



## “Tulsi” - The wonder Herb (Pharmacological Activities of *Ocimum Sanctum*)

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### Abstract

*Ocimum sanctum* is an annual herb belonging to the mint family with 150 varieties worldwide. *Ocimum sanctum* emits a spicy scent when bruised. It is believed to purify expectorants, and called the “wonder herb”. Tulsi is pungent and bitter in taste, pungent in the post digestive effect and has hot potency. The roots, leaves and seeds of Tulsi possess several medicinal properties. Ayurvedic texts categorise tulsi as stimulant, aromatic and antipyretic. It has a variety of biological / pharmacological activities such as antibacterial, antiviral, antifungal, anti protozoal, anti malarial, anthelmintic, anti diarrhoeal, analgesic, antipyretic, anti inflammatory, antiallergic, antihypertensive, cardioprotective, central nervous system (CNS) depressant, memory enhancer, antihypercholesterolaemic, hepatoprotective, anti-diabetic, anti-asthmatic, anti thyroidic, antioxidant, anticancer, chemopreventive, radio-protective, immunomodulatory, anti fertility, antiulcer, anti arthritic, adaptogenic / anti stress, anti cataract, anti leucodermal and anticoagulant activities. Its leaves are helpful in sharpening memory and in curing fever and common cold. *Ocimum* contains fixed oil which is confirmed by chemical tests for glycerine. The plant increased the physical endurance and prevented stress-induced ulcers.

**Keywords:** *Ocimum sanctum*, Expectorant, Stimulant, Anthelmintic, Antiallergic, Leucodermal, Glycerine.

### 1. Introduction

Holy basil has a rich and fanciful history known since the Vedic age for its immense curative and multi-purpose utility. It has been the ‘Herb royale’ to the French, a sign of love by Italians, and a sacred herb in India. In the first century A.D. Roman naturalist Pliny reported that basil relieves flatulence, which had been subsequently proven true. In the Far East, the herb had been used as a cough medicine, and in Africa, it has been used to expel worms. American colonists considered holy basil is the essential ingredients in a snuff used to ease headaches. The plant grows all over India up to 2000 meters height. It is grown in houses, temples and gardens. An erect annual grows 0.5-1.5 meters in height and has red or purple quadrangular branches. The leaves are opposite, about 2-4 cm long,

margins entire or toothed, hairy on both the surfaces, dotted with minute glands and are aromatic. The flowers are tiny, purple and inflorescence is a long spike or 12-14 cm in length. The fruits are small, smooth nut lets, reddish grey in color. Botanically, Tulsi is known as *Ocimum sanctum* and it belongs to family Lamiaceae. The leaves contain an essential oil, which contains eugenol, eugenal, carvacrol, methylchavicol, limatrol and caryophylline. The seeds contain oil composed of fatty acids and sitosterol. The roots contain sitosterol

### **Ayurveda**

Tulsi has been used for thousands of years in Ayurveda, a Hindu form of medical science, for its diverse healing properties. It is mentioned in the Charaka Samhita, an ancient Ayurvedic text. Tulsi is considered to be an adaptogen, balancing different processes in the body, and helpful for adapting to stress. 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. If sprinkled over cooked food in stored water, tulsi leaves prevent bacterial growth during the eclipses.

### **Importance in Hinduism**

Every part of the Tulsi plant is revered and considered sacred. Even the soil around the plant is holy. The Padma Purana declares a person who is cremated with Tulsi twigs in his funeral pyre gains moksha and a place in Vishnu's abode Vaikuntha. If a Tulsi stick is used to burn a lamp for Vishnu, it is like offering the gods lakhs of lamps. If one makes a paste of Tulsi leaves and smears it over his body and worships Vishnu, it is worth several ordinary pujas and lakhs of Godan (donation of cows). Water mixed with the Tulsi leaves is given to the dying to raise their departing souls to heaven. Just as Tulsi respect is rewarding, her contempt attracts the wrath of Vishnu. Precautions are taken to avoid this. It is taboo to urinate, excrete or throw waste water near the plant. Uprooting and cutting branches of the plant is prohibited. When the plant withers, the dry plant is immersed in a water body with due religious rites as is the custom for broken divine images, which are unworthy for worship. Though Tulsi leaves are necessary for Hindu worship, there are strict rules for it. Only a male must cut them and only in the daylight. A prayer of forgiveness may also be offered to Tulsi before the act.

