INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230 – 8407

Research Article

GC-MS ANALYSIS OF BIOACTIVE COMPOUNDS IN PETROLEUM ETHER EXTRACT OF *FICUS KRISHNAE*

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Article Received on: 27/09/17 Approved for publication: 20/10/17

DOI: 10.7897/2230-8407.0810204

ABSTRACT

The presence of phytochemical constituents in this selected species of Moraceae has been reported. There is no report exist on the phytochemical composition of i.e. GC-MS analysis of *Ficus krishnae* in petroleum ether extract. The present study was designed to determine the bioactive compounds in the petroleum ether extract of *Ficus krishnae* stem bark. Gas chromatography-mass spectrometry (GC-MS) analyses of petroleum ether extract of *Ficus krishnae* stem bark was investigated using Perkin-Elmer Gas chromatography-Mass spectrometry. The GC-MS analysis has shown the presence of different phytochemical compounds in petroleum ether extract of *Ficus krishnae* composition. A total of 12 compounds were identified with valuable biological activity in the above extract. From the results, it is evident that *Ficus krishnae* contain various phytocomponents and is recommended as a plant of phytopharmaceutical importance.

Keywords: GC-MS, Ficus krishnae, Bioactive compounds, terpenoids, oils.

INTRODUCTION

Medicinal plants were always identified by presence of rich sources of bioactive compounds widely used as potential drug for the treatment of various disease and WHO (World Health Organization) has also stated that the traditional medicines are safe remedies for the treatment of various heath related problems[1,2]. Now a day's the pharmaceutical companies are moving towards the formulation of the natural drugs from plant extracts because of side effect associated with synthetic drugs. *Ficus krishnae* belongs to the family Moreacae known as Makkhan kattori in Hindi and Krishna butter cup in English. Plant is native to India, found in tropical Africa and Sri Lanka [3]. Plant grows 10 m height, fast growing tree with branches. The unique character of this tree is that pocket like fold at the base of leaf. Various parts of the plant are used to treat ulcers, vomiting, fever, inflammations and leprosy. The plant is also used as aphrodisiac, as a tonic, in piles and gonorrhoea. Stem bark and leaves are useful in treatment of diabetes. The aerial roots are styptic; useful in syphilis, biliousness, dysentery and inflammation of liver [4,5]. The *Ficus krishnae* stem bark extract of petroleum ether extract has shown the potential antimicrobial activity and presence of various phytoactive compounds[6].

From the last few years, the gas chromatography mass spectrometry (GC-MS) has become the key technique for the identification of secondary metabolites present in plant species[7,8]. A detail literature survey on this plant shows that, so far there are no published reports available worldwide, related to presence of chemical components of *Ficus krishnae* stem bark extract in petroleum ether. Hence the present research was aimed to evaluate the presence of chemical compounds by GC-MS analysis.

MATERIALS AND METHOD

Collection of Plant Material and Extraction

Stem bark of *Ficus krishnae* was collected by Dev Dev vana botanical garden, Bidar, Karnataka. The plant is duly identified by Department of Botany, Gulbarga University Kalaburagi, Karnataka, India.

The stem bark was shade dried for two to four weeks. After drying, it was grinded and stored in airtight container. The air dried bark powder (100 g) was successively extracted by Soxhlet extraction with petroleum ether solvent. The extracts were dried and stored in a sterile container for further use.

Gas Chromatography-Mass Spectrum Analysis

2µl of methanol bark extract from *Ficus krishnae* was used for GC-MS analysis[9]. These extracts were dissolved in HPLC grade methanol and subjected to GC and MS JEOL GC mate equipped with secondary electron multiplier. JEOL GCMATE II GC-MS (Agilent Technologies 6890N Network GC system for gas chromatography). The column (HP5) was fused with silica 50 m x 0.25 mm I.D. Analysis conditions were 20 minutes at 100°C, 3 minutes at 235°C for column temperature, 240°C for injector temperature, helium was the carrier gas and split ratio was 5:4. The sample (1 µl) was evaporated in a split less injector at 300°C. Run time was 30minutes.

Identification of components

Interpretation of mass spectrum GC-MS was made by using the database of National Institute Standard and Technology (NIST), having more than 62,000 patterns[10]. Spectrum of the unknown component was compared with the spectrum of known

components stored in the NIST Library. Prediction of bioactivity of compound is done based on Dr. Duke's Phytochemical and Ethnobotanical Database. The relative percentage amount of each phyto-component was calculated by comparing its average peak area to the total area. The name, molecular weight, molecular formula and the structure of the components of test materials were recorded.

