

THERAPEUTIC EFFECT OF TULSI (OCIMUM SANCTUM LINN) IN GENERAL AND ORAL HEALTH

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ABSTRACT

Ocimum sanctum is a widely branched, erect, stout and aromatic herb, about 75 cms high. This small herb is found throughout India and is cultivated near Hindu houses and temples. The leaves, seeds and root of this plant have been used in Ayurvedic medicine. The chemical composition of Tulsi is highly complex, containing many nutrients and other biological active compounds. Due to its inherent botanical and biochemical complexity, Tulsi standardization has, so far, eluded modern science. Perhaps best known of many active

compounds that have been identified and extracted are eugenol (an essential oil) and ursolic acid. Many scientific studies have indicated that *Ocimum sanctum* has anti-stress, antioxidant, hepatoprotective, immunomodulating, antiinflammatory, antibacterial, antiviral, antifungal, antipyretic, antidiuretic, antidiabetic, antimalarial and hypolipidemic properties with a wide margin of safety. In Ayurvedic medicine, Tulsi is being used either alone or in combination with others in various clinical conditions like anxiety,

chronic cough, bronchitis, fever, snake and scorpion bites.

Keywords: *Ocimum sanctum*, Tulsi leaves, Ayurvedic Medicine.

INTRODUCTION

The Use of plants and plant products as medicines could be traced as far back as the beginning of human civilization. The earliest mention of medicinal use of plants in hindu culture is found in Rigveda , which is said to have been written between 4500-1600 BC and is supposed to be the oldest repository of human knowledge.

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.

Tulsi has been described as of two types- vanya (wild) and gramya (grown in homes). Although having identical usage, the former has darker leaves. Tulsi is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, Catarrhal fever, otalgia, lumbago, hiccough, ophthalmic, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress^{disorders[1-2]}.

It has also aromatic, stomachic, carminative, demulcent, diaphoretic, diuretic, expectorant, alexiteric, vermifuge and febrifuge properties^[3]. 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 indifferent literatures.

Tulsi grows wild in the tropics and warm regions. The plant is distributed and cultivated throughout India. It is an erect, much branched, fragrant and erected plant attaining a height of about 30-60 cm when mature. The plant is bitter and acrid.^[2-3]

Tulsi is described as sacred and medicinal plant in ancient literature.

The name Tulsi is derived from ‘Sanskrit’, which means “matchless one”. 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.

Ocimum sanctum (Linn) is the most prominent species of the genera. The leaves of the plant are considered to be very holy and often form a consistent part of the Hindu spiritual rituals (Tirtha or Prasada). *Ocimum sanctum* has two varieties i.e. black (Krishna Tulsi) and green (Rama Tulsi), their chemical constituents are similar. Both the varieties also have common medicinal properties^[1].

Traditional uses

Tulsi is also known as "the elixir of life" since it promotes longevity. Different parts of plant are used in Ayurveda and Siddha Systems of Medicine for prevention and cure of many illnesses and everyday ailments like common cold, headache, cough, flu, earache, fever, colic pain, sore throat, bronchitis, asthma, hepatic diseases, malaria fever, as an antidote for snake bite and scorpion sting, flatulence, migraine headaches, fatigue, skin diseases, wound, insomnia, arthritis, digestive disorders, night

blindness, diarrhoea and influenza. The leaves are good for nerves and to sharpen memory. Chewing of Tulsi leaves also cures ulcers and infections of mouth^[2].

Phytoconstituents

The leaves of OS contain 0.7% volatile oil comprising about 71% eugenol and 20% methyl eugenol. The oil also contains carvacrol and sesquiterpine hydrocarbon caryophyllene. Fresh leaves and stem of OS extract yielded some phenolic compounds (antioxidants) such as cirsilineol, circimaritin, isothymusin, apigenin and rosameric acid, and appreciable quantities of eugenol⁸. Two flavonoids, viz., orientin and vicenin from aqueous leaf extract of OS have been isolated³. Ursolic acid, apigenin, luteolin, apigenin-7-O-glucuronide, luteolin-7-O glucuronide, orientin and molludistin have also been isolated from the leaf extract. OS also contains a number of sesquiterpenes and monoterpenes viz., bornyl acetate, elemene, neral, and pinenes, camphene, campestral, cholesterol, stigma sterol and – sitosterol^[9].

