GC-MS analysis of *Holarrhena antidysentrica Wall* Flower

Paramanantham, M* and. Murugesan, A.

ABSTRACT

Objective: To investigate the phytoconstitutent of ethyl acetate extract of holarrhena antidysentrica using GC-MS. M**ethods :** GC-MS analysis of flowers extract were performed using a Thermo GC-Trace Ultra VERSION :5.0 interfaced to a Thermo Mass Spectrometer DSQ II , fused Silica Capillary Column (30mmX 0.25mm 1DX1 eMdf ,composed of 100% Dimethyl polysiloxane). **Results:** The results of the GC-MS analysis confirmed the presence of thirty compounds. The most prevailing compounds are-1-Eicosanol, Hexadecane, Sigmastane 1,3-dione,Behenic alcohol etc.

* **Conclusions:** From the results, it can be concluded that the flowers extract show the presence of 30 phyto compounds. The presence of various bioactive compounds justifies the use of the plant flower for various ailments by traditional practitioners.

Index Terms:- Green Synthesis, GCMS – Analysis, Holarrhena antidysentrica, Nano particle

1. Introduction

The natural products has act as a major role in primary health care, most of the developing countries follow the medicinal plants are for medicine to be safe and effective. The value of medicinal plant s as potential source of new compounds and drug development (Bobbarala V etal., 2011;). The literature survey reveal the presence of alkaloids, tannins ,xanthoproteins .carboxylic acid, coumarins, and carbohydrates(Sharma.P etal., 2010);. Hence the modern methods describing the identification and quantification of active

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constituents in the plant material maybe ful for proper standardization of herbals and its formulations[3].

Holarrhena antidysenterica Wall. (Apocyanaceae), commonly known as "kutaja" is an important plant used in indigenous systems of medicine as remedy for bronchitis, hematuria, spermatorrhoea, epilepsy, asthma, piles, leprosy, eczema, diarrhea, fever and jaundice (Bhattacharjee, 2000; Guha Basshi et al., 2001). Various parts of H. antodysenterica have been reported to possess antibacterial activity (Jolly and Mechery 1996; Sujan Ganapathy et al., 2008). The bark has been reported to possess a stringent and antidiarrheal properties (Chopra et al., 1982). Leaves of the plant are used to cure scabies (Prajapati et al., 2004).

H. antidysentrica (W.) is commonly known as "kudappalai" in vazhaithoppu tribals of Sathuragiri hills,Western Ghats of Tamil Nadu(Maruthupandian etal 2011;). The plant have been used by Ayurvedic physicians in India for external use to treat to skin problems, dermatitis, cure the snakebites[5].

The present study was aimed to identify the chemical constituents in Ethyl acetate flower extract of *H. antidysentrica* were analyzed by the GC-MS technique through phytochemical screening

2. Materials and methods

The flowers of *H. antidysentrica (W.) were* collected from the sathuragiri Biosphere Reserve, Western Ghats, Tamil Nadu. The plants were shaded dried, weighed and transferred to stoppered flask, and treated with ethyl acetate until the powder is fully immersed. The flask was shaken every hour for the first 12 hours and then it was kept aside and again shaken after 24 hours. This process was repeated for 3 days and then the extract was filtered. The extract was collected and evaporated to dryness by using a vacuum distillation unit. The final residue thus obtained was then subjected to GC-MS analysis.

2.1. GC-MS Analysis

GC-MS analysis of these extracts were performed using a Perkin-Elmer GC Clarus 500 system and Gas chromatograph interfaced to a Mass spectrometer (GC-MS) equipped with a DSQ II, fused silica capillary column (30mmX0.25mm 1D X 1 f Mdf, composed of 100% Dimethyl poly siloxane). For GC-MS detection, an electron ionization system with ionizing energy of 70 eV was used. Helium gas (99.999%) was

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used as the carrier gas at constant flow rate 1ml/min and an injection volume of 2fl was employed (split ratio of 10:1); Injector temperature 260 °C; Ion-source temperature 350 °C. The oven temperature was programmed from 70 C (isothermal for 2 min.), with an increase of 10 C/min, to 150 C, then 5 C/ min to 220 C, 10C/min to 260c ending with a 10 min isothermal at 350 C. Mass spectra were taken at 70 eV; a scan interval of 0.5seconds and fragments from 45 to 450 Da. Total GC running time was 38 minutes. The relative % 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.