RESULT AND DISCUSSION

After successful extraction of *F.krishnae* with petroleum ether by soxhlet extraction method, GC-MS is a technique is applied for the identification of volatile profile of bioactive compounds[11]. It works on the separation of the separate compound by GC according to RT and even separated compound were analysed at molecular level by MS22[12]. In present study, 12 bioactive compounds have been identified from the petroleum ether extract of *Ficus krishnae* stem bark from GC-MS analysis as shown in Figure 1.

The mass spectrometer analyzes the compounds eluted at different times to identify the nature and structure of the compounds. These mass spectra are the fingerprint of that compounds giving rise to appearance of peaks at different m/z ratio, which can be identified from the library search[13]. The report on GC-MS analysis of petroleum ether extract of *Ficus krishnae* stem bark for the identification of bioactive compounds with RT and molecular formula was made as shown in Table-1 and molecular structure was predicted in Figure 2. The presences of active biological molecules in petroleum extract have the potential anti-inflammation and anti-oxidant activity of *Ficus kriushnae*[14].

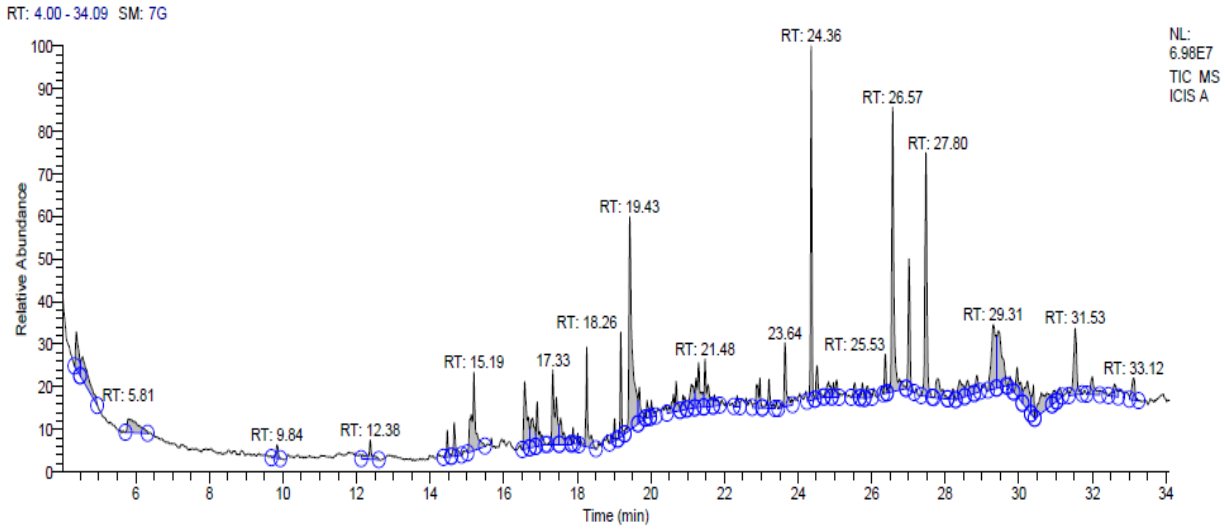

Figure 1: GC-MS Chromatogram of the petroleum ether extract of *Ficus krishnae* stem bark.

Table 1: Bioactive compounds detected in petroleum ether extract of *Ficus krishnae*bark.

Compound name	Compound nature	RT	Molecular formula	Biological activity
9,12,15-Octadecatrienoic acid	Fatty acid	4.56	$C_{27}H_{52}O_4$	Essential oil
Mellein	Phenol	14.65	$C_{10}H_{10}O_3$	Asthma, coughs, tuberculosis, and related respiratory problems
Betulin	Triterpene	29.31	$C_{30}H_{50}O_2$	Anti-inflammatory and anti-bacterial activity
Lupeol	Triterpene	29.31	$C_{30}H_{50}O$	antiprotozoal, antimicrobial, antiinflammatory, antitumor and chemopreventive properties
Cholestane3,6,7triol,	Cholestenone	27.80	$C_{27}H_{48}O_3$	Anti-bacterial activity
Bolasterone	Steroids	25.53	$C_{21}H_{32}O_2$	muscle strength and mass
Oleic acid, 3(octadecyloxy)propyl ester	Fatty acid	25.89	$C_{39}H_{76}O_3$	restored the heart's
Phytol	Diterpenes	20.88	$C_{20}H_{40}O$	Antioxidant and anticancer
nHexadecanoic acid	Fatty acid	19.43	$C_{16}H_{32}O_2$	Anti-inflammation
l(+) Ascorbic acid 2,6dihexadecanoate	-	19.43	$C_{38}H_{68}O_8$	Anti-bacterial activity
Cyclopentasiloxane, decamethyl		19.84	$C_{10}H_{30}O_5Si_5$	Biomedical application
Geranyl isovalerate	Monoterpene	16.79	$C_{15}H_{26}O_2$	Anti-inflammatory, antioxidant and anti-viral activities

