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Research Article

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DETERMINATION OF PHYTOCOMPONENTS IN THE METHANOLIC EXTRACT OF *Ipomea obscura* BY GC-MS ANALYSIS

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ABSTRACT

Plants have been an important source of medicine with qualities for thousands of years. Phytochemicals are the chemicals extracted from plants. These organic chemicals are classified as primary or secondary constituents, depending on their role in plant metabolism. GC-MS method used for the analysis of the obtained extract can be an interesting tool for testing the amount of some active principles in herbs used in various industries. The aim of this study was to carry out for identification of bioactive compounds from the whole plant methanolic extract of *Ipomea obscura* by Gas chromatography and Mass spectroscopy (GC-MS). GCMS analysis of methanolic extract was done by standard protocol using the equipment Perkin-Elmer Gas Chromatography–Mass Spectrometry, while the mass spectra of the compounds found in the extract was matched with the National Institute of Standards and Technology (NIST) library. The GC-MS analysis revealed the presence of various compounds like 1-(+)-Ascorbic acid 2,6-dihexadecanoaten, Cyclohexane, 1-Ethenyl-1-Methyl-2,4-Bis, 9,12,15-Octadecatrienoic Acid, (Z,Z,Z), Oleic Acid, Propyl Ester and Icosanoic Acid in the methanolic extract of *Ipomea obscura*. These findings support the traditional use of *Ipomea obscura* in various disorders.

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INTRODUCTION

Plants have been an important source of medicine with qualities for thousands of years. Plants are used medicinally in different countries, and they are the source of many potent and powerful drugs. Mainly on traditional remedies such as herbs for their history, they have been used as popular folk medicines (Sathyaprabha *et al.*, 2010). It has been shown that *in vitro* screening methods could provide the needed preliminary observations

necessary to elect crude plant extracts with potentially useful properties for further chemical and pharmacological investigations (Mathekaga *et al.*, 1998):

Phytochemistry or plant chemistry has developed in recent years as a distinct discipline, somewhere in between natural product organic chemistry and plant biochemistry and is closely related to both. It is concerned with the enormous variety of organic substances that are elaborated with and accumulated by plants and deals with the chemical structures of these substances,

their biosynthesis, turn over and metabolism, their natural distribution and their biological function (Harborne, 1986).

Phytochemicals are the chemicals extracted from plants. These organic chemicals are classified as primary or secondary constituents, depending on their role in plant metabolism. Primary constituents include the common sugars, aminoacids, proteins, purines and pyrimidines of nucleic acids, chlorophyll's etc. Secondary constituents are the remaining plant chemicals such as alkaloids (derived from aminoacids), terpenes (a group of lipids) and phenolics (derived from carbohydrates) (Liu, 2004). Plant produces these chemicals to protect itself but recent research demonstrates that emphasizes the plant source of most of these protective, disease-preventing compounds. A true nutritional role for phytochemicals is becoming more probable every day as research uncovers more of their remarkable benefits (Hamburger and Hostettmann, 1991). Within a decade, there were a number of dramatic advances in analytical techniques including TLC, UV, NMR and GC-MS that were powerful tools for separation, identification and structural determination of phytochemicals (Roberts and Xia, 1995).

The chosen medicinal plant namely as *Ipomea obscura* L belongs to the Convolvulaceae family. *Ipomea obscura*. (Convolvulaceae) is widely distributed in India, Nepal and Bhutan. (Khare, 2007). The literature survey revealed that no biological activity done in this plant. The biological activity was screened against the microorganisms causing skin allergies, diarrhea and dysentery. A recent study with methanol extract of mature leaves reported anti-inflammatory and antinociceptive activity (Merish *et al.*, 2014, Sadique *et al.*, 1987, Chatterjee, 1990; Nadkarni, Nadkarani, 1982; Auddy *et al.*, 2003 and Asolkar *et al.*, 1992). The aim of this study is to determine the organic compounds present in the *Ipomea obscura* extract with the aid of GC-MS Technique, which may provide an insight in its use in tradition medicine.

MATERIAL AND METHODS

Plant materials

The fully mature *Ipomea obscura* leaves were collected in January 2015 from Tamil University Campus, Thanjavur District, Tamil Nadu, India from a single herb. The leaves were identified and authenticated by Dr. S. John Britto, The Director, the Rabinat Herbarium and centre for molecular systematics, St. Joseph's college Trichy-Tamilnadu. India. A Voucher specimen has been deposited at the Rabinat Herbarium, St. Josephs College, Thiruchirappalli, Tamil nadu, India.

