

Pharmacological Review on *ocimum Sanctum*

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Abstract: In this study, *Ocimum sanctum* a medicinal herb used in the indigenous system of medicine. It has been adored in almost *Ocimum sanctum* Linn. commonly known as Holy Basil or Tulsi is an Ayurvedic herb of Southeast Asia with a long history of traditional use. ancient ayurvedic texts for its extraordinary medicinal properties. It is pungent and bitter in taste and hot, light and dry in effect. Its seeds are considered to be cold in effect. The roots, leaves and seeds of Tulsi possess several medicinal properties. Ayurvedic texts categorise as stimulant, aromatic and antipyretic. While alleviating kapha and vata, it aggravates pitta. It has a wide range of action on the human body mainly as a cough alleviator, a sweat-inducer and a mitigator of indigestion and anorexia. *Ocimum sanctum* has a variety of biological / pharmacological activities such as antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, analgesic, antipyretic, antiinflammatory, antiallergic, antihypertensive, cardioprotective, CNS depressant.

Keywords: Medicinal properties, *Ocimum sanctum* (OS, Tulsi), Pharmacological activities

I. INTRODUCTION

Tulsi is an important symbol of the Hindu religious tradition. Although the word 'Tulsi' gives the connotation of the incomparable one, its other name, Vishnupriya means the one that pleases Lord Vishnu. Found in most of the Indian homes and worshipped, its legend has permeated Indian ethos down the ages. Known in English as Holy Basil and botanically called *Ocimum sanctum*, Tulsi belongs to plant family Lamiaceae. It has made important contribution to the field of science from ancient times as also to modern research due to its large number of medicinal properties. The medicinal plants are rich in secondary metabolites (which are potential sources of drugs) and essential oils of therapeutic importance. Some of the most important bioactive phytochemical constituents in plants are alkaloids, flavonoids, phenolics, essential oils, tannins and Saponins the plants known as medicinal plants are rich in the secondary metabolites, which include alkaloids, glycosides, steroids and relative active metabolites which are used as drugs in pharmaceutical company The secondary metabolites are accumulated by plants in their leaves, roots and other organs. Despite the fact their biosynthetic origin and role in the plant are poorly understood, secondary metabolites are of considerable interest because of their potential industrial, pharmacological and medicinal value. These secondary metabolites have been reported to have multiple biological effects, including antioxidant activity. Potential sources of antioxidants have been found in leaves, oil seeds,barks and Natural antioxidants from plant sources are potent and safe due to their harmless nature and wild herbs have been investigated for their antioxidant properties. Tulsi is an important symbol of hindu religious tradition.



Fig. 1. Tulsi

Tulsi (sanskrit:-surasa) has been used for thousands of years in ayurveda for its diverse healing properties. It is mentioned in the Charaka Samhita, an ancient ayurvedic text. Marked by its strong aroma and astringent taste, it is regarded in ayurveda as a kind of "elixir of life" and believed to promote longevity. Tulsi, the queen of herbs, the legendary



'incomparable one' of India, is one of the holiest and most cherished of the many healing and healthy giving herbs of the orient. Tulsi, is renowned for its religious and spiritual sanctity, as well as for its important role in the traditional ayurvedic and unani system of holistic health and herbal medicine. Tulsi is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, catarrhal fever, otalgia, lumbago, hiccup, ophthalmia, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress. It has also aromatic, stomachic, carminative, demulcent, diaphoretic, diuretic, expectorant, alexiteric, vermifuge and febrifuge properties. In view of these facts, an attempt has been made to review on the various pharmacological activities of OS based on the experimental and clinical studies reported in different literatures. Tulsi grows wild in the tropics and warm regions.

II. PLANT PROFILE

Ocimum sanctum belongs to family Labiateae and OS is very important for their therapeutic potentials. *Ocimum sanctum* L. (Labiateae) is a strongly scented small annual herb, up to 18 inches tall, grows into a low bush and is commonly known as holy basil, tulsi or tulsi three varieties of tulsi are light tulsi (*ocimum sanctum*), dark tulsi (*ocimum sanctum*), vana tulsi (*ocimum gratissimum*).