Interpretation on mass spectrum GC-MS was conducted using the database of the South Indian Textile Research Association (SITRA) having more than 50,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components stored in the SITRA library. The Name, Molecular weight and structure of the components of the test materials were ascertained.

1. 3. Results

The phytochemical compounds present in the ethyl acetate extract of plant flower of *H. antidysentrica* were identified by GC-MS analysis (Fig.1). The active principles with their retention time (RT), molecular formula, molecular weight (MW) and concentration % in the methanol extract of plant flower of *H. antidysentrica* are presented inTable1. The prevailing compounds in ethyl acetate extract of plant flower were 1-Eicosanol(11.40%), Hexadecane(9.815), Behenic alcohol (7.71%),1-Hexadecene (CAS) (7.23%),2-(1'-Naphthyl)-6-[2"-oxo-1",5"-dimethyl-4"-phenyl-(tetrahydro)pyrazol-1"-yl]-5-(hydroxymethyl)-tetrahydropyran (6.74%) 1-Octadecene (CAS) (4.12%),17-Pentatriacontene (3.84%), Styrene (3.81%),2-Propenoic acid, 2-ethylhexyl ester(3.24%)Figure2,3and 4 shows mass spectrum and structures of dl-Citrulline,Cyclobarbital,2-Pyrrolidineacetic acid and 2-Pyrrolidinone,1-ethenyl respectively and major phytocomponents and its biological activities obtained through GC-MS study of H. *antidysentrica*

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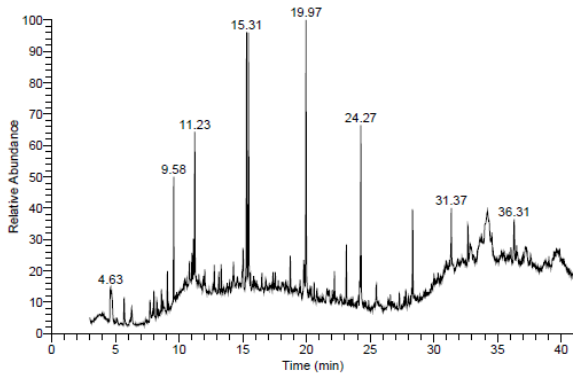

Fig.GC-MSSpectrumofHolarrhenaantidysentrica

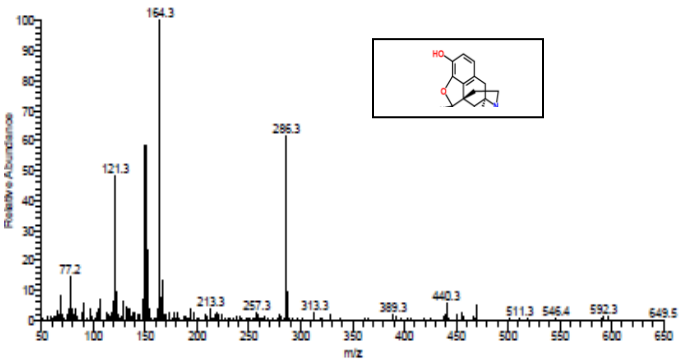

Fig2 .Mass Spectrum of Burpernorphine

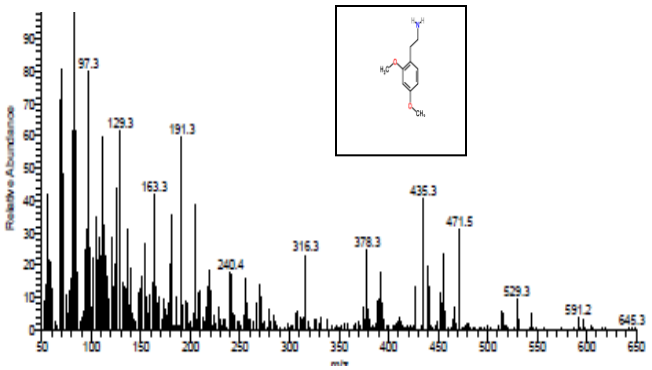

FIG2. 2,4-Dimethoxybenzene ethanamine.

