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PHYTOCONSTITUENTS OF ETHANOL EXTRACT OF *MALLOTUS PHILIPPENSIS* (LAM.) MULL. ARG. VAR. *PHILIPPENSIS* (EUPHORBIACEAE)

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ABSTRACT

An ethnomedicinal plant, *Mallotus philippensis* (Lam.) Mull. Arg., var. *philippensis* was analyzed for Gas Chromatography-Mass Spectrometry analysis. Polarity based with organic solvents such as hexane, chloroform and ethanol extracts were subjected to determine the successive values. The present findings showed fifteen compounds in ethanol extract of leaves.

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Key Words

Medicinal plant, *Mallotus philippensis* var. *philippensis*, leaves, chemical composition, GC-MS analysis.

INTRODUCTION

The genus *Mallotus* Lour., (Euphorbiaceae) comprises of about 150 species in the world, of which 20 species has been reported from India¹ and 11 species with 2 varieties were reported from Tamil Nadu state². An ethnomedicinal plant, *Mallotus philippensis* (Lam.) Muell. Arg., var. *philippensis* locally known as *Kapilapodi* has been used medicinally for long time throughout India. The leaves are used externally for parasitic infections, aphrodisiac, skin infections, wound healing^{3, 4, 5}. Recent work has reported an antifilarial activity of *M. philippensis*⁶. Ethnobotanically, the leaves are used for the treatment of skin diseases by Malayali tribes of Javadu hills at Tiruvannamalai district, Tamil Nadu and for vertigo by Korku tribes of Amravati district at Maharashtra, India⁷. Phytochemically, the compound Berginine was isolated from the leaves⁸.

After scrutiny of published literature, so far no sufficient work has been done regarding the GC-MS analysis of leaves on this selected plant. The active principles of many drugs found in plants are secondary metabolites⁹ and so the phytochemical investigation on the extracts for their main phytocompounds is very vital. Hence in the present study, the ethanol extracts of leaves of *M. philippensis* were screened for Gas Chromatography-Mass Spectrometry.

MATERIALS AND METHODS

Plant Material and Preparation of the Extracts

The leaves of *Mallotus philippensis* (Lam.) Muell, Arg. (Euphorbiaceae) were collected from the Marakanam Reserve forest, Tamil Nadu and its botanical identity was confirmed at French Institute Herbarium, Pondicherry. The herbarium specimens were deposited at Bio-Science Research Foundation, Pondicherry for further reference (Voucher no. ACTDKVJ42).

The leaves were chopped into small pieces, shade-dried and powdered. The obtained powder was then subjected to successive extraction with organic solvents such as hexane, chloroform and ethanol by Soxhlet method. The extracts were then collected and distilled at atmospheric pressure and the last trace of the solvents was removed *in vacuo* and stored at 4°C. The ethanol extract used for GC-MS analysis respectively.

Determination of Successive Extractive values

All the successive extracts of leaves were subjected to determine the Successive extractive values by following the standard methods¹⁰.

Gas Chromatography-Mass spectrometry (GC-MS) analysis

GC-MS analysis was performed with GC Clarus 500 Perkin Elmer equipment. Compounds were separated on Elite-1 capillary column (100% Dimethylpolysiloxane). Oven temperature was programmed as follows: isothermal temperature at 50°C for 2 min, then increased to 200°C at the rate of 10°C/min, then increased up to 280°C at the rate of 5°C/min held for 9 min. Ionization of the sample components was performed in the EI mode (70 eV). The carrier gas was helium (1ml/min) and the sample injected was 2 µl. The detector was Mass detector turbo mass gold-Perkin Elmer. The total running time for GC was 36 min and software used was Turbomass 5.2. The individual constituents were identified by comparing their mass spectra with the spectra of known compounds stored in the spectral database, NIST (version year 2005).

RESULTS AND DISCUSSION

The successive extraction values of leaves are given in the Table 1. The successive extractive values recorded in leaves were hexane (13%), chloroform (9%), ethanol (10.5%) respectively.

Table 1. Successive extractive values of leaves of *Mallotus philippensis* var. *philippensis*.

