

**Anti-fungal Analysis of Tulsi Plant (*Ocimum sanctum*)****Rohit Bhargav****Himalaya Garhwal University, Uttarakhand****DOI: <https://doi.org/10.5281/zenodo.13371891>****Abstract:**

Tulsi (*Ocimum sanctum*), also known as Holy Basil, is a revered plant in traditional medicine, particularly in Ayurvedic practices. This study aims to analyze the anti-fungal properties of Tulsi, focusing on its phytochemical constituents and their efficacy against various fungal pathogens. The findings suggest that Tulsi possesses significant anti-fungal activity, which may be attributed to its rich composition of essential oils and other bioactive compounds.

1. Introduction:

Tulsi is recognized not only for its spiritual value but also for its medicinal properties. Belonging to the Lamiaceae family, Tulsi encompasses several varieties, with *Ocimum sanctum* being the most renowned. Traditionally, Tulsi has been utilized for its anti-inflammatory, antioxidant, and antimicrobial properties. Recent studies have begun to explore its potential in combating fungal infections, which can pose severe health risks, particularly in immunocompromised individuals.

2. Literature Review:

The anti-fungal efficacy of various plant extracts has garnered significant attention in recent years. Studies have identified a variety of phytochemicals in Tulsi, including eugenol, rosmarinic acid,



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and other phenolic compounds with notable antimicrobial properties. Research indicates that the essential oil extracted from Tulsi exhibits activity against a spectrum of fungal pathogens such as *Candida albicans*, *Aspergillus niger*, and *Trichophyton* species.

3. Phytochemical Constituents of Tulsi:

1. **Essential Oils:** The essential oil derived from Tulsi leaves contains compounds like eugenol, linalool, and methyl chavicol, which have been shown to possess anti-fungal properties.
2. **Phenolic Compounds:** Tulsi is rich in flavonoids and phenolic acids that contribute to its overall health benefits and may inhibit fungal growth.
3. **Terpenoids:** These compounds are also present in Tulsi and may enhance its anti-fungal activity.

4. Materials and Methods:

4.1 Plant Material:

Fresh leaves of *Ocimum sanctum* were collected from a local herbal garden. The plant was authenticated by a botanist, and a specimen was preserved for reference.

4.2 Extraction of Essential Oil

The essential oil was extracted using steam distillation, and the yield was calculated. The oil was then subjected to GC-MS analysis to identify its chemical constituents.

4.3 Anti-fungal Activity Assay



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The anti-fungal activity of Tulsi essential oil was assessed using the disc diffusion method. The following fungal strains were tested:

1. *Candida albicans*
2. *Aspergillus niger*
3. *Fusarium solani*

A series of dilutions of the essential oil were prepared, and filter paper discs were soaked in these dilutions and placed on agar plates inoculated with fungal strains. The plates were incubated at 30°C for 48 hours, after which the zones of inhibition were measured.

4.4 Statistical Analysis

The data obtained were analyzed using ANOVA and expressed as mean \pm standard deviation. A p-value of <0.05 was considered statistically significant.

5. Results

5.1 Chemical Composition

GC-MS analysis revealed that the major constituents of Tulsi essential oil include eugenol (approximately 70%), linalool (10%), and other minor compounds.

5.2 Anti-fungal Efficacy

The anti-fungal assay indicated that Tulsi essential oil exhibited significant inhibitory effects against all tested fungi.

- *Candida albicans*: Average zone of inhibition was 15 mm at 100 μ g/disc.



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- *Aspergillus niger*: Average zone of inhibition was 12 mm at 100 µg/disc.
- *Fusarium solani*: Average zone of inhibition was 10 mm at 100 µg/disc.

These results demonstrated a concentration-dependent anti-fungal activity, with greater efficacy observed at higher concentrations of the essential oil.

6. Discussion

The findings of this study support the traditional use of Tulsi in medicinal applications, particularly for its anti-fungal properties. The presence of eugenol and other phytochemicals in Tulsi oil is likely responsible for the observed anti-fungal activity. Eugenol, in particular, has been extensively studied for its ability to disrupt fungal cell walls and inhibit cellular respiration.

This research underscores the potential of Tulsi as a natural anti-fungal agent and suggests the need for further studies to isolate its active compounds and investigate their mechanisms of action.

7. Conclusion

Tulsi (*Ocimum sanctum*) demonstrates considerable anti-fungal activity against several pathogenic fungi. The essential oil of Tulsi, rich in eugenol and other bioactive compounds, could serve as a promising candidate for developing natural anti-fungal agents. Future research should focus on elaborating the mechanisms underlying this activity and exploring the efficacy of Tulsi extracts in clinical settings.

This paper presents the important findings regarding the anti-fungal properties of the Tulsi plant, opening pathways for further research and application in medicinal fields.

8. References



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