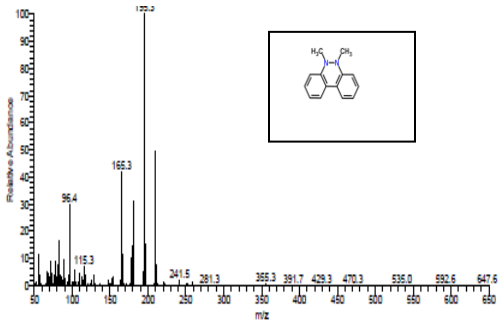

Fig3. 5,6-dihydro-5,6-dimethylbenzo[c]cinnolin

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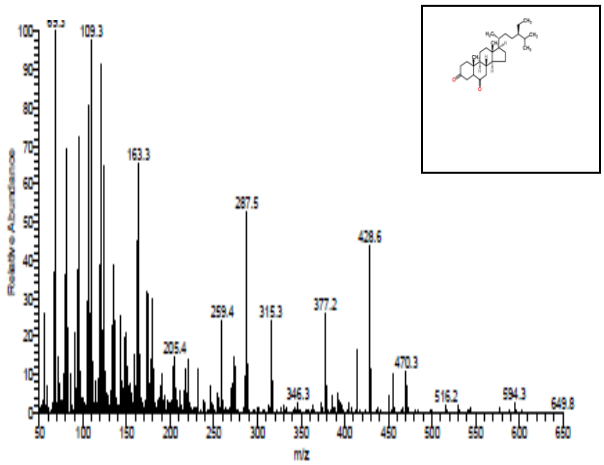

Fig4.Stigmastane-3,6-dione

Discussion

The Authenetic and chemical level is a critical step in the use of these botanical ethyl acetate extract for both scientific research purposes and synthetic commercial preparations. For any living organism, identity is very important in order to distinguish itself from other organisms within the population and other populations. , during this molecular formula, the morphological characters and phytochemical properties also play a vital role in systematic studies of phytochemistry . In recent times, in addition morphological markers, anatomical, cytological, biochemical, and molecular markers are also being used to classify the organisms. Understanding the availability of phytochemical compounds and pharmacological properties, Gas Chromatography-Mass Spectrometry (GC-MS) is a valuable tool for reliable and novel identification of phytocompounds(Sampath Kumar 20110). In the present study,30 compounds have been identified from the ethyl acetate extract of the plant flower of Holarrhena antidysentrica by Gas Chromatography-Mass Spectrometry analysis. 2,4-Dimethoxybenzene ethanamine, Burpernorphine, .Stigmastane-3,6-dioneAmong the identified phytochemicals, .

Thus this type of GC-MS analyses is the first step towards understanding the nature of active principles in this medicinal plant (Neeharika V 2012) and this type of study will be helpful for further detailed study. Further investigation into the pharmacological of Holarrhena antidysentrica from various solvent extracts and detailed phytochemistry may add new knowledge to the information in the traditional medical systems

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Appendix

GC-MS analysis of Holarrhena antidysentrica Wall Flower - Compounds detected Ethyl Acetate flower extract table

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APPENDIX

Compounds detected Ethyl Acetate flower extract of *Holarrhena antidysentrica Wall*