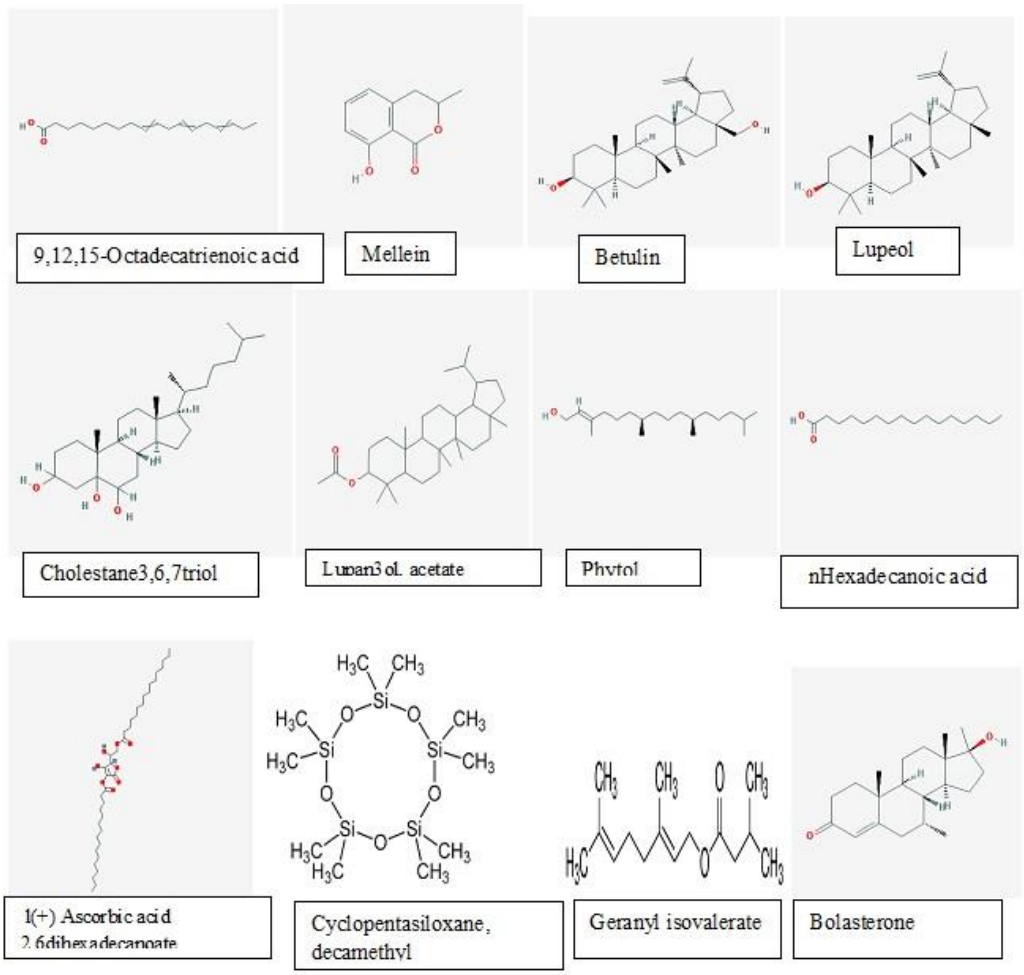

Figure 2: The molecular structure of compounds characterized by GC-MS analysis.

CONCLUSION

In this present study about 12 bioactive compounds are identified from petroleum ether extract of *Ficus krishnae* by Gas chromatogram-Mass spectrometry (GC-MS) analysis. The presences of various phytoactive compounds in this plant are responsible for the pharmaceutical properties. Therefore, it is recommended as a plant of phytopharmaceutical importance.

ACKNOWLEDGMENT

The author's are thankful to the University Grant Commission (UGC), New Delhi for providing financial support to carry out this research work under Rajiv Gandhi national fellowship (RGNF) scheme.

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Cite this article as:
Amarvani P Kanjikar & Ramesh L Londonkar. GC-MS analysis of bioactive compounds in petroleum ether extract of *Ficus krishnae*. Int. Res. J. Pharm. 2017; 8(10):178-181 http://dx.doi.org/10.7897/2230-8407.0810204

Source of support: University Grant Commission (UGC), New Delhi, Conflict of interest: None Declared