



A Review on Pharmacological Activities of *Ocimum Sanctum*

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Abstract *Ocimum sanctum*, A medicinal herb, belongs to the family Lamiaceae. It is erect, branched and fragrant, having height of about 30-60 cm. Different part of the plant are used to cure so many diseases, such as headache, leucoderma, asthma, bronchitis, fever, vomiting, hiccups, ophthalmic, genitourinary disorders, ring worms and skin diseases, coughs, diarrhea, constipation, wart, worm, influenza, common cold, colic pain, hepatic diseases, arthritis, digestive disorders and kidney dysfunctions. The plant of *Ocimum sanctum* commonly known as “Tulsi”, belong to Lamiaceae family. It is an erect, much branched, fragrant and erected plant attaining a height of about 20-50 cm. Different parts of the plant are used in Ayurveda and Siddha systems of medicine for prevention and cure of many illnesses like cough, influenza, common cold, headache, fever, colic pain, bronchitis, asthma, hepatic diseases, fatigue, skin diseases, arthritis, digestive disorders.

Keywords *Ocimum sanctum*, Lamiaceae, Headache, Asthma, Ayurveda

Introduction

Herbal medicine, the backbone of traditional medicine in many countries have played an important role in curing the diseases of humans since ancient time. Medicinal plants are great source of bioactive compounds and chemical structures that have potential beneficial effects. The present review compiles information on ethnopharmacologically useful information and pharmacological properties of *Ocimum sanctum*. *Ocimum sanctum* (OS) has many medicinal properties like antioxidant, antidiabetic, antiulcer, anticancer, antibacterial, antifungal and other. The medicinal properties of tulsi have been studied in hundreds of scientific studies including in vitro, animal and human experiments.

Tulsi “Queen of herbs” is described as sacred and medicinal plant in ancient literature. It is an important symbol of the Hindu religious tradition. The name Tulsi is derived from „Sanskrit“, which means “matchless one” [2]. Its other name, Vishnupriya means the one that pleases Lord Vishnu. This plant belongs to the family Labiatae, characterized by square stem and specific aroma. Botanical name of Tulsi is *Ocimum sanctum* (Linn). In India, the plant is grown throughout the country from Andaman and Nicobar Islands to the Himalayas up to 1800 meters above the sea level.

These studies reveal that Tulsi has a unique combination of actions that include: Antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmintic), mosquito repellent, anti-diarrheal, anti-oxidant, anti-cataract, anti-inflammatory, chemo preventive, radioprotective, hepato-protective, neuro-protective, cardio-protective, anti-diabetic, anti-hypercholesterolemia, anti-hypertensive, anti-carcinogenic, analgesic, anti-



pyretic, anti-allergic, immunomodulatory, central nervous system depressant, memory enhancement, anti-asthmatic, anti-tussive, diaphoretic, anti-thyroid, anti-fertility, anti-ulcer, anti-emetic, anti-spasmodic, anti-arthritis, adaptogenic, anti-stress, anti-cataract, anti-leukodermal and anti-coagulant activities.

Ayurveda And Lifestyle Medicine

As a science of life and the world's oldest medical system, Ayurveda has a holistic approach to health and disease that focuses on preserving and promoting good health and preventing disease through healthy lifestyle practices. These practices include consumption of fresh, minimally processed foods, the use of Rasayanas (formulas) that eradicate ageing and disease, sophisticated detoxification practices and regular consumption of adaptogenic herbs that enhance the body's capacity to maintain balance in the midst of a variety of stressors.

Ayurveda's use of medicinal and culinary herbs draws upon India's incredible biodiversity with a variety that is unsurpassed by any medical system; yet, of all the herbs used, none has a status comparable to Tulsi or holy basil (*Ocimum sanctum*).

Tulsi: A Potent Adaptogen

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. Within Ayurveda, Tulsi is known as “The Incomparable One,” “Mother Medicine of Nature” and “The Queen of Herbs,” and is revered as an “elixir of life” that is without equal for both its medicinal and spiritual properties. Within India, Tulsi has been adopted into spiritual rituals and lifestyle practices that provide a vast array of health benefits that are just beginning to be confirmed by modern science. This emerging science on Tulsi, which reinforces ancient Ayurvedic wisdom, suggests that tulsi is a tonic for the body, mind and spirit that offers solutions to many modern-day health problems.