Tulsi as a prophylactic agent

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 methanol 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: α -bisabolene (13-20%), methyl chavicol (3-19%), 1,8-cineole (9-33%), eugenol (4-9%), (E)- α -bisabolene (4-7%) and α -terpinol (1.7-7%) are the main constituents of tulsi oil^[10]. 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^[11]. 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. The leaf juice of tulsi along with triphala is used as an eye tonic and is recommended for glaucoma, cataract, chronic conjunctivitis and other diseases associated with eyes. Chewing of leaves before a meal helps stimulating the appetite, and a tea taken after a meal promotes digestion by increasing the flow of gastric juices, while reducing gas and bloating. *Ocimum sanctum* also reduces the chances of ulcers. It is an active diaphoretic common cold. It removes excess cough from lungs and nasal passages. A decoction of Tulsi leaves is a popular remedy for common cold in India. It is also given for fever along with the clove. It also lowers the uric acid levels and hence is considered as a potential anti-inflammatory agent. The leaves of basil are specific for many fevers.

During the rainy season, when malaria and dengue fever are widely prevalent, tender leaves, boiled with tea, act as preventive against these diseases. In case of acute fevers, a decoction of the leaves boiled with powdered cardamom brings down the temperature, thereby it has been considered

as a potential antipyretic cocktail as a home remedy. Tulsi is an important constituent of many cough syrups and expectorants. It helps to mobilize mucus in bronchitis and asthma. Chewing Tulsi leaves relieves cold and flu. The leaves are nerve tonic and also sharpen memory. They promote the removal of the catarrhal matter and phlegm from the bronchial tube.

It is useful in teeth disorders and is also recommended as a remedy against pyorrhoea. Also, it is used as a remedy for night blindness and conjunctivitis. Being nerve tonic the leaves are used to sharpen memory. It is a good source of antioxidants and offer substantial protection against free radical induced damage. Oxygen free radicals are natural physiological products, containing one or more unpaired electrons^[10].

Reactive oxygen species (ROS) may damage life important membrane lipids, proteins, DNA and carbohydrates. This damage has been implicated in the causation of several diseases such as liver cirrhosis, atherosclerosis, cancer, and diabetes etc^[11-12]. It has been well accepted that dietary antioxidants have great potential in ameliorating these disease processes.

Antioxidants thus play important role in protecting the human body against damage by reacting oxygen species. It also decreases the lipid peroxidation and increases the activity of super-oxide dismutase^[13]. Presence of eugenol attributes to its anti-oxidative property and is also thought to be responsible for inhibition of lipid peroxidation. This property helps in maintaining good health and in preventing the chances occurrence of heart diseases as well as most of the other biochemical diseases because oxidative stress is the hallmark of such diseases^[14].

Chemical properties

Ocimum sanctum has specific aromatic odour because of the presence of essential or volatile oil, mainly concentrated in the leaf. This aromatic volatile oil mainly contains phenols, terpenes and aldehydes. The oil extracted from seeds is called fixed oil and mainly composed of fatty acids.

Besides oil, the plant also contains alkaloids, glycosides, saponines and tannins. The leaves contain ascorbic acid and carotene as well. The present day information about the chemical properties is based on the various studies that have been done in different parts of the world^[15] and it is likely that chemical

constituents may be varying due to edaphic and geographic factors^[16].

