

**VOLATILE CONSTITUENTS AND TRACE METAL ANALYSIS OF
ALPINIA CONCHIGERA GRIFF.**

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**DISSERTATION SUBMITTED IN FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE**

**FACULTY OF SCIENCE
UNIVERSITY OF MALAYA
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FEBRUARY 2014

ABSTRACT

The rhizomes and leaves of *Alpinia conchigera* were extracted by supercritical fluid extraction (SFE) technique using liquid carbon dioxide at constant temperature (40°C) with two different pressures (A1: leaves extract at 1500 psi; A2: leaves extract at 5000 psi; B1: rhizomes extract at 1500 psi; B2: rhizomes extract at 5000 psi). The volatile constituents of the extracts were detected by GCMS. The major compound was identified as acetoxychavicol acetate in all the extracts. Besides that, β - bisabolene, chavicol, *trans-p*-coumaryl diacetate and acetoxyeugenol acetate were detected too. The concentration of macronutrients and trace metal for rhizomes and leaves of *Alpinia conchigera* were determined using microwave digestion method and analyzed by Flame Atomic Absorption Spectroscopy (FAAS). From the analysis on rhizomes and leaves of *Alpinia conchigera*, the dominant metals are Ca and Mg respectively while the Cu content is the least in all samples. B2 showed strong inhibition against dermatophytic fungi (*Trichophyton mentagrophytes*) whereas A1 and A2 revealed moderate inhibition against *Microsporum canis*, *Trichophyton mentagrophytes* and *Trichophyton rubrum*. Therefore, the rhizome extracts of *Alpinia conchigera* (B2) is more effective compared to the leaves extracts of *Alpinia conchigera* (A1 and A2).

ABSTRAK

Rizom dan daun bagi *Alpinia conchigera* telah diekstrak menggunakan teknik pengekstrakan lampau genting (SFE) dengan gas karbon dioksida pada suhu yang tetap (40°C) dan dua tekanan yang berbeza (A1:ekstrak daun pada 1500psi; A2: ekstrak daun pada 5000 psi; B1: ekstrak rizom pada 1500 psi; B2: ekstrak rizom pada 5000 psi). Komponen ekstrak yang mudah meruap telah dikenalpasti dengan menggunakan gas kromatografi jisim spektroskopi (GCMS). Acetoxychavicol acetate merupakan komponen utama yang telah dikenal pasti dalam semua ekstrak. Selain itu, β - bisabolene, chavicol, *trans-p-coumaryl* diacetate dan acetoxyeugenol acetate juga terkandung dalam semua ekstrak. Kepekatan kandungan makronutrisi dan logam surih bagi rizom dan daun bagi *Alpinia conchigera* telah ditentukan menggunakan kaedah penguraian gelombang mikro dan dianalisis oleh Nyalaan Penyerapan Atom Spektroskopi (FAAS). Analisis dari rizom dan daun bagi *Alpinia conchigera* menunjukkan kepekatan Ca dan Mg masing-masing adalah dominan manakala kepekatan Cu merupakan yang terendah dalam kedua-dua sampel. B2 menunjukkan kerencatan yang tertinggi terhadap fungus dermatofitik (*Trichophyton mentagrophytes*) manakala A1 dan A2 menunjukkan kerencatan yang sederhana terhadap fungus dermatofitik *Microsporum canis*, *Trichophyton mentagrophytes* dan *Trichophyton rubrum*. Oleh yang demikian, ekstrak rizom bagi *Alpinia conchigera* (B2) adalah lebih efektif berbanding ekstrak daun bagi *Alpinia conchigera* (A1 dan A2).

ACKNOWLEDGEMENTS

Bismillah ir-Rahman ir-Rahim, Praise to Allah the Most Gracious and Compassionate for giving me strength and spiritual guidance during my research. I wish to express my honest gratitude towards my supervisors, Professor Dr. Khalijah Awang and Associate Professor Dr. Nor Kartini Abu Bakar for their continuous support, guidance and patience throughout my research.

I would also like to express my deep appreciation towards the members of the Herbarium members (Mr. Din Mohd Noor, Mr. Rafly and Mr. Teo) and the staff of the Chemistry Department (Ms. Norzalida, Mr. Nordin, Mrs. Dara Fiona, Mr. Mat and Mr. Siew) for their help and guidance in completing my research. My heartfelt thanks and appreciation also goes to my Phytochemistry laboratory members (Mr. Chong, Mr. Fadzli, Mr. Tiong, Mr. Azrul, Mr. Remy, Dr. Jamil, Mr. Wali, Mr. Arshia, Mr. Ahmad Kaleem, Mr. Omar, Mrs. Shelly, Mrs. Norsita, Mrs. Nurul, Mrs. Azeana, Mrs. Syazreen, Ms. Sook Yee, Mrs. Julia, Mrs. Chan, Mrs. Ayu, Mrs. Faizah, Mrs. Mahfuzah, Ms. Lailey, Ms. Aimi, Ms. Hazrina, Dr. Yasodha, Ms. Devi and Ms. Rosalind) and friends for their willingness to assist me with my work, as well as showering me with encouragement and support.

Last but not least, I would like express my special appreciation to my family (Abah, Mama, Shima, Wan, Fatin and Aiman) for their endless love, support and encouragement.

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LIST OF SYMBOLS AND ABBREVIATIONS

α	Alfa
ANOVA	Analysis of variance
β	Beta
Cd	Cadmium
Ca	Calcium
cm	Centimeter
C.V	Coefficient variation
cfu	Colony forming unit
Cu	Copper
R^2	Correlation coefficient
FAAS	Flame Atomic Absorption Spectroscopy
FAO	Food and Agricultural Organization
GC-MS	Gas Chromatography Mass Spectrometry
GC-FID	Gas Chromatography Flame Ionization Spectrometry
g	Gram
IC ₅₀	Half maximal inhibitory concentration
HCL	Hollow Cathode Lamp
Fe	Iron
Pb	Lead
L	Litre
LOD	Limit of detection
LOQ	Limit of quantitation
Mg	Magnesium
Mn	Manganese
μm	Micrometre
$\mu\text{g/g}$	Microgram per gram
mg	Milligram

mg/L	Milligram per litre
ml	Millilitre
mm	Millimetre
MIC	Minimum inhibitory concentration
MFC	Minimum fungicidal concentration
nm	Nanometre
ppm	Parts per million
P	Phosphorus
K	Potassium
Na	Sodium
SFE	Supercritical Fluid Extraction
S.D	Standard deviation
UPLC-MS-MS	Ultra Performance Liquid Chromatography Tandem Mass Spectrometry
V	Vanadium
v/v	Volume per volume
w/w	Weight per weight
WHO	World Organization Health