



## Role Of Tulsi in Systemic and Oral Disease- An Overview

### KEYWORDS

tulsi, oral health, general health

### Malvania Ekta A.

Senior Lecturer, Dept of Public Health Dentistry, AMC Dental College & Hospital, Khokhra. Ahmedabad

### ABSTRACT

Nature has bestowed on us a rich botanical wealth and different types of plants grow in different parts of world. The medicinal plants are widely used by the traditional medical practitioners for curing various diseases. In traditional systems of medicine, different parts of *Ocimum sanctum* Linn (known as Tulsi in Hindi), have been recommended for the treatment of various disorders. Although because of its great therapeutic potentials and wide occurrence in India, a rational approach to this traditional medical practice with modern system of medicine is, however, not much available. This paper reviews the therapeutic potential of this plant in the treatment of various systemic and oral disorders.

In recent times focus on plant research has increased all over the world and a large body of evidence has collected to show the immense potential of medicinal plants used in various traditional systems. The important advantage claimed for therapeutic uses of medicinal plants are their safety besides being economical, effective and easy availability.

The name 'Tulsi in Sanskrit means 'the incomparable one'. The sacred basil, *Ocimum sanctum* L. (also known as *Ocimum tenuiflorum*) 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 of the East.<sup>[1]</sup> Although Tulsi is known as a general vitalizer and increases physical endurance. The stem and leaves of holy basil contain a variety of constituents that may have biological activity.

### USES FOR SYSTEMIC DISORDERS

#### Antidiabetic

Ethanol extract of *O. sanctum* L. significantly decreases the blood glucose, glycosylated hemoglobin and urea with a concomitant increase in glycogen, hemoglobin and protein in streptozotocin-induced diabetic rats.<sup>[2]</sup>

#### Wound healing activity

Ethanol extract of leaves of *O. sanctum* L. helps to increase the wound breaking strength, wound epithelialization process. The extract also significantly decreases the anti-healing activities of dexamethasone in all wound healing models.<sup>[3]</sup>

*Ocimum sanctum* L. may be useful in the management of abnormal healing such as keloids and hypertrophic scars.<sup>[4]</sup>

#### Radio-protective effect

Uma Devi et al<sup>[5]</sup> reported that two water-soluble flavonoids, Orientin (Ot) and Vicenin (Vc), isolated from the leaves of *O. sanctum* L. provide significant protection against radiation.

#### Antioxidant

Aqueous extract of *O. sanctum* L. significantly increases the activity of anti-oxidant enzymes such as superoxide dismutase and catalase level.<sup>[6]</sup>

#### Hypolipidemic

Trevisan et al<sup>[7]</sup> have reported that the administration of *O. sanctum* L. seed oil (0.8 gm/kg body weight/day) for four weeks, in cholesterol-fed (100 mg/kg body weight/day) rabbits significantly decreases serum cholesterol, triacylglycerol and LDL + VLDL cholesterol as compared to untreated cholesterol-fed group, hence suggesting the hypocholesterolemic activity of *O. sanctum* L.

#### Antimicrobial

Linoleic acid in *O. sanctum* L. fixed oil shows good antibacterial activity against *Staphylococcus aureus*, *Bacillus pumilus* and *Pseudomonas aeruginosa*.<sup>[8]</sup>

Geeta et al<sup>[9]</sup> studied that the aqueous extract of *O. sanctum* L. (60 mg/kg) show wide zones of inhibition compared to alcoholic extract against *Klebsiella*, *E. coli*, *Proteus*, *S. aureus* and *Candida albicans* when studied by agar diffusion method.

#### Gastroprotective

Herbal preparation containing *O. Sanctum* L. has been suggested to shorten the course of illness, clinical symptoms and biochemical parameters in patients suffering from viral hepatitis. It is helpful in improving appetite. The juice of fresh leaves is used to treat dysentery, dyspepsia, chronic fever & hemorrhage.<sup>[10]</sup>

#### Antiinflammatory

Singh<sup>[11]</sup> in his study reported that linoleic acid present in different amount in the fixed oil of different species of *O. sanctum* L. has the capacity to block both the cyclooxygenase and lipoxygenase pathways of arachidonate metabolism and could be responsible for the anti-inflammatory activity.

#### Anticancer

Fresh leaf paste (topically) and aqueous and ethanolic extract (orally) were evaluated for their chemopreventive activity against 7,12-dimethylbenzanthracene (DMBA) induced (0.5%) hamster buccal pouch carcinogenesis. Incidence of papillomas and squamous cell carcinomas were significantly reduced and increased the survival rate in the topically applied leaf paste and orally administered extracts to animals. Histopathological observation made on the mucosa confirmed the profound effect of the orally administered aqueous extract than other.<sup>[12]</sup>

Prashar et al.<sup>[13]</sup> in their study reported that *O. sanctum* L. leaf extract blocks or suppresses the events associated with chemical carcinogenesis by inhibiting metabolic activation of the carcinogen.