Parts used	Solvents	Successive extractive values
Leaves	Hexane	13.0%
	Chloroform	9.0%
	Ethanol	10.5%

The compounds identified by GC-MS analysis were enumerated with molecular formula, retention time, molecular weight and peak area % (Table 2). GC-MS analysis of an ethanol extract showed 15 compounds, of which, 7 compounds were belonged to aromatic groups and 8 compounds were belonged to aliphatic groups. In aromatic groups, 3 compounds belonged to organic esters and one compound each

belonged to hydrocarbon, phenol, sesquiterpene respectively. In aliphatic groups, 7 compounds belonged to fatty acid groups and one compound belonged to diterpene alcohol group. Among organic esters, diethyl phthalate found to be present as major component with highest peak area of 94.47% and retention time 11.29 followed by methyl salicylate with peak area (2.42%) and retention time (6.30).

Table 3. GC-MS analyses of ethanol extract of the leaves of *Mallotus philippensis* var. *philippensis*.

S. No.	Name of the Compounds	Molecular formula	Retention time(mm)	Molecular weight	Peak area %
1. Aromatic Groups					
<i>(i) Organic Esters</i>					
1.	Methyl Salicylate	C ₈ H ₈ O ₃	6.30	152	2.42
2.	Benzoic acid, 2-hydroxy-, ethyl ester	C ₉ H ₁₀ O ₃	7.38	166	0.06
3.	Diethyl phthalate	C ₁₂ H ₁₄ O ₄	11.29	222	94.96
<i>(ii) Hydrocarbons</i>					
4.	Tricyclo[4.3.0.0(7,9)]nonane, 2,2,5,5,8,8-hexamethyl-, (1 α ,6 β ,7 α ,9 α)-	C ₁₂ H ₂₆	13.67	206	0.02
<i>(iii) Phenols</i>					
5.	1,4-Benzenediol, 2-methyl-	C ₇ H ₈ O ₂	13.95	124	0.07
<i>(iv) Sterols</i>					
6.	β -sitosterol	C ₂₅ H ₅₀ O	29.33	414	0.10
<i>(v) Sesquiterpenes</i>					
7.	Neoisolongifolene, 8-bromo-	C ₁₅ H ₂₃ Br	27.11	282	0.03
2. Aliphatic Groups					
<i>(i) Fatty acids</i>					
8.	n-Hexadecanoic acid	C ₁₆ H ₃₂ O ₂	16.17	256	0.14
9.	9, 12-Octadecadienoic acid (Z,Z)-	C ₁₈ H ₃₂ O ₂	18.74	280	0.01
10.	9, 12, 15-Octadecatrienoic acid, methyl ester, (Z,Z,Z)-	C ₁₉ H ₃₂ O ₂	18.88	292	0.06
11.	9,12-Octadecadienoic acid, methyl ester, (E,E)-	C ₁₉ H ₃₄ O ₂	18.99	294	0.01
12.	Octadecanoic acid	C ₁₈ H ₃₆ O ₂	19.14	284	0.01
13.	Methyl ricinoleate	C ₁₉ H ₃₆ O ₃	20.94	312	0.11
14.	Ricinoleic acid	C ₁₈ H ₃₄ O ₃	21.96	298	1.98
<i>(ii) Diterpene alcohol</i>					
15.	Phytol	C ₂₀ H ₄₀ O	18.43	296	0.01

Secondary metabolites in plant products are responsible for several biological activity in man and animals¹¹. The active components usually interfere with growth and metabolism of microorganisms in a negative

manner¹². From the result, the chemical constituents identified by GC-MS in ethanol extract. Medicinally, diethyl phthalate was used for the preparation of 67 consumer formulations including bath preparations

(oils, tablets, and salts), eye shadow, toilet waters, perfumes and other fragrance preparations, hair sprays, wave sets, nail polish and enamel removers, nail extenders, bath soaps, detergents, aftershave lotions, and skin care preparations^{13, 14} and also as a component in insecticide sprays and mosquito repellents, as a camphor substitute¹⁵. Thus the compound identified by GC-MS analysis in an ethanol extract was highly potential to treat various infectious diseases.

CONCLUSION

From our study is concluded that the bioactive compounds should be isolated, purified and identified to develop a new lead of therapeutic interest to cure various human ailments.

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