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**GC-MS ANALYSIS OF PHYTOCOMPONENTS IN THE METHANOLIC EXTRACT
OF *OCIMUM SANCTUM* (TULSI)**

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ABSTRACT

Ocimum sanctum, is locally called as “Tulsi” belongs to the family *Lamiaceae*. The present study was carried out to identify the phytochemicals present in the methanolic extract of the leaves of *Ocimum sanctum* by GC-MS analysis. From the GC-MS results three compounds were identified as major constituents, they are Benzene, 1, 2-dimethoxy-4-(2-propenyl)-, Isocaryophyllene and Eugenol.

KEYWORDS

Ocimum sanctum, Leaves, *Lamiaceae*, Methanolic, GC-MS and Phytochemicals.

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INTRODUCTION

Plants are of the important sources of medicine & a large numbers of drugs in use are derived from plants. The therapeutic uses of plant are safe, economical & effective as their ease of availability¹. Among the plants known for medicinal values, plants of genus *Ocimum* belonging to family *Lamiaceae* are very important for their therapeutic potentials. *Ocimum sanctum* has two varieties i.e. black (Krishna Tulsi) and green (Rama Tulsi), their chemical constituents are similar². *Ocimum sanctum* is widely distributed covering the entire Indian sub continent, ascending up to 1800 m in the Himalayas,

to as far as the Andaman and Nicobar Islands³. Tulsi is a word of Sanskrit which means “the incomparable one” and has a very special place in the Hindu culture. Several medicinal properties have been attributed to the tulsi plant not only in Ayurveda and Siddha but also in Greek, Roman and Unani systems of medicine⁴. *Ocimum sanctum* plants are considered as one of the most important source of medicine and drugs with many secondary metabolites and essential oils recommended for treatment of malaria, diarrhea, bronchial asthma, dysentery, bronchitis, skin diseases, arthritis, painful eye disease, chronic fever and eye diseases etc^{5,6}. In addition, *Ocimum sanctum* also shows anticancerous, antifungal, antimicrobial, antifertility, hepatoprotective, antispasmodic, cardio protective, antiemetic, antidiabetic, analgesic, adaptogenic, and diaphoretic properties⁶⁻⁹. The present communication deals with the GC-MS analysis of phytochemicals in the methanolic extract of the leaves of *Ocimum sanctum*.

MATERIALS AND METHODS

Collection of the plant material

The leaves of *Ocimum sanctum* were collected from GKVK, University of Agricultural Sciences, Bangalore-65, India.

Extraction of Plant Material

Plant material (leaves, 20 Gms) was extracted with 250 mL of methanol at 60°C for 8hrs in Soxhlet extractor. The methanolic extracts were filtered through Whatmann No. 1 filter paper. The filtrate was evaporated to dryness at 80°C and stored until further analysis.

Preparation of stock solution

The extracts were reconstituted in methanol. Methanolic extracts (1 µl) were injected for GC-MS analysis.

Gas Chromatography-Mass Spectrometry analysis

The methanolic extract of the leaves of *Embllica officinalis* Gaertn was subjected to GC-MS analysis on a GC- MS Clarus 500 Perkin Elmer system comprising a AOC- 20i autosampler and gas chromatograph interfaced to a mass spectrometer

(GC-MS) instrument employing the following conditions: Restek Rtx^R – 5, (30 meter X 0.25 mm) (5% diphenyl / 95% dimethyl polysiloxane), running in electron impact mode at 70 eV; helium (99.999%) was used as carrier gas at a constant flow of 1ml/min and an injection volume of 1.0 µl was employed (split ratio of 10:1); injector temperature 280 °C. The oven temperature was programmed from 40°C (isothermal for 5 min.), with an increase of 6 °C / min to 280 °C, then ending with a isothermal for 15min at 280°C. Mass spectra were taken at 70 eV; a 0.5 seconds of scan interval and fragments from 40 to 550 Da. Total GC running time was 60 minutes.

Identification of Compounds

Interpretation on mass spectrum GC-MS was conducted using the database of National Institute of Standard and technology (NIST). The mass spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library.

