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

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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 dermathophytic 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).

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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
µg/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