Health Benefits of Basil (Tulsi)

The health benefits of holy basil or tulsi include oral care, relief from respiratory disorders, fever, asthma, lung disorders, heart diseases and stress. Holy Basil (scientific name is *Ocimum Sanctum*) or Tulsi is undoubtedly the best medicinal herb ever known. It has endless miraculous and medicinal values and is being worshipped in India since thousands of years. Even going closer to a Tulsi plant alone can protect you from many infections. A few leaves dropped in drinking water or foodstuff can purify it and can kill germs in it. Even smelling it or keeping it planted in a pot indoors can protect the whole family from infections, cough and cold and other viral infections. Holy Basil is so good for boosting up the immune system that cannot be explained in words. It protects from nearly all sorts of infections from viruses, bacteria, fungi and protozoa. Recent studies show that it is also helpful in inhibiting growth HIV and carcinogenic cells.

1. Healing Power

The tulsi plant has many medicinal properties. The leaves are a nerve tonic and

also sharpen memory. They promote the removal of the catarrhal matter and phlegm from the bronchial tube. The leaves strengthen the stomach and induce copious perspiration. The seed of the plant are mucilaginous.

2. Fever & Common Cold

The leaves of basil are specific for many fevers. During the rainy season, when malaria and dengue fever are widely prevalent, tender leaves, boiled with tea, act as preventive against these diseases. In case of acute fevers, a decoction of the leaves boiled with powdered cardamom in half a liter of water and mixed with sugar and milk brings down the temperature. The juice of tulsi leaves can be used to bring down fever. Extract of tulsi leaves in fresh water should be given every 2 to 3 hours. In between one can keep giving sips of cold water. In children, it is every effective in bringing down the temperature.

3. Coughs

Tulsi is an important constituent of many Ayurvedic cough syrups and expectorants. It helps to mobilize mucus in bronchitis and asthma. Chewing tulsi leaves relieves cold and flu.

4. Sore Throat

Water boiled with basil leaves can be taken as drink in case of sore throat. This water can also be used as a gargle.

5. Respiratory Disorder

The herb is useful in the treatment of respiratory system disorder. A decoction of the leaves, with honey and ginger is an effective remedy for bronchitis, asthma, influenza, cough and cold. A decoction of the leaves, cloves and common salt also gives immediate relief in case of influenza. They should be boiled in half a litre of water till only half the water is left and add then taken. and honey, if taken regularly for 6 months it will expel them via the urinary tract.

7. Heart Disorder

Basil has a beneficial effect in cardiac disease and the weakness resulting from them. It reduces the level of blood cholesterol.

8. Children's Ailments

Common paediatric problems like cough cold, fever, diarrhoea and vomiting respond favourably to the juice of basil leaves. If pustules of chicken pox delay their appearance, basil leaves taken with saffron will hasten them.

9. Stress

Basil leaves are regarded as an 'adaptogen' or anti-stress agent. Recent studies have shown that the leaves afford significant protection against stress. Even healthy persons can chew 12 leaves of basil, twice a day, to prevent stress. It purifies blood and helps prevent several common elements.

10. Mouth Infections

The leaves are quite effective for the ulcer and infections in the mouth. A few leaves chewed will cure these conditions.

11. Insect Bites

The herb is a prophylactic or preventive and curative for insect stings or bites. A teaspoonful of the juice of the leaves is taken and is repeated after a few hours. Fresh juice must also be applied to the affected parts. A paste of fresh roots is also effective in case of bites of insects and leeches.

12. Skin Disorders

Applied locally, basil juice is beneficial in the treatment of ringworm and other skin diseases. It has also been tried successfully by some naturopaths in the treatment of leucoderma.

13. Teeth Disorder

The herb is useful in teeth disorders. Its leaves, dried in the sun and powdered, can be used for brushing teeth. It can also be mixed with mustered oil to make a paste and used as toothpaste. This is very good for maintaining dental health, counteracting bad breath and for massaging the gums. It is also useful in pyorrhoea and other teeth disorders.