#### Eye (Ocular) disorders

The leaf juice of *O. sanctum* L. along with triphala is used in Ayurvedic drop preparation. It is used for glaucoma, cataract, chronic conjunctivitis.<sup>[10]</sup>

#### Renal disorders

Juice of tulsi leaves along with honey, if taken regularly for six months helps to expel the renal stone through urinary tract.<sup>[14]</sup>

#### Psychological disorders

Tulsi leaves are regarded as adaptogen (anti stress). Substantial evidence has accumulated that the herb's powerful general adaptogenic properties offer significant preventive and curative potential with respect to the stress-related degenerative diseases endemic to industrialized societies.<sup>[11]</sup>

#### Skin disorders

Juice of tulsi leaves if applied locally is beneficial in the treatment of ringworm and other skin diseases.<sup>[14]</sup>

#### Sexually transmitted disease

Extract of *O. sanctum* L. caused inhibition of *Neisseria gonorrhoeae* clinical isolates and WHO organization strains. The activity is comparable to penicillin and ciprofloxacin.<sup>[15]</sup>

#### Thyroid activity

The extract of *O. sanctum* L. leaf extract at the dose of 0.5 g/kg body weight for 15 days significantly decreased serum T4 concentration.<sup>[16]</sup>

#### Anti inflammatory effect

Tulsi inhibits inflammation causing enzymes in our bodies which contribute to pain and other signs of inflammation. The anti inflammatory effects are comparable to ibuprofen and aspirin. By improving the blood circulation in body it helps in dealing with any kind of swelling in body.<sup>[17]</sup>

#### Respiratory disorders

A decoction of tulsi leaves with honey and ginger is commonly used to treat cold, cough, bronchitis and bronchial asthma. It helps to mobilize mucus in bronchitis and asthma thus helps in maintenance of clear and healthy respiratory passage.<sup>[10]</sup>

#### USES IN DENTISTRY

##### Toothache

Tulsi can act as a COX-2 inhibitor like modern analgesic due its significant amount of eugenol.<sup>[10]</sup>

#### Periodontal disorders

Powdered form of dried leaves of tulsi can be used for brushing teeth. It can also be mixed with mustered oil to make a paste and used as toothpaste.<sup>[14]</sup> It can be used as mouthwash to treat various periodontal disorders.<sup>[18-20]</sup> Mouthwash containing tulsi can serve as a good alternative to patients who wish to avoid alcohol (e.g. Xerostomics), sugar (e.g. Diabetics), any artificial preservatives and artificial colors in their mouthrinses.

#### Anticariogenic effect

*Streptococcus mutan* (S.mutan) is considered as the main culprit microorganisms responsible for dental caries. An in vitro study conducted by Pooja et al have assessed various concentration of tulsi extract against S.mutan & concluded that composition of tulsi extract at 4% has a maximum antimicrobial potential.<sup>[21]</sup>

#### Candidiasis

Khan A et al<sup>[22]</sup> have investigated the anti fungal activity of essential oil of *Ocimum sanctum* and its two components i.e. eugenol and linalool against *Candida albicans* and *Candida tropicalis* and concluded that linalool is more effective against *Candida*.

#### Oral submucous fibrosis

The active alkaloids present in *Ocimum Sanctum* i.e. Phenolic acid, Flavonoides, Glycosides, Linalols, Eugenol, Cineol can be used as deodorant, stimulant, astringent, oedema reliever, analgesic and haemostatic agent for the treatment of oral sub mucous fibrosis. Srivastva A et al.<sup>[23]</sup> have reported in their study that a paste of 1gm tulsi powder and 1gm of turmeric powder in a glycerine if applied locally for 3-4 times a day can significantly increase mouth opening and reduce burning sensation.

#### Anti ulcer activity

Tulsi possess anti ulcerogenic as well as ulcer healing properties due to its ability to reduce acid secretion and increase mucous secretion. The fixed oil of tulsi was found to possess significant anti ulcer activity against drug induced as well as stress induced ulceration in experimental models.<sup>[24]</sup>

#### CONCLUSION

Recognizing the importance of broadening western medical perspective, the World Health Organization has recommended that traditional health and folk medicine systems to be integrated with modern medical therapies to more effectively address health problems worldwide. Due to anti inflammatory, antibacterial, ulcer healing and antioxidant properties tulsi can prove to be beneficial to treat various oral disorders. Ongoing clinical investigation of Tulsi's health promoting qualities is sure to bear rich fruit.