RESULTS AND DISCUSSION

GC-MS analysis

GC-MS chromatogram of the methanolic extract of *Ocimum sanctum* showed three major peaks (Figure No.1) and has been identified after comparison of the mass spectra with NIST library, indicating the presence of three phytochemicals. From the results, it was observed that presence of Benzene, 1, 2-dimethoxy- 4- (2- propenyl) - (synonym: Methyl-Isoeugenol), Isocaryophyllene (synonym: Caryophyllene) and Eugenol (Synonym: 2-Methoxy-4-(2-propenyl) phenol) were the major components in the extract. The phytochemicals that contribute to the medicinal property of the plant leaves is listed in Table No.1. Methyl-Isoeugenol has the property of Antifungal activity¹⁰, Nematicidal activity¹¹ and Antifeedant activity¹². Caryophyllene is well-known for its anti-inflammatory, cytotoxicity and antifungal activity¹³⁻¹⁸. Eugenol is reported to possess Antimycotic¹⁹ Antiviral²⁰ Desinsection²¹ Antiparasitic²² Antioxidant²³ Anticancer²⁴ and Anti-insect activities²⁵.

Table No.1: Chemical constituents and its Activity of some of the phytocomponents identified in the methanolic extracts of the Leaves of *Ocimum sanctum* by GC-MS

S. No	Retention Time	Name of the Compounds	Molecular Formula	Molecular Weight	Activity**
1	21.84	Benzene, 1, 2-dimethoxy-4-(1-propenyl) -	C ₁₁ H ₁₄ O ₂	178.2	Antibacterial, Nematicide Insect-attractant Perfumery, Flavour
2	22.16	Caryophyllene	C ₁₅ H ₂₄	204.3	Anti-tumor, Analgesic, Antibacterial, Anti-inflammatory, Fungicide
3	20.77	Eugenol	C ₁₀ H ₁₂ O ₂	164.2	Acaricide, Antibacterial, Anti-inflammatory, Antioxidant, Cancer- Preventive, Antispasmodic, Antiviral, Insecticide

**Source: Dr. Duke's phytochemical and ethnobotanical database (online database)

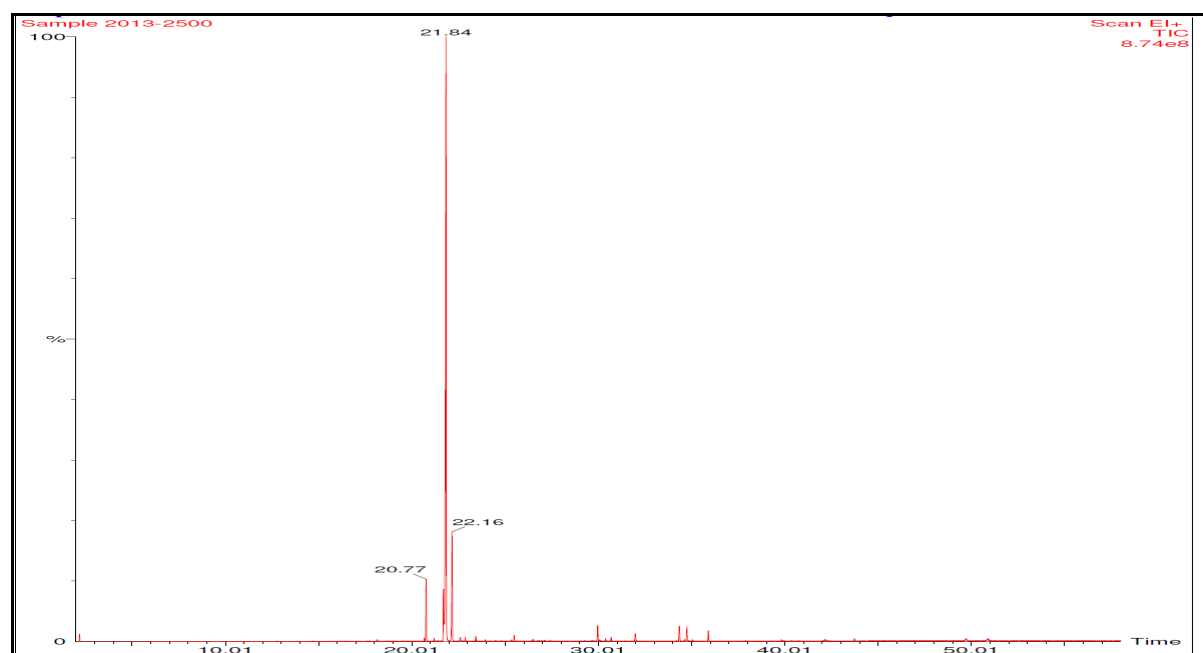


Figure No.1: GC- MS chromatogram of the methanolic extract of the leaves of *Ocimum sanctum*

CONCLUSION

The presence of various bioactive compounds justifies the uses of the tulsi leaves for various ailments by local population. However, if individual phytochemical constituents are isolated from the plant and subjecting it to pharmacological activity will definitely give fruitful results.

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