### **Tulsi as a Diety**

The presence of tulsi plant symbolizes the religious bent of a Hindu family. A Hindu household is considered incomplete if it doesn't have a tulsi plant in the courtyard. Many families have the tulsi planted in a specially built structure, which has images of deities installed on all four sides, and an alcove for a small earthen oil lamp. Some households can even have up to a dozen tulsi plants on the verandah or in the garden forming a "tulsi-van" or "tulsivindavan" - a miniature basil forest.

### **Properties:** [1, 2]

Tulasi is pungent and bitter in taste, pungent in the post digestive effect and has hot potency. It alleviates kapha and vata doshas, but slightly aggravates the pitta dosha. It possesses light and dry attributes. On the contrary the seeds are oily and slimy in attributes and have a cold potency. Tulasi is a stimulant, aromatic herb and effectively reduces the fever.

### **Morphology**

Tulsi belongs in the basil genus in the family Lamiaceae. It is an aromatic plant which is native throughout the Eastern World tropics and widespread as a cultivated plant and an escaped weed. The plant is an erect, much branched subshrub, 30–60 cm tall with hairy stems and simple, opposite, green leaves that are strongly scented. Leaves have petioles, and are ovate, up to 5 cm long, usually slightly toothed. The flowers are purplish in elongate racemes in close whorls. The two main morphotypes cultivated in India and Nepal are green-leaved and purple-leaved.



**Figure 1**

**Pharmacognostic Study:** [3, 4, 5]

It is much branched small herb and 30 to 75 cm in height. All parts of Tulasi are used in medicine, especially fresh and dried leaves. Leaves are oblong, acute with entire or serrate margin, pubescent on both sides and minutely gland-dotted. The leaves are green in color with aromatic flavour and slightly pungent taste. Flowers are purplish in color in the form of racemes. Nutlets are subglobose, slightly compressed, pale brown or red in color. Seeds are reddish-black and subglobose.

**Botanical Classification**

Kingdom : Planta  
Divison : Magnoliophyta  
Class : Magnoliopsida  
Order : Lamiales  
Family : Lamiaceae  
Genus : Ocimum  
Species : Sanctum

**Other Names**

English name - holy basil/sacred basil

Hindi name - tulsi

Sanskrit name - tulasi

Gujarati name - tulsi

**Habitat**

*Ocimum sanctum* is native to India, Iran and now cultivated in Egypt, France, Hungary, Italy, Morocco, USA. Basil is naturally found wild in the tropical and subtropical regions of the world. Basil thrives in warm and temperate climates. Basil is an aromatic, low growing herb the leaves of which have a bright green to purple ovate color, and is grown in warm, tropical climate.

**Therapeutic Uses:**

Some of the basil is a rich source of key nutrients like Vitamin A, Vitamin C, calcium and phosphorus. The presence of Vitamin A helps in strengthening eyesight.

- a. Basils also contain antioxidants like beta carotene that help in preventing cell damage
- b. "Tulsi" or the holy basil, is famous throughout the globe for its healing and other medicinal properties. Its leaves are helpful in sharpening memory and in curing fever and common cold
- c. They also act as an anti stress agent and also help in purifying blood. This, in turn, helps in reducing the risk of heart attacks and also lowers the cholesterol level
- d. The leaves of the basil are also effective in reducing mouth ulcer and other infections of the mouth.

**Cultivation**

- a. Basil grows to between 30-130 cm tall, with opposite, light green, silky leaves 3-11 cm long and 1-6 cm broad. The flowers are small, white in color and are arranged in a terminal spike. Unusual among Lamiaceae, the four stamens and the pistil are not pushed under the upper lip of corolla, but lie over the inferior lip. After entomophilous pollination, the corolla falls off and four round achenes develop inside the bilabiate calyx.
- b. Basil is very sensitive to cold, with best growth in hot, dry conditions. It behaves as an annual if there is any chance of a frost. Although basil will grow best outdoors, it can be grown indoor in a pot and, like most herbs, will do best on an equator-facing windowsill. It should be kept away from extremely cold drafts, and grows best in strong sunlight; therefore a greenhouse or row cover is ideal if available. They can, however, be grown even in a basement, under fluorescent lights.

**Chemical Constituents** [6]

One study found forty-five compounds and oils in basil. The main constituents in volatile oil from basil are rosmarinic acid (a strong antioxidant), linalool, methylchavicol, methylcinnamat, 1,7-dimethyl,6-octadien-3-ol, and eugenol. Its medicinal effects are mostly due to thymol, eugenol and camphor. The mucilage is composed of sugars, xylose and polysaccharides. The seeds contain an oil composed of fatty acids and sitosterol. It is one of the healing herbs that, contain Vitamin A, and Vitamin C stimulates production of disease fighting antibodies by up to 20% as well as antioxidants that help to prevent cell damage that can lead to cancerous conditions.

