ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Phytochemical Analysis of Ethanolic Extract of *Merremia emaraginata* Burm. F by GC-MS

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ABSTRACT

Merremia emarginata Burm. F (Convolvulaceae) is a perennial, much branched herb (creeper). It is found widely distributed all over the India. *Merremia emarginata* is also known as *Ipomoea reniformis* chois. It is reported to have many important medicinal properties. In the Indigenous system of Medicine, *Ipomoea reniformis* has been claimed to be useful for cough, headache, neuralgia, rheumatism, diuretic, inflammation, troubles of nose, fever due to enlargement of the liver and also for treating cancer. The present study was designed to investigate the phytoconstituent of the the plant *Merremia emarginata* Burm. f which contain terpenes, steroids, polyphenols, glycosides, flavanoids, carbohydrates and proteins are confirmed by preliminary phytochemical studies and GC-MS analysis.

Keywords: *Merremia emarginata*, *Ipomoea reniformis,* phytoconstituent, GC-MS

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ISSN: 0975-8585

INTRODUCTION

A knowledge of the chemical constituents of plants is desirable not only for the discovery of therapeutic agents, but also because such information may be of great value in disclosing new sources of economic phytocompounds for the synthesis of complex chemical substances and for discovering the actual significance of folkloric remedies. Hence a thorough validation of the herbal drugs has emerged as a new branch of science emphasizing and prioritizing the standardization of the natural drugs and products because several of the phytochemicals have complementary and overlapping mechanism of action. Mass spectrometry, coupled with chromatographic separations such as Gas chromatography (GC/MS) is normally used for direct analysis of components existing in traditional medicines and medicinal plants. In recent years GC-MS studies have been increasingly applied for the analysis of chinese medicinal plants as this technique has proved to be a valuable method for the analysis of non polar components and volatile essential oil, fatty acids, lipids and alkaloids [1].

Merremia emarginata Burm. F (Convolvulaceae) is a perennial, much branched herb (creeper). It is found widely distributed all over the India, especially in damp places in upper gangetic plain, Gujarat, Bihar, West Bengal, Western- Ghats, ascending up to 900m in the hills, Goa, Karnataka in India, Ceylon and Tropical Africa[2,3]. *Merremia emarginata* is also known as *Ipomoea reniformis* chois[4]. The vernicular name of *Merremia emarginata* is Musakani [Hindi], Elikkatukkirai [Tamil], ElukacheviAku [Telugu] Udiramani [Marathi] Akhukarni, bhudari bhava,[Sanskrit], Indurkani[Bengali]. It is reported to have many important medicinal properties. In the Indigenous system of Medicine, *Ipomoea reniformis* has been claimed to be useful for cough, headache, neuralgia, rheumatism, diuretic, inflammation, troubles of nose, fever due to enlargement of liver and also in kidney diseases. Powder of leaves is used as a snuff during epileptic seizures, Juice acts as purgative and the root is having diuretic, laxative, and applied in the disease of the eyes and gums[5].The present study is to invesitage the phytoconstituent of ethanolic extract of *Merremia emarginata* Burm.f through GC-MS analysis.

MATERIALS AND METHODS

Collection of plant materials

The whole plant *Merremia emarginata* were collected from surroundings of Tirunelveli. They were identified and authenticated by Prof Jayaraman, PARC, Tambaram, Chennai, Tamilnadu, India.

Sample Preparation

The whole plant *Merremia emarginata* were shade dried and pulverized well. About 20g of the powdered leaves were soaked in 100 mL of ethanol. It was left for 24 hours so that terpenoids, and other constituents if present will get dissolved. The ethanolic extract was filtered using Whatmann (number 1) filter paper and the residue was removed.

ISSN: 0975-8585

Phytochemical Screening [6, 7]

Phytochemical screening of the whole plant extract was carried out as per standard procedure

Gas Chromatography-Mass Spetroscopy [8, 9]

The ethonolic extract was subjected to GC-MS analysis on the instrument GC-MS SHIMADZU QP2010 with Elite – DB-5M column and the GC-MS solution version 2.53 software. Initially oven temperature was maintained at 70^{o}C for 2.0 minutes, and the temperature was gradually increased upto 300^{o}C at 10.0/35.0 min and 4.0 µL of sample was injected for analysis .Helium gas 99.995% of purity was used as a carrier gas as well as a eluent. The flow rate of helium gas was set to 1.5 mL/min. The sample injector temperature was maintained at 260º C and the split ratio is 20 throughout the experiment periods. The ionization mass spectroscopic analysis was done with 70 eV. The mass spectra was recorded for the mass range 40-1000 *m/z* for about 35 minutes. Identification of components was based on comparison of their mass spectra. As the compounds separated, on elustion through the column, were detected in electronic signals.

As individual compounds eluted from the Gas chromatographic column, they entered the electron ionization detector where they were bombarded with a stream of electrons causing them to break apart into fragments. The fragments were actually charged ions with a certain mass. The m/z ratio obtained was calibrated from the graph obtained which was called as the mass spectrum graph which is the fingerprint of the molecule. The identification of compounds was based on the comparisons of their mass spectra with NIST Library 2008 WILEY8, FAME.

RESULTS AND DISCUSSION

Phytochemical screening of the plant *Merremia emarginata* by GC-MS method

The phytochemical active compounds *of Merremia emarginata* were qualitatively analysed and the results are presented in Table.1 which indicates that the ethanolic extract of *Merremia emarginata* whole plant showed the presence of phytochemical active compounds such as carbohydrates, steroids, tannin, phenolic compounds, flavonoids and terpenoids [10, 11].