Taxonomy

Kingdom: Plantae

Subkingdom: Tracheobionta

Superdivision: Spermatophyta

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Asteridae

Order: Lamiales

Family: Lamiaceae

Genus: *Ocimum*

Species: *O. sanctum*



Figure 1: Plant of *Ocimum Sanctum* (Tulsi)



Pharmacological activities

| | Therapeutic activity | Extract used | Part used |
|----|-----------------------------|--------------------------|----------------------|
| 1 | Anti-stress | Ethanolic | Whole plant (dried) |
| 2 | Anti-inflammatory | Methanolic/aqueous | Leaves |
| 3 | Anti-fungal | Methanolic/Ethanolic | Leaves |
| 4 | Anti-fertility | Benzene | Leaves |
| 5 | Hepatoprotective | Ethanolic/aqueous | Whole plant (aerial) |
| 6 | Anti-diabetic | Ethanolic/aqueous | Leaves |
| 7 | Anti-ulcer | Ethanolic/aqueous | Leaves |
| 8 | Anti-microbial | Ethanolic | Leaves |
| 9 | Anti-psychotic | Methanolic/ leaves paste | Leaves |
| 10 | Anti-cancer | Ethanolic | Root |

Antifungal activity

An antifungal activity is found in the essential oil that can be obtained by steam-distillation (1.1% w/v) of the aerial parts of *O. gratissimum*. The results showed that the essential oil inhibit the growth of all fungi tested, including the phytopathogens, Botryosphaeria rhodina, Rhizoctonia sp. and two strains of Alternaria sp. Ethanolic, hot water and cold-water extract of *O. gratissimum* was tested against Colletotrichum species isolated from spoilt tomatoes. Maximum zone of inhibition was measured in case of hot water extract and then in ethanolic extract and least in cold water extract. Antifungal activities against, Microsporum canis, M. gypseum, Trichophyton rubrum and T. mentagrophytes. Trichophyton rubrum, the most common dermatophytes in Brazil was carried out and found that hexane extract of *O. gratissimum* and eugenol is very effective against the dermatophyte.

Antibacterial activity

Different extracts from the leaves of *Ocimum gratissimum*, show antibacterial activity when tested against Staphylococcus aureus, Salmonella typhi and Salmonella typhimurium, pathogenic bacteria which causes diarrhea. Extract included cold water extract, hot water extract and steam distillation extract. Only steam distillation extract has inhibitory effects on the selected bacteria and the minimum inhibitory conc. ranged from 0.1% for S. aureus to 0.01% for E. coli and S. typhimurium, and 0.001% for S. typhi. *Ocimum gratissimum*, ethanolic extract was tested for anti-microbial activity against Actinobacillus actinomycetemcomitans in human dental plaque and compared with 0.2% chlorhexidine as the positive control and dimethyl sulfoxide (DMSO) as the negative control. Maximum antimicrobial potential was at 0.6% concentration level. Antimicrobial activity was carried out against Aggregatibacter actinomycetemcomitans, Prevotella intermedia, and Porphyromonas gingivalis and found that 0.5 and 1.0 % extract showed maximum zone of inhibition. Doxycycline was taken as positive control and DMSO as negative control.

Ovicidal activity

The main component of ovicidal activity present in the essential oil of *Ocimum gratissimum* is eugenol. It was evaluated against Haemonchus contortus, a gastrointestinal parasite of small ruminants. The essential oil and



eugenol showed maximum inhibition at 0.5% conc. These results suggest a possible utilization of essential oil of *O. gratissimum* as an aid to control gastrointestinal helminthiasis of small ruminants.

Larvicidal, pupicidal and adulticidal potential

Larvicidal, pupicidal and adulticidal activities of acetone, hexane and chloroform extracts of *Ocimum gratissimum* investigated against filariasis mosquito vector *Culex quinquefasciatus*. Results suggested that *O. gratissimum* chloroform extract is a best controlling agent for *Cx. Quinquefasciatus* among all the extracts. Pupicidal and larvicidal mortality was recorded in the same extract exposure at 24 hrs is of 2.6916 mg/ml and 2.8916 mg/ml respectively.

Wound Healing activity

Wound healing effects of *Ocimum gratissimum* were investigated using incisional wound model in rats and found that *O. gratissimum* have wound healing potential. The ability to increase the vascular permeability of *O. gratissimum* may be one of the factors that contribute to its wound healing property.

Anti-Inflammatory activity

The study reported the inhibitory effect produced by chemical constituents of essential oils of *Ocimum gratissimum* used in traditional medicine as anti-inflammatory and analgesic drugs, in vitro, on soybean lipoxygenase L-1 and cyclooxygenase function of prostaglandin H synthase, the two enzymes, which are involved in the production of mediators of inflammation.

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