S.I	RT	Name of the compound	MF	MW	Peak Area (%)	Activity
1.	3.77	Hexanedioic acid, bis(2-ethylhexyl) ester (CAS)	C22H42O4	370	2.16	Antioxidant, antimicrobial, anti-proliferative
2.	4.65	Styrene	C8H8104	104	3.81	Antioxidant, antibacterial, antiasthamatic
3.	5.71	(1S,4S,8S)-8-Methoxy-1,8-dimethylbicyclo[2.2.2]oct-5-en-2-one	C11H16O2	180	1.16	Antimicrobial
4.	6.28	ETHYL HEXANOL	C8H18O	130	1.45	Antibiotic, antioxidant, anticholeresterolemic
5.	8.03	Cyclododecane (CAS)	C12H24	168	1.47	Antimicrobial, antitumour
6.	9.09	CYCLOHEXANE, (4-METHYLPENTYL)-	C12H24	168	1.17	Antimicrobial, antidiabetic, sedative
7.	9.58	2-Propenoic acid, 2-ethylhexyl ester	C11H20O2	184	3.24	Antimicrobial, antioxidant, hypotensive
8.	11.23	1-Hexadecene (CAS)	C16H32	224	7.23	Antioxidant, antiasthamatic,

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						antileukemic
9.	12.1	Hexanedioic acid, mono(2-ethylhexyl)ester	C14H26O4	258	1.36	Antimicrobial, antiulcer, cytotoxic
10	12.76	Cyclohexanecarboxylic acid, octyl ester	C15H28O2	240	1.48	Antimicrobial, antiinflamaatory
11	14.27	2(3H)-Benzo uranone, hexahydro-4,4,7a-trimethyl-	C11H18O2	182	1.65	Antimicrobial, antioxidant
12	15.02	1,2-Dihydronaphtho[2,1-b]furan	C12H10O	170	2.08	Antimicrobial, antioxidant
13	15.31	Hexadecane	C16H34	226	9.81	Antimicrobial, antioxidant, antidiabetic
14	16.06	Di(2-ethylhexyl)adipate	C22H42O4	370	1.15	Antimicrobial, anti-inflammatory
15	19.97	1-Eicosanol	C20H42O	298	11.40	Antimicrobial, antioxidant
16	21.64	1,10-Dimethoxy-5-carbonitrile-3-methyl-5H-benzo[b]carbazole-6-dione	C20H14N2O4	346	1.25	Antimicrobial, oestrogenic activity
17	22.19	5,6-dihydro-5,6-dimethylbenzo[c]cinnoline	C14H14N2	210	1.72	Antimicrobial, hyaluronidase inhibitors
18	23.13	10-Nonadecanone	C19H38O	282	1.89	Antimicrobial
19	24.27	Behenic alcohol	C22H46O	326	7.71	Antiviral
20	25.49	Phthalic acid, isobutyl pentadecyl ester	C27H44O4	432	1.99	Antimicrobial
21	28.32	1-Octadecene (CAS)	C18H36	252	4.12	Anticandida
22	30.01	1-Tricosanol (CAS)	C23H48O	340	1.50	Cytotoxic, antitrypanosomal
23	30.97	9 Buprenorphine	C29H41NO4	467	2.04	Antimicrobial, antitumour, anesthesia
24	31.37	17-Pentatriacontene	C35H70	490	3.84	Antibacterial, antiviral

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25	32.69	Dotriacontane (CAS)	C32H66	450	1.42	Antimicrobial, antioxidant, antispasmodal
26	33.63	2-{2,6-Dimethoxy-4-[(2,2-bis(ethoxycarbonyl)ethyl]phenyl}-1,10-phenanthroline	C28H28N2O6	488	2.08	Antimicrobial, antioxidant
27	34.21	Stigmastane-3,6-dione,	C29H48O2	428	8.26	Antimicrobial, anti-inflammatory, diuretic
28	36.31	Tricosane	C23H48	324	2.21	Antimicrobial, antioxidant
29	37.22	2,4-Dimethoxybenzeneethanamine	C10H15NO2	181	2.60	Antimicrobial, antioxidant
30	39.69	2-(1'-Naphthyl)-6-[2"-oxo-1",5"-dimethyl-4"-phenyl-(tetrahydro)pyrazol-1"-yl]-5-(hydroxymethyl)-tetrahydropyran	C27H31N2O34	431	6.74	Antimicrobial

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