GC-MS Analysis

GC-MS analysis was carried out on the ethanolic extract of *Merremia emarginata* and 18 compounds were identified. The GC-MS analysis was done using the instrument GC-MS SHIMADZU QP2010 with GCMS solution version 2.53 software. The sample volume was 4.0 µL. The sample of ethanolic extract was run for 35 minutes. The Chromatogram (Figure.1) shows 7 prominent peaks in the retention time range 8.208 - 31.068. The peak at 9.342 retention time is

ISSN: 0975-8585

having the peak area 72.92. This largest peak is due to the presence of sec-Butyl nitrite. The Second less prominent peak at 17.384 retention time has the peak area 5.2 is due to the presence of Hexadeconic acid ethyl ester. The third less significant peak at 18.501 retention time with the peak area 4.32 is characteristic of 2- Hexadecen – 1 – ol. The Fourth less prominent peak at 19.020 retention time with the peak area 3.50 denotes 9, 12-Octadecadionic acid. The other important peak at 27.384 and 30.156 retention time with the peak area 1.16 and 1.38 denotes Phytosterol and Neophytadiene. The other less prominent peaks at other retention times are given in Table 2. The total ion chromatograph (TIC) showing the peak identities of the compounds identified have been given in Figure 1.

Table : 1 Preliminary Phytochemical studies

S.No	Phytoconstituent (Test)	Result
1	Alkaloids	-
2	Glycosides	+
3	Phenolics	+
4	Carbohydrates	+
5	Proteins and aminoacids	+
6	Tannins	+
7	Fixed oil and fats	+
8	Flavanoids	+
9	Steroids	+
10	Terpenoids	+
11	Saponins	+
12	Resins	+

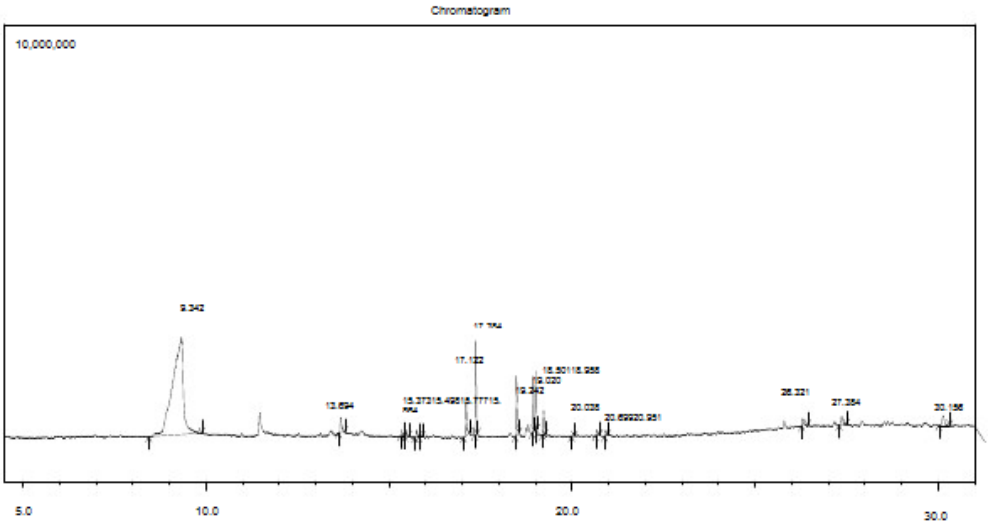

Figure : 1

ISSN: 0975-8585

PEAK	R.TIME	AREA%	NAME OF PHYTOCONSTITUENT
1	9.342	72.92	sec-Butyl nitrite
2	13.694	1.8	1,3,4,5-Tetrahydroxy-cyclohexanecarboxylic acid
3	15.373	0.24	(-)-Loliolide
4	15.498	0.19	Pluchidiol
5	15.777	0.5	2,6,10-Trimethyl, 14-ethylene-14-pentadecne
6	15.864	0.18	2-Pentadecanone, 6,10,14-trimethyl-
7	17.122	2.78	n-Hexadecanoic acid
8	17.384	5.12	Hexadecanoic acid, ethyl ester
9	18.501	4.32	2-Hexadecen-1-ol, 3,7,11,15-Tetramethyl-, [R-[R*,R*-(E)]]-
10	18.958	2.96	Ethyl(9Z,12Z)-9,12-Octadecadienoate
11	19.02	3.5	9,12-Octadecadienoic acid(9Z,12Z)-, Ethyl ester
12	19.242	1.31	Octadecanoic acid, ethyl ester
13	20.038	0.23	S-[2-[N,N-Dimethylamino]ethyl]N,N-dimethylcarbamoyl thiocarbohydroximate
14	20.699	0.35	Chloromethyl 5-chloroundecanoate
15	20.951	0.34	Ethyl icosanoate
16	26.321	0.73	alpha.-Tocopherol-.beta.-D-mannoside
17	27.384	1.16	Stigmasterol
18	30.156	1.38	Neophytadiene

CONCLUSION

The result of the present investigation reveals that the alcoholic extracts of *Merremia emarginata* possessed significant antiarthritis activity which was analyzed by phytochemical screening and GC-MS analysis. The plant extract reveals the presence of carbohydrates, steroids, tannin, phenolic compounds, flavonoids and terpenoids. The GC-MS analysis of the ethanolic extract of *Merremia emarginata* reveals the presence of phytoconstituents belonging to the type-acids, esters, alcohols, ethers, *etc.* Thus, the medicinal plant *Merremia emarginata* is found to possess significant phytoconstituents. The presence of such a variety of phytochemicals may be attributed to the medicinal characteristics of this plant *Merremia emarginata.*

ACKNOWLEDGEMENT

The author thanks Dr. Grace Rathnam, Director of the institute for facilities and Mr. Srinivasan for getting chemicals in right time. And also thank the Sargam metals, Lab in charge. For analyzing the plant sample for GC-MS.

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