Table 1. Scientific Classification

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliosida
Order	Lamiales
Family	Lamiaceae
Genus	Ocimum
Species	O. Tenuiflorum
Binomial name	Ocimum tenuiflorum or Ocimum sanctum L.

III. CHEMICAL CONSTITUENTS

Ocimum Sanctum leaves are rich in volatile oil (0.7%), phenolics, flavonoids, neolignans, terpenoids and fatty acid derivatives. *Ocimum sanctum* seeds contain fixed oil (18–22%), mucilage, polysaccharides and β -sitosterol in the unsaponifiable matter. *Ocimum Sanctum* seed oil is rich in triglycerides (94–98%) in which linolenic acid (43.8%) is the main content.

IV. PHARMACOLOGICAL ACTIVITIES

4.1 Prophylactic Activity

Decoction of leaves is used against the gastritis and hepatic disorders. The juice of fresh leaves is also given to patients to treat dysentery. In a study, it has been found that methanolic extract of *Ocimum suave* showed healing effect against chronic gastric ulcers induced in experimental rats. *Ocimum* sp. along with pepper, turmeric and onion is prophylactic against malaria. Oil is insecticidal and larvicidal. It contains: β -bisabolene (13–20%), methyl chavicol (3–19%), 1,8-cineole (9–33%), eugenol (4–9%), (E)- α -bisabolene (4–7%) and α -terpineol (1.7–7%) are the main constituents of tulsi oil. Often, Tulsi is planted in Indian gardens as a mosquito repellent. Essential oils of Tulsi possess 100 % larvicidal property. It has been found that Tulsi has excellent anti-malarial properties as well. Eugenol is the main constituent and it is responsible for its repellent property. Paste prepared from Tulsi leaves is used against the ringworm infection. Tulsi removes worms and parasites. Tulsi extract with honey is recommended so that the parasites may be excited, thus drawing them out of their hiding places. Paste of its leaves is applied on face to clear marks. Urosolic acid present in leaves returns elasticity and removes wrinkles. Tulsi helps skin stay healthy and supple. Use of Tulsi in the treatment of all kinds of cuts, wounds and ulcers is highly beneficial.

4.2 Antidiabetic Activity

Leaves of *O. sanctum* have been shown to possess hypoglycaemic effects in experimental animals. Decoction prepared with various parts of plant lowers the blood sugar level. A study conducted on rats has suggested that constituent of *O.*



sanctum leaf extracts have stimulatory effects on physiological pathways of insulin secretion. Various studies have been performed on the antglycemic properties of Ocimum but its mechanism of action has not been elucidated as yet . Study conducted with tulsi plus neem has suggested that this combination is better for the diabetic patients in lowering the sugar level.

4.3 Antioxidant Activity

The antioxidant activity of Ocimum Sanctum has been antioxidant properties of flavonoids and their relation to membrane protection have been observed. Antioxidant activity of the flavonoids (orientin and vicenin) *in vivo* was expressed in a significant reduction in the radiation induced lipid peroxidation in mouse liver OS extract has significant ability to scavenge highly reactive free radicals. The phenolic compounds, viz., cirsilineol, cirsimarin, isothymusin, apigenin and rosmarinic acid, and appreciable quantities of eugenol (a major component of the volatile oil) from OS extract of fresh leaves and stems possessed good antioxidant activity.

4.4 Antihypertensive and Cardioprotective Activities

The transient cerebral ischemia and long term cerebral hypoperfusion (causing cellular oedema, gliosis and perivascular inflammatory infiltrate) have been prevented by OS. The OS fixed oil administered intravenously produced hypotensive effect in anaesthetized dog, which seems to be due to its peripheral vasodilatory action. Essential fatty acids like linoleic and linolenic acids, contained in the OS oil produce series 1 and 3 (PGE1 and PGE3) prostglandins and inhibit the formation of series prostglandins (PGE2). The long term feeding of OS offers significant protection against isoproterenol-induced myocardial necrosis in Wistar rats through enhancement of endogenous antioxidant.