## REFERENCE

- 1) Pattanayak P, Behera P, Das D, Panda SK. Ocimum sanctum Linn. A reservoir plant for therapeutic applications: An overview. *Phcog Rev* 2010;4:95-105. | 2) Narendhirakannan RT, Subramanian S, Kandaswamy M. Biochemical evaluation of antidiabetogenic properties of some commonly used Indian plants on streptozotocin-induced diabetes in experimental rats. *Clin Exp Pharmacol Physiol* 2006;33:1150-7. | 3) Udupa SL, Shetty S, Udupa AL, Somayaji SN. Effect of Ocimum sanctum Linn on normal and dexamethasone suppressed wound healing. *Indian J Exp Biol* 2006;44:49-54. | 4) Shetty S, Udupa S, Udupa L, Somayaji N. Wound healing activity of Ocimum sanctum Linn with supportive role of antioxidant enzymes. *Indian J Physiol Pharmacol* 2006;50:163-8. | 5) Uma Devi P, Ganasoundari A, Vrinda B, Srinivasan KK, Unnikrishnan MK. Radiation protection by the Ocimum flavonoids orientin and vicenin: Mechanisms of action. *Radiat Res* 2000;154:455-60. | 6) Gupta S, Mediratta PK, Singh S, Sharma KK, Shukla R. Antidiabetic, antihypercholesterolaemic and antioxidant effect of Ocimum sanctum (Linn) seed oil. *Indian J Exp Biol* 2006;44:300-4. | 7) Trevisan MT, Vasconcelos Silva MG, Pfundstein B, Spiegelhalter B, Owen RW. Characterization of the volatile pattern and antioxidant capacity of essential oils from different species of the genus Ocimum. *J Agric Food Chem* 2006;54:4378-82. | 8) Singh S, Malhotra M, Majumdar DK. Antibacterial activity of Ocimum sanctum L. fixed oil. *Indian J Exp Biol* 2005;43:835-7. | 9) Geeta, Vasudevan DM, Kedlaya R, Deepa S, Ballal M. Activity of Ocimum sanctum (the traditional Indian medicinal plant) against the enteric pathogens. *Indian J Med Sci* 2001;55:434-8. | 10) Bhateja S, Arora G. Therapeutic benefits of holy Basil (Tulsi) in general and oral medicine: A review. *Int J Res Ayur Pharm* 2012; 3(6):761-4. | 11) Singh S. Comparative evaluation of antiinflammatory potential of fixed oil of different species of Ocimum and its possible mechanism of action. *Indian J Exp Biol* 1998;36:1028-31. | 12) Karthikeyan K, Ravichandran P, Govindasamy S. Chemopreventive effect of Ocimum sanctum on DMBA-induced hamster buccal pouch carcinogenesis. *Oral Oncol* 1999;35:112-9. | 13) Prashar R, Kumar A, Hewer A, Cole KJ, Davis W, Phillips DH. Inhibition by an extract of Ocimum sanctum of DNA-binding activity of 7,12-dimethylbenzanthracene in rat hepatocytes in vitro. *Cancer Lett* 1998;128:155-60. | 14) MP Bhattacharyy. 15 benefits of Holy Basil (Tulsi). [cited 2015 Jan 9] Available from [http:// www. hinduism. com](http://www.hinduism.com). | 15) Shokeen P, Ray K, Bala M, Tondon V. Preliminary studies on activity of Ocimum sanctum, *Drynaria quercifolia*, and *Annona squamosa* against *Neisseria gonorrhoeae*. *Sex Transm Dis* 2005;32:106-11. | 16) Panda S, Kar A. Ocimum sanctum leaf extract in the regulation of thyroid function in the male mouse. *Pharmacol Res* 1998;38:107-10. | 17) Gupta SK, Prakash J, Srivastva S. Validation of claim of Tulsi, Ocimum Sanctum Linn as a medicinal plant. *Indian J Experimental Biology* 2002;40(7):765-73. | 18) Haffajee AD, Yaskell T, Socransky SS. Antimicrobial effectiveness of an herbal mouthrinse compared with an essential oil and a chlorhexidine mouthrinse. *J Am Dent Assoc* 2008 May;139(5):606-11. | 19) Agrawal P, Nagesh L. Comparative evaluation of efficacy of 0.2% Chlorhexidine, Listerine and Tulsiextract mouth rinses on salivary *Streptococcus mutans* count of high school children--RCT. *Contemp Clin Trials* 2011 Nov;32(6):802-8. | 20) Malhotra R, Grover V, Kapoor A, Saxena D. Comparison of the effectiveness of a commercially available herbal mouthrinse with chlorhexidine gluconate at the clinical and patient level. *J Indian Soc Periodontol*. 2011 Oct-Dec; 15(4): 349-352. | 21) Agrawal P, Nagesh L, Murlikrishnan. Evaluation of the antimicrobial activity of various concentrations of Tulsi(Ocimum sanctum) extract against *Streptococcus mutans*: An in vitro study. *Indian J Dent Res* 2010;21(3):357-59. | 22) Khan A, Ahmad A, Manzoor N and Khan LA. Antifungal activity of Ocimum Sanctum Essential oil and its Lead Molecules. *Natural Products Communications* 2010;5(2):345-49. | 23) Srivastva A, Agrawal R, Chaturvedi TP, Chandra A, Singh OP. Clinical evaluation of the role of tulsi and turmeric in the management of oral submucous fibrosis: A pilot, prospective observational study. *J Ayurveda Integr Med* 2015 Jan- Mar;6(1):45-9. | 24) Das SK and Vasudevan DM. Tulsi: The Indian holy power plant. *Natural Product Radiance* 2006;5(4):279-83. |