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Gc-Ms Analysis of Essential Oil of *Ocimum Sanctum*

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Abstract-Tulsi is an aromatic shrub in the basil family Lamiaceae (tribe ocimeae) that is thought to have originated in north central India and now grows native throughout the eastern world tropics. The GC-MS analysis of essential oil of *Ocimum sanctum* reported 37 compounds, out of which 9 compounds were present in greater than 1% of total compounds. 35.46% m-Eugenol, it was followed by 21.79% Caryophyllene, 7.72% Linalool, 7.33 % Alpha Terpinyl acetate, 6.12% Isoborenol, 5.87 % Eucalyptol, 4.33% Alpha Terpinol, 3.34% Camphor, and 1.17% Caryophyllene oxide.
Key words: Eugenol, GC-MS, *Ocimum sanctum,* Phytochemicals, Tulsi.

Introduction

The Lamiaceae family (formerly Labiatae) includes basil. Tulsi is known as Sritulasi in Kannada, and holy basil is known as Tulsi in Hindi, Bengali, Telugu, Marathi, Tamil, English, and Malayalam. The entire plant is used to treat bronchitis, it is used as a tonic when dried, and it is used to treat diabetes. A sugar-free cough linctus called "Diakof" that contains tulsi is helpful for both dry cough and active cough. Antioxidants are present in the natural ayurveda product "tulsichurna," which is used to enhance digestion and general health. Its pharmaceutical uses, including the treatment of cataract and cancer, were the subject of more than fifty patents (Mondal et al., 2009; Pattanayak, 2010; Shivananjappa and Joshi, 2012). Several secondary metabolites, including glucose, tannin, flavonoids, saponins, terpenoids, glycosides, fatty acids, and phenol are said to be present in tulsi leaf extract, according to the study. The quantitative analysis revealed that Tulsi leaf contains phenols in large amounts, ranging from 1.6 to 7.6 percentages. Thus, the percentages of alkaloids and flavonoids ranged from 0.91 to 1.28 and 1.56 to 2.24, respectively. Three chemicals were found to be the main elements of the methanolic extract based on the GC-MS analysis: benzene, eugenol, 1, 2-dimethoxy- 4- (2-propenyl), farnesene, and cyclohexane, 1, 2, 4-triethenyl. While it has been stated that the aerial portions (leaves, stem, and flower) of *O. sanctum* contain apigenin, methyl eugenol, urosolic acid, linalool, caryophyllene, stigmesterol, orientin, luteolin, isorienentin, molludistin, vitexin, triacontanol ferulate, aesculetin, chlorogenic acid (Laskar and Majumdar, 1988; Jadhav et al., 2004; Prakash et al., 2005; Dev et al., 2011). The present investigation was performed to find our phytochemicals present in *Ocimum sanctum* essential oil.

Materials and Methods

Collection of Plant Material

*Ocimum sanctum*leaf material was from Shahjahanpur. The Head of the Biotechnology Department at Gandhi Faiz-e-Aam College in Shahjahanpur recognized the plant materials using their taxonomical traits. All were air dried in the shade, pulverized, and utilized for extraction.

Essential oil Extraction

The hydrodistillation process uses hot water and steam as the main medium to pull bioactive compounds from the plant matrix and transport them all the way through. The disadvantage is that in order for the essential oil to float over the Clevenger apparatus, it must be less dense than water. Moving the condenser and the beaker used to collect the liquid, however, can modify this. The Clevenger gadget is notable for extracting more oil when compared to other extraction methods. This is accomplished in laboratories using Clevenger equipment.

GC-MS Analysis

All test samples underwent GC-MS analysis at the Jawaharlal Nehru University's Advanced

Instrumentation Research Facility (AIRF), in New Delhi.

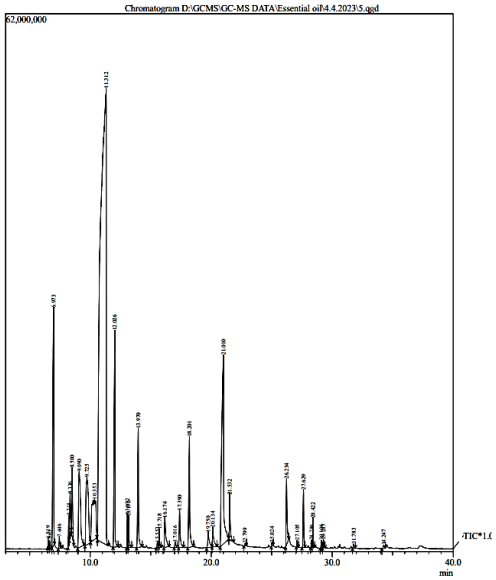
Results and Discussion

The GC-MS analysis of essential oil of *Ocimum sanctum* reported 37 compounds, out of which 9 compounds were present in greater than 1% of total compounds. 35.46% m-Eugenol with R time of 26.321, it was followed by 21.79% Caryophyllene (R Time 28.235), 7.72% Linalool (R Time 14.071), 7.33 % Alpha Terpinyl acetate (R Time 24.937), 6.12% Isoborenol (R Time 16.744), 5.87 % Eucalyptol (R Time10.780), 4.33% Alpha Terpinol (R Time 18.361), 3.34% Camphor (R Time 15.840) and 1.17% Caryophyllene oxide (R Time 34.258). The GC-MS study of *O. sanctum* essential oil found 22 components, of which 11 components could be identified. The monoterpenes hydrocarbons (such aspinene, camphene), sesquiterpene hydrocarbons (such as caryophllene, Copaene, alpha-Caryophyllene, alpha-Bourboene, and alpha alpha-cubebene), oxygenated monoterpenes (such as Caryophyllene oxide, and aromatic compounds) and sesquiterpene hydrocarbons (such as Copaene, (e.g., Eugenol, Borneol, Methyl iso-eugenol).Eugenol (15.096%) is the second major and active constituent in the essential oil of *O. sanctum* and is also present in big quantity as compared to previously reported Caryophyllene (22.265%) is present in large amount but lacking as compared to previously reported. It also serves as an antibacterial and anaesthetic in local medicine and is largely responsible for Tulsi's medicinal properties(Zafar et al., 2017, 2018a, b, c). According to Joshi, 2013 ten monoterpene hydrocarbons (15.5%), six oxygenated monoterpenes (1.6%), nine sesquiterpene hydrocarbons (6.1%), one oxygenated sesquiterpene (0.1%), and five phenyl derivatives (76.0%) were identified as volatile compounds in the *Ocimum* making up 31 constituents (99.3%) of the total oil. Eugenol (75.1%) was the most significant chemical in terms of quantity. Germacrene D (3.9%) and terpinolene (14.2%) were the other insignificant substances. The presence of these compounds in the plant extract may at least be responsible for the pharmacological properties and thus recommended as plant of phytopharmaceutical importance

Table 1: List of major compounds identified by GC-MS analysis of *Ocimum sanctum* essential oil

Peak	R. Time	Area%	Name
1	10.780	5.87	Eucalyptol
2	14.071	7.72	Linalool
3	15.840	3.34	Camphor
4	16.744	6.12	Isoborneol
5	18.361	4.33	Alpha Terpinol
6	24.937	7.33	Alpha Terpinyl acetate
7	26.321	35.46	Eugenol
8	28.235	21.79	Caryophyllene
9	34.258	1.17	Caryophyllene oxide

Figure 1: GC-MS chromatogram of *Ocimum sanctum* essential oil



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