Preparation of extracts

The collected *Ipomea obscura* whole plant was washed several times with distilled water to remove the traces of impurities from the whole plant. The plant was dried at room temperature and coarsely powdered. The powder was extracted with 70% ethanol for 48 hours. A semi solid extract was obtained after complete elimination of alcohol under reduced pressure. The extract was stored in desiccator until used. The extract contained both polar and non-polar phytocomponents of the plant material used.

GC MS analysis

GC-MS analysis was carried out on a GC clarus 500 Perkin Elmer system comprising a AOC-20i autosampler and gas chromatograph interfaced to a mass spectrometer instrument employing the following conditions: column Elite-1 fused silica capillary column (30 x 0.25mm ID x 1µMdf, composed of 100% Dimethyl polydioxane), operating in electron impact mode at 70eV; Helium gas (99.999%) was used as carrier gas at a constant flow of 1 ml /min and an injection volume of 0.5 µl was employed (split ratio of 10:1) injector temperature 250 °C; ion-source temperature 280 °C. The oven temperature was programmed from 110 °C (isothermal for 2 min), with an increase of 10 °C/min, to 200°C, then 5°C/min to 280°C, ending with a 9min isothermal at 280°C. Mass spectra were taken at 70eV; a scan interval of 0.5 seconds and fragments from 40 to 450 Da. Total GC running time is 36min. min. The relative percentage amount of each component was calculated by comparing its average peak area to the total areas. Software adopted to handle mass spectra and chromatograms was a TurboMass Ver 5.2.0

RESULTS AND DISCUSSION

Plants have an almost limitless ability to synthesize aromatic substances, most of which are phenols or their oxygen substituted derivatives. Most are secondary metabolites, of which at least 12,000 have been isolated, a number estimated to be less than 10% of the total. These substances serve as plant defense mechanisms against, insects and herbivores. Flavonoids exhibit several biological effects such as anti-inflammatory, anti-fungal, anti-hepatotoxic and anti-ulcer actions (de-Fatima *et al.*, 2006).

GC-MS ANALYSIS

Twenty compounds were identified in *Ipomea obscura* by GC-MS analysis. The active principles with their retention time (RT), molecular formula, molecular weight (MW) and

concentration (%) are presented in (Table 1 and Fig 1). The prevailing compounds were The GC-MS analysis revealed the presence of various compounds like 1-(+)-Ascorbic acid 2,6-dihexadecanoaten, Cyclohexane, 1-Ethenyl-1-

Methyl-2,4-Bis, 9,12,15-Octadecatrienoic Acid, (Z,Z,Z), Oleic Acid, Propyl Ester and Icosanoic Acid

Fig 4 Chromatogram obtained from the GC-MS with the extract of *Ipomea obscura* leaves

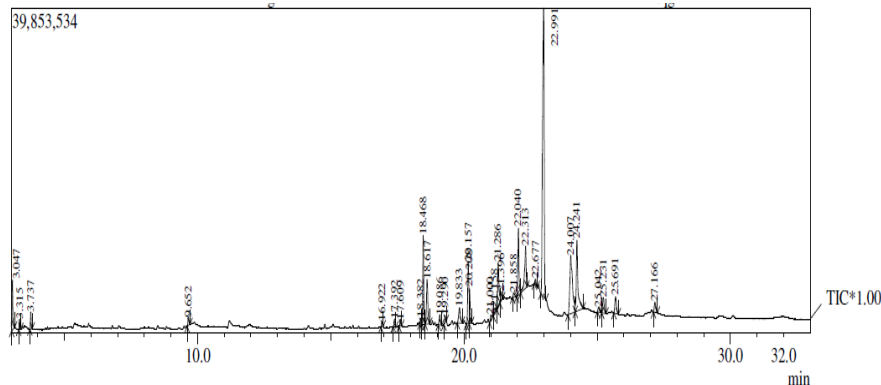


Table 1 Components identified in ethanolic extract of *Ipomea obscura* leaves (GC- MS study)