4.5 Analgesic Activity

The Ocimum Sanctum oil was found to be devoid of analgesic activity in experimental pain models (tail flick, tail clip and tail immersion methods). However, it was effective against acetic acid induced writhing method in mice in a dose dependent manner. The writhing inhibiting activity of the oil is suggested to be peripherally mediated due to combined inhibitory effects of prostaglandins, histamine and acetylcholine.

4.6 Antipyretic Activity

The antipyretic activity of Ocimum Sanctum fixed oil was evaluated by testing it against typhoid-paratyphoid A/B vaccine-induced pyrexia in rats. The oil on ip administration considerably reduced the febrile response indicating its antipyretic activity. At a dose of 3 ml/kg, the antipyretic activity of the oil was comparable to aspirin. Further, the fixed oil possessed prostaglandin inhibitory activity and the same could explain its antipyretic activity.

4.7 Central Nervous System (CNS) Depressant Activity

The AIE of OS prolonged the time of lost reflex in mice due to pentobarbital (40 mg/kg, ip), decreased the recovery time and severity of electroshock and pentylenetetrazole-induced convulsions. It also decreased apomorphine induced fighting time and ambulation in "open field" trials. At high doses, OS extract increased swimming time suggesting a CNS stimulant and/or antistress activity. The effect was comparable to that of desipramine, an antidepressant drug. OS fixed oil (2-3 ml/kg, ip) has been reported to increase pentobarbitone-induced sleeping time in rats. The inhibition of hepatic metabolism of pentobarbitone / renal clearance by fixed oil could be responsible for potentiation of pentobarbitone-induced sleeping time.

4.8 Antiulcer Activity

The fixed oil of Ocimum Sanctum administered intraperitoneally elicited significant antiulcer activity against aspirin, indomethacin, alcohol (ethanol 50%), histamine, reserpine, serotonin or stress-induced ulcers in rats. The fixed oil significantly possessed antiulcer activity due to its lipoxygenase inhibitory, histamine antagonistic and antisecretory effects.



4.9 Anticoagulant Activity

The Ocimum Sanctum fixed oil (3 ml/kg, ip) prolonged blood clotting time and the response was comparable to that obtained with aspirin (100 mg/kg). The effect appears to be due to the antiaggregator action of oil on platelets.

4.10 Toxicity

The median lethal dose (LD50) of OS fixed oil was determined after ip administration in mice. The fixed oil was well tolerated up to 30 ml/kg, while 100% mortality was recorded with a dose of 55 ml/kg. The LD50 of oil was 42.5ml/kg. There was found no untoward effect on subacute toxicity study of Ocimum Sanctum fixed oil at a dose of 3 ml/ kg/day, ip for 14 days in rats.

4.11 Anti-microbial Activity

Ocimum sanctum shows antimicrobial activity. Ethanolic, methanolic, and organic solvents extracts of Ocimum sanctum L. show wide zones of inhibition against Escherichia coli, Staphylococci sp., Shigella sp., Staphylococcus aureus and Enterobacteria sp. Ocimum sanctum also acts against Pseudomonas aeruginosa, Staphylococci species, salmonella typhi, Klebsiella pneumonia, Proteus, Candida albicans, Mycobacterium Tuberculosis. These results prove that OS can act as excellent antimicrobial agent against many microbes.

4.12 Anti – Pyretic Activity

The antipyretic activity of Ocimum sanctum L. fixed oil was evaluated by testing it against typhoid-paratyphoid A/B vaccine-induced pyrexia in rats. The fixed oil possessed prostaglandin inhibitory activity and the same could explain its antipyretic activity.

V. CONCLUSION

In this study, it was concluded that the traditional medicine is safe and has many therapeutic use. The Ocimum Sanctum medicinal plant is one of the important herbs which have the multiple pharmacological properties. In the scientific research on Ocimum sanctum L. Suggest a biological potential of this plant so it can be concluded that the tulsi is a traditionally and clinically used.

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

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