Toothache

Tulsi can act as COX 2 inhibitor, like modern analgesics due to its significant of eugenol (1 hydroxyl- 2 methoxy-4 allyl benzene) ocimum sanctum leaves contain 0.7 % volatile oil comprising about 71% eugenol & 20% methyl eugenol.^[28]

Periodontal disorder

Tulsi leaves dried in sun & powdered can be used for brushing teeth. It can also be mixed with mustered oil to make a paste to use as tooth paste. This is very good in maintaining oral health & counteracting oral malodor. This can also be used for massaging gingival to treat various gingival problems.^[27-28]

Anticariogenic agent

Streptococcus mutans is a microorganism which has been well implicated in causing dental caries. In an in-vitro study various concentrations of tulsi extracts have been

assessed against S. mutans & concluded that the composition of tulsi extract 4% has maximum antibacterial potential.

Leukoplekia & Sub Mucous Fibrosis

Polyphenol rosmarinic acid present in Tulsi can act as powerful antioxidant so this property can therapeutically utilized in treating common oral precancerous lesions & conditions.

14. Headaches

Basil makes a good medicine for headache. A decoction of the leaves can be given for this disorder. Pounded leaves mixed with sandalwood paste can also be applied on the forehead for getting relief from heat, headache, and for providing coolness in general.

15. Eye Disorders

Basil juice is an effective remedy for sore eyes and night-blindness, which is generally caused by deficiency of vitamin A. Two drops of black basil juice are put into the eyes daily at bedtime.

Anticancer activity

The anticancer activity of OS has been proved and cited by several investigators^[17]. The alcoholic extract (AIE) of leaves of OS

has a modulatory influence on carcinogen metabolizing enzymes such as cytochrome P 450, cytochrome b5, aryl hydrocarbon hydroxylase and glutathione Stransferase(GST), which are important in detoxification of carcinogens and mutagens.

Antimicrobial activity

AqE of OS showed growth inhibition for Klesbiella, E. coli, Proteus and Staphylococcus aureus; while AIE of OS showed growth inhibition for Vibrio cholerae. The AIE of OS was also found to be active against multidrug-resistant strains of S. aureus that are also resistant to common beta lactam antibiotics. Similarly, OS was found to be active against resistant Neisseria gonorrhoea strains.

Indian mythological book Padmottara Purana asserts that a house where a garden of Tulsi exists is itself a centre of pilgrimage; neither servants of Yama (The lord of death) nor disease can enter there and wherever fragrance of Tulsi goes, the air gets purified^[6]. This statement seems to have some relevance because the essential oil, which forms the specific fragrance, is volatile in nature and can kill various types of microbes. The essential oil is reported to possess antibacterial and insecticidal

properties. The oil has been shown to have inhibitory effects on growth of Mycobacterium tuberculosis and Micrococcus pyogenes var. aureus. It has one tenth anti-tubercular potency of streptomycin and one-fourth that of isoniazid^[4].

Aqueous and acetone extracts of Ocimum sanctum were also found to be sensitive to many plant fungi. The essential oils of Tulsi have been effective against both Gram-positive and Gram-negative bacteria and the properties were comparable with the effectiveness of clove oil^[25].

Antimicrobial activity of Ocimum sanctum was found to be higher as compared to commonly available other species of Ocimum (i.e. O. canum, O. gratissimum, O. basilicum) in India more so, aqueous extract, alcoholic extract and seed oil of Tulsi shown antimicrobial properties against enteric pathogens^[26].

Conclusion

therapies involving plants have existed for thousands of years & may be as old as human civilization itself. One such medicinal plant is “Tulsi” which is regarded as the “Queen of Herbs” because of its varied medicinal properties & mythological

values too. Traditionally it has been used for treating various systemic conditions in Ayurveda. It can prove beneficial in oral disease also because of its antibacterial, anti-inflammatory, ulcer healing, antioxidant, immunomodulatory properties.

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