Peak#	R.Time	Area%	Molecular formal	Molecular weight	Name of the compounds
1	3.047	2.66	C ₃ H ₈ O ₃	92	Glycerin
2	3.315	0.51	C ₅ H ₈ O	84	1-Penten-3-One
3	3.737	0.86	C ₄ H ₆ O ₃	116	Propanoic Acid, 2-Oxo-, Methyl Ester
4	9.652	0.63	C ₆ H ₈ O ₄	144	4h-Pyran-4-One, 2,3-Dihydro-3,5-Dihyd
5	16.922	0.30	C ₁₅ H ₂₆ O	222	Cyclohexanemethanol, 4-Ethenyl-.Alpha.,4-Trimethyl
6	17.392	0.49	C ₁₅ H ₂₄	204	Cyclohexane, 1-Ethenyl-1-Methyl-2,4-Bis
7	17.609	0.43	C ₁₅ H ₂₄ O	406	(-)-5-Oxatricyclo[8.2.0.0(4,6)]Dodecane,,
8	18.382	0.28	C ₁₆ H ₃₀ O	238	10,12-Hexadecadien-1-Ol
9	18.468	5.65	C ₁₈ H ₃₀ O ₂	278	9,12,15-Octadecatrienoic Acid, (Z,Z,Z)
10	18.617	3.63	C ₁₅ H ₂₄	204	Bicyclo[5.2.0]Nonane, 2-Methylene-4,8,8-
11	19.086	0.83	C ₁₅ H ₂₄ O	220	Bergamotol, Z-.Alpha.-Trans-
12	19.290	0.44	C ₁₅ H ₂₄ O	220	Bergamotol, Z-.Alpha.-Trans-
13	19.833	1.82	C ₁₅ H ₂₄ O	220	2-(4a,8-Dimethyl-1,2,3,4,4a,5,6,7-Octahydro-Naphthalen-2-Yl)-Prop-2-
14	20.157	4.90	C ₂₁ H ₃₄ O ₂	318	Androstan-17-One, 3-Ethyl-3-Hydroxy-,
15	20.208	2.07	C ₁₅ H ₂₄ O	220	2-(4a,8-Dimethyl-1,2,3,4,4a,5,6,7-Octahydro-Naphthalen-2-Yl)-Prop-2-
16	21.000	0.55	C ₁₅ H ₂₂ O ₂	234	6-(1-Hydroxymethylvinyl)-4,8a-Dimethyl-3,5,6,7,8,8a-Hexahydro-1H-
17	21.158	0.67	C ₂₁ H ₃₄ O ₂	318	Androstan-17-One, 3-Ethyl-3-Hydroxy-,
18	21.286	4.08	C ₁₅ H ₂₂ O ₂	234	Glaucic Acid
19	21.396	0.74	C ₁₈ H ₃₀ O ₂	292	9,12,15-Octadecatrienoic Acid, (Z,Z,Z)
20	21.858	0.45	C ₂₁ H ₄₀ O ₂	282	Oleic Acid, Propyl Ester
21	22.040	5.01	C ₃₈ H ₆₈ O ₈	652	L-(+)-Ascorbic Acid 2,6-Dihexadecanoate
22	22.313	4.58	C ₂₂ H ₃₂ O ₂	328	Doconexent
23	22.677	0.40	C ₁₅ H ₂₀ O ₂	232	Germacra-1(10),4,11(13)-Trien-12-Oic Acid, 6.Alpha.-Hydroxy-, .Gamma.-La
24	22.991	33.75	C ₁₅ H ₁₈ O ₂	230	Azulen[4,5-B]Furan-2(3H)-One, 3a,4,6a,7,8,9,9a,9b-Octahydro-6-M
25	24.007	10.74	C ₅₇ H ₁₀₄ O ₆	282	9-Octadecenoic Acid, 1,2,3-Propanetriyl E
26	24.241	8.29	C ₁₈ H ₃₆ O ₂	282	Octadecanoic Acid
27	25.042	0.60	C ₈ H ₁₄ O ₂	252	Spiro[2.4]Heptane-5-Methanol, 5-Hydroxy
28	25.231	1.62	C ₃₂ H ₅₂ O ₂	468	9,19-Cycloergost-24(28)-En-3-Ol, 4,14-Dimethyl-, Acetate, (3.B
29	25.691	1.91	C ₂₄ H ₃₂ O ₅	400	Bufa-20,22-Dienolide, 14,15-Epoxy-3,11-Dihydroxy-, (3.Bet

30	27.166	1.12	C ₂₀ H ₄₀ O ₂	312	Icosanoic Acid
		100.00			

Identification of components

Interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST) having more than 62,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components stored in the

NIST library. The name, molecular weight and structure of the components of the test materials were ascertained. The biological activities listed (Table 2) are based on Dr.Duke's Phytochemical and Ethnobotanical Databases by Dr. Jim Duke of the Agricultural Research Service/USDA.

