

Pharmacognostical and Phytochemical studies of the fruits of *Ficus religiosa*

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Abstract:

Ficus religiosa Linn. is a large evergreen tree found throughout India, wild as well as cultivated. It is a highly apparent plant in ayurvedic system of medicine for the treatment of various ailments. No reports are available on the pharmacognostic nature and phytochemical studies of the fruits; hence, the present study was carried out to investigate the same using GC-MS. The compound detection employed the NIST Ver. 2.0 - Year 2008 library. The results of the GC-MS analysis provide different peaks determining the presence of many phytochemical compounds with different therapeutic activities. The major phytoconstituents were n-Hexadecanoic acid; 9, 12-Octadecadienoic acid; 9, 12, 15-Octadecatrienoic acid, and Butyl 9, 12, 15-octadecatrienoate. Hence, this study offers a base of using *F. religiosa* as herbal alternative for the synthetic agents.

Keywords: GC-MS analysis, Phytochemical, Hexadecanoic acid, Octadecanoic acid.

Introduction

Ficus religiosa Linn (Moraceae) commonly known as 'Peepal tree' is a large widely branched tree with leathery, heart-shaped, long-tipped leaves on long slender petioles and purple fruits growing in pairs. The tree is regarded as a sacred tree to both Hindus as well as Buddhists. It has got mythological, religious and medicinal importance in Indian culture since ancient times [1-3]. The tree grows throughout India and widely cultivated in south-east Asia especially in vicinity of temples. In Ayurveda, *F. religiosa* belongs to a class of drugs called rasayana. Rasayana are rejuvenators, antioxidants and relieve stress in the body [4-5]. In India it is known by several vernacular names, the most commonly used ones being Asvatthah (Sanskrit), Sacred fig (Bengali), Peepal (Hindi), Arayal (Malayalam), Ravi (Telgu) and Arasu (Tamil) [6].

The present investigation deals with the qualitative and quantitative Pharmacognostical evaluation of the fruits of *Ficus religiosa*.

Materials and Methods:

Reagents: The reagents used during the study were of analytical grade and procured from standard laboratory suppliers i.e. absolute Methanol from Merck specialties.

Methodology: Collection of Plant Material: The Fruits of *Ficus religiosa* were collected from the Kurukshetra University campus, Kurukshetra (29°6'N, 76°5'E) in the month of August. The plant and sample specimen are identified by a taxonomist from department of Botany. The fruits were made dry.

Preparations of Plant Extract (Drug): The collected fruits were dried in the oven at 40°C temperature for 48 hours. The dried fruits were grinded to make fine powder. After measurement of powder it was

macerated in absolute methanol i.e. 100 g / 250 ml, w/v and stirred using magnetic stirrer for one day at room temperature. Extract was then filtered using Whatman filter paper No 1. After filtration, the methanol was evaporated from the extract by heating at 55°C in water bath for 12 hrs. The resulting partially solid extracts were stored at -20°C until used.

GC-MS analysis: GC-MS analysis of these extracts was carried out by following the method of Hema et al. [7] GC-MS analysis were performed using a Perkin-Elmer GC clauses 500 system and Gas Chromatograph interfaced to a mass spectrometer (GC-MS) equipped with a Elite-1, fused silica capillary column (30 m X 0.25 mm ID X 1 µ df, 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 used as the carrier gas at constant flow rate 1 ml/min and an injection volume of 2 ml 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 9 min isothermal at 280°C. Mass spectra were taken at 70eV; a

scan interval of 0.5 seconds and fragments from 45 to 450 Da.

Identification of components: The relative percentage amount of each component was calculated by comparing its average peak area to the total areas. The detection employed the NIST (National Institute of Standards and Technology) Ver.2.0-Year 2008 library. The spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library. The name of the components of the test materials was ascertained.

Results

The results pertaining to GC-MS analysis leads to the identification of number of compounds from the GC fractions of the methanolic extract of *F. religiosa*. These compounds were identified through mass spectrometry attached with GC. These observations may be due to the nature of biological active components and the stronger extraction capacity of methanol could have been produced number of active constituents. The GC-MS analysis of the extracts showed the presence of phytocomponents enlisted in Table.

Table: Phytocomponents identified in methanolic fruit extract of *F. religiosa* using GC-MS

| Peak | RT | Area % | Name of the compound | Molecular Formula | MW |
|------|--------|--------|--------------------------------|--|-----|
| 120 | 16.806 | 11.23 | n-Hexadecanoic acid | C ₁₆ H ₃₂ O ₂ | 256 |
| 122 | 16.954 | 4.35 | Hexadecanoic acid, ethyl ester | C ₁₈ H ₃₆ O ₂ | 284 |
| 133 | 18.562 | 36.459 | 12-Octadecadienoic acid | C ₁₈ H ₃₂ O ₂ | 280 |
| 134 | 18.660 | 8.879 | 12, 15-Octadecatrienoic acid | C ₁₈ H ₃₀ O ₂ | 278 |
| 135 | 18.785 | 7.05 | Octadecanoic acid | C ₁₈ H ₃₆ O ₂ | 284 |
| 160 | 25.698 | 2.29 | Butyl 9,12,15octadecatrienoate | C ₂₂ H ₃₈ O ₂ | 334 |

Discussion

The medical properties of many compounds found in GC-MS of methanolic extract of *F.*

religiosa fruits can be related to the earlier studies on the *Vitex altissima* L. The n-Hexadecanoic acid is found possess the Nematicide, Pesticide, Lubricant, Antiandrogenic, Flavor, Hemolytic5-

Alpha reductase inhibitor, Antioxidant, Hypocholesterolemic activities. The Hexadecanoic acid, ethyl ester is known to possess the Nematicide, Pesticide, Lubricant, Antiandrogenic, Flavor, Hemolytic 5-Alpha reductase inhibitor activities. The 9,12-Octadecadienoic acid is found to be have Hypocholesterolemic, 5-Alpha reductase inhibitor, Antihistaminic, Insectifuge, Antieczemic, Antiacne activities. [8]

The medical properties of other compounds can be related to earlier studies on the *cassia italic*. The 9,12,15-Octadecatrienoic acid possess the Anti-inflammatory, Hypocholesterolemic, Cancer preventive, Hepatoprotective, Nematicide, Insectifuge Antihistaminic, Antiarthritic, Anticoronary, Antieczemic Antiacne, 5-Alpha reductase inhibitor Antiandrogenic properties. [9] No medical activity of the Octadecanoic acid is known. [8-9] Also medical activity of Butyl 9,12,15-octadecatrienoate is unknown.

Conclusion

The GC-MS method is a direct and fast analytical approach for identification of phytocomponents. The importance of the study is due to the biological activity of some of these compounds. The present study, which reveals the presence of some components with unknown medical activity in *F. religiosa* suggest that the contribution of these compounds on the pharmacological activity should be evaluated.

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