscopy
UV	Ultraviolet spectroscopy
LC	Lethality concentration
^{13}C	Carbon-NMR
J	Coupling constant
^{1}H `	Proton-NMR
TLC	Thin layer chromatography
Ppm	parts per million
S, d, t, q, m	singlet, doublet, triplet, quartet, multiplet
EtoAc: hex	ethyl acetate: hexane

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