Table 2 Biological Activity of phyto-components identified in the ethanolic extracts of the *Ipomea obscura* leaves by GC-MS.

Peak#	R.Time	Area%	Name of the compound	Biological Activity**
1	22.040	5.01	l-(+)-Ascorbic acid 2,6-dihexadecanoaten,	Vitamin c, Antioxidant , immunomodulator
2	17.392	0.49	Cyclohexane, 1-Ethenyl-1-Methyl-2,4-Bis	Antimicrobial
3	21.396	0.74	9,12,15-Octadecatrienoic Acid, (Z,Z,Z)	Hypocholesterolemic, Nematicide Antiarthritic , Hepatoprotective, Anti androgenic, Nematicide 5-Alpha reductase inhibitor, Antihistaminic Anticoronary, Insectifuge, Antieczemic
4	21.858	0.45	Oleic Acid, Propyl	Anemiagenic, Antialopepic, Antiandrogenic, Antiinflammatory , Antileukotriene-D4 (Anti-platelet activating factor), Cancer-Preventive, Choleric, Dermatitigenic Flavor, Hypocholesterolemic, Insectifuge Irritant, Percutaneostimulant, Perfumery, Propepic
5	27.166	1.12	Octadecanoic Acid	Lower LDL Cholesterol level, Antiviral, antiinflammatory, Hypocholesterolemic,

**Source: Dr.Duke's phytochemical and ethnobotanical databases [Online database].

CONCLUSION

The investigation concluded that the stronger extraction capacity of methanol could have been produced number of active constituents responsible for many biological activities. So that those might be utilized for the development of traditional medicines and further investigation needs to elute novel active compounds from the medicinal plants which may be created a new way to treat many incurable diseases.

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Reference:

- Asolkar L. V., Kakkar K. K., Chakre O. J., "Second Supplement to Glossary of Indian Medicinal Plant with Active Principles," NISCAIR, New Delhi, India, 1992, pp. 1965-1985.
Auddy B., Ferreira M., Blasina F., Lafon F.,

- Arredondo F., Dajas F., Tripathi P. C., Seal, T., Mukherjee B., *J. Ethnopharmacol.*, 84, 131138 (2003).
- Chatterjee A., "Treaties of Indian Medicinal Plants," Council for Scientific and Industrial Research, New Delhi, India, 1990, p. 327.
- de-Fatima A, Modolo LV, Conegero LS, Pilli RA, Ferreira CV, Kohn LK, de-Carvalho JE. (2006). Lactones and their derivatives: biological activities, mechanisms of action and potential leads for drug design. *Curr. Med. Chem.* 13: 3371-3384.
- Hamburger M, Hostettmann, K. (1991) Bioactivity in plants: the link between phytochemistry and medicine. *Phytochemistry.* 30; 3864-3874.
- Harborne, J.B. (1986). Plant flavonoids in biology and medicine: Biochemical, pharmacological, and structure-activity relationships. NY, USA: Alan R. Liss. pp. 15-24.
- Khare CP. Indian Medicinal Plant. Springer Science and Business Media Publisher, 2007, 428
- Liu RH. (2004). Potential synergy of phytochemicals in cancer prevention: Mechanism of action. *Journal of Nutrition*, 134(12 Suppl.); 3479S-3485S.
- Mathekaga, AD, and Meyer JJM. Antibacterial activity of South African *Helichrysum* species. *South Afr J Bot* 1998; 64:293-5.
- Merish S, Tamizhamuthu M and TM Walter. 2014 Review of *Mollugo cerviana* with special reference to traditional Siddha medicine. Research and Reviews: *Journal of Pharmacognosy and Phytochemistry.* 2(1) 5-10.
- Nadkarni K. M., Nadkarani A. K., "Indian Material Medica," Vol. I, Popular Prakashan, Bombay, 1982, p. 531.
- Roberts JKM, Xia JH. (1995) High-resolution NMR methods for study of higher plants, *Methods Cell Biol.* 49; 245-258.
- Sadique J, Chandra T, Thenmozhi V, Elango V. The anti-inflammatory activity of *Enicostemma littorale* and *Mollugo cerviana*. *Biochem Med Metab Biol.* 1987 Apr; 37(2):167-76
- Sathyaprabha G, Kumaravel S, Ruffina D, Praveenkumar P. A comparative study on antioxidant, proximate analysis, antimicrobial activity and phytochemical analysis of *Aloe vera* and *Cissus quadrangularis* by GC-MS. *J Pharma Res* 2010; 3:2970-3.

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