

# A Review on Antimicrobial Potential of Indian *Ocimum sanctum* (Tulsi)

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**Abstract:** Tulsi, a subcontinental plant has been cultivated in India for the religious and medicinal purposes. It is an erect, many branched subshrub of 30-60cm tall with hairy stem placed in Lamiaceae family. There are approximately 54 compounds that have been already identified in tulsi leaves, flower and spikes which are proposed to be responsible for this type of activity. E. Coli and other pathogens causing skin, oral and soft tissue infections, essential oil of tulsi could be a valuable typical antimicrobial agent for management of skin and oral infections caused by these organisms. Many research and review articles have been already published on this topic and they proposed to antimicrobial function of tulsi. The major objective of my study was to evaluate the antimicrobial activity of tulsi oil extract, chloroform extract, and alcohol extract of tulsi has a powerful impact against different microbial pathogens like *Salmonella enteritica*, *Vibrio parahaemolyticus*, *E. Coli* and *Listeria monocytogenes*. In general extract obtained by all methods showed antimicrobial activity against all tested microorganisms. In conclusion extract of *Ocimum* found to be containing chemical compounds useful in food preservation, development of drugs against food born and infectious microorganisms.

**Keywords:** MIC (Minimum inhibitory concentration), Essential oil components, Bactericidal, Anti fungal, mode of action.

## 1. Introduction

### About Tulsi

Tulsi is an aromatic plant in the family Lamiaceae which is native to the Indian subcontinent and widespread as a cultivated plant. It is considered "The Queen of the herbs" for its restorative and spiritual properties. Tulsi is cultivated for religious and medicinal purposes and for its essential oils. Tulsi is an erect, many branched, subshrub, 30-60 cm tall with hairy stems. A group of researchers from Punjab University, Bhatinda, have found that this plant originates from north central India. Tulsi is a sacred plant for Hindus and is worshipped as the avatar of Laxmi. Tulsi has been used for thousands of years in Ayurveda for its diverse healing properties; it is mentioned in Charaka Samhita, an ancient Ayurvedic text. Tulsi extract is used in Ayurvedic remedies for a variety of ailments. Traditionally, tulsi is taken in many forms; as herbal tea, dried powder, fresh leaf of mixed with ghee. For centuries, the dried leaves have been mixed with stored grains to repel insects. In Sri Lanka this plant is used as a mosquito repellent.

### Chemical Composition of Essential Oil

Essential oil of tulsi has antibacterial, anti-fungal and anti-viral properties. The major chemical compounds that were found in essential oil are: eugenol (61.76%), isopropyl palmitate (11.36%), alpha-lubene (3.85%), 2-3-dihydroxypropyl elaidate (5.10%), 1-methyl 3-benzene (1.73%), 2-methoxy 4-(1-propyl) phenol (2.65%), vanillin (1.27%), 1,4-diethyl benzene (1.03%), hexadecanoic acid methyl ester (2.51%), and [2-methyl 4-(1-propyl phenoxy) silane] (2.01%) essential oil of tulsi.

## 2. Mode of Action on Pathogens

Eugenol is the most prominent phytoconstituent present in the

tulsi plant which may be responsible for antimicrobial activity. Many researchers proposed the mechanism of bactericidal action of eugenol, alpha-terpinol and gamma-terpine which are the major components of tulsi essential oil against test microorganisms. The study was done to observe changes in membrane composition by assaying for the leakage of protein and lipid using Bradford and Van Handel's method respectively. The oil components were capable of including cell lysis by the leakage of protein and lipid contents. Previous studies show that eugenol at 2X MIC was highly effective toward protein content leakage after 120 min. of exposure. Alpha-terpinol and gamma-terpinene showed similar effect at 2X MIC under the same condition. The result of reference literature revealed that both cell wall and membrane of the treated Gram positive and Gram negative were significantly damaged.

## 3. Conclusion

Tulsi has been recognized for thousands of years to be one of India's greatest healing herbs. Tulsi in Sanskrit means "one that is incomparable" one that does not tolerate or permit similarity. The knowledge of holy basil needs to spread for the benefits of all humanity. In conclusion it is to be found that tulsi extract has different antibacterial effects on different types of microorganisms. They show different modes of action on various microorganisms. The literature will serve as the guidelines for the researchers in future work related to the antimicrobial potential of tulsi.

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