**Uses**

- Used for bronchial asthma; expectorant and bronchodilator effects.
- Used against respiratory ailments including bronchitis and tuberculosis.
- Used for rhinitis (inflammation of nasal mucus membrane).

- Can serve as a cure and prophylactic as well for the severe acute respiratory syndrome (SARS) – The root of the tulsi plant should be crushed and boiled with turmeric powder for a few minutes, after which it should be filtered. Consuming two spoonfuls of this potion twice daily will cure SARS and prevent contracting of the disease.
- Tulsi tea with honey is a good expectorant especially in cases where fever is involved.
- The juice of the leaves is given in catarrh and bronchitis in children.
- Chewing the leaves relieves cold and flu. A decoction of the leaves, cloves and common salt also gives immediate relief in case of influenza.

## 2. Anti Microbial Effects

Inhibits the growth of E. coli Tulsi is a remover of worms and parasites, when the fresh juice or strong tea is taken with honey; the sweetness excites the parasites drawing them out of their hiding places.

### **Digestive System:**

(esophagus, stomach, intestines, liver, pancreas) Liver support generally contributes to healthy liver functions and counteracts liver diseases.

### **Liver Protective:**

Improves the metabolic breakdown and elimination of dangerous chemicals in the blood included as part of detoxification program Anti-diabetic-insulin and glucose normalizing blood sugar and blood-lipid levels

### **Hypoglycemic (low blood glucose)**

Balance blood sugar and insulin metabolism can reduce fasting blood glucose Inhibits Lipid peroxidation (the oxidative deterioration of Lipids) normalizes lipids Anti ulcer activity well as ulcer-healing properties and could act as a potent therapeutic agent against peptic ulcer disease decreases incidence of gastric ulcer. Reduces the effect of irritating drugs on the stomach lining and increases the production of protective stomach mucus.

### **Cardiovascular-Circulatory System** (heart, blood, circulation)

Cardiotonic-prevents heart attack Lowers stress-related high blood pressure normalizes blood pressure Vascular protection-protects the heart and blood vessels, promotes even circulation Mild blood thinning qualities thereby decreasing like likelihood of strokes Lowers dangerous cholesterol protects against damage caused by foreign toxins in the blood (such as industrial chemicals) treatment of stress-related arterial hypertension (high blood pressure).

### **Muscular System:** (skeletal, smooth and cardiac muscles)

Anti-arthritis activity Anabolic activity- enhances protein synthesis, muscle mass and strength A remedy for sore eyes and night blindness (Vitamin A) To treat conjunctivitis the juice of Tulsi mixed with honey is used as an eye wash to either wash the eyes or spread on the tender skin below the eye.

### **Nervous System** (brain, spinal cord, nerves)

Anti- convulsions potential Central nervous system effect- increased motor activity, Analgesic activity Normalizes neurotransmitter levels in brain Influences the neurochemistry of the brain and also sharpens memory.

### **Antipyretic:**

Prevents, removes or reduces fevers Treatment for viral encephalitis, malaria and typhoid; The Imperial Malarial Conference has declared Tulsi to be a genuine remedy for malaria. Drug and nicotine withdrawal Tulsi oil is also used as ear drops in case of pain. Add fresh garlic juice after you cook Tulsi in mustard oil and then place this warm medicated oil in the ears to remove ear aches. The fresh juice of Tulsi taken with black pepper powder cures periodic fevers. 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. Reproductive System Anti-fertility effect – may reduce the estrogen hormone levels in females and decrease the sperm count in men.

### **Precaution:** [7, 8]

Although tulsi is a safe herb, consult a doctor before consuming tulsi in any form if you are nursing or pregnant. Also consult a physician if you are taking any prescription medications, before you take any tuls.

### **Uses:** [9,10]

Tulsi, also known as holy basil, is an herb native to India. People in India honor tulsi as a sacred plant and revere it as a cleaning and healing agent of the mind, body and spirit. Although Indians use tulsi in religious rituals, tulsi is more commonly used for medicinal purposes and as a natural remedy for common ailments.

### **Other Health Benefits:** [11,12]

In recent years, as more holistic methods of healing are gaining acceptance, research studies have delved into various medicinal herbs. Studies of tulsi validated ancient healers' claims and have yielded new discoveries about tulsi. Scientists have discovered that tulsi has rich antioxidant and potent anti-inflammatory properties. As records on organicindia.com, Dr. Ralph Miller, former director research for the Canadian Dept. of Health and welfare summarizes the results; "Modern scientific research offers impressive evidence that tulsi reduces tulsi, enhances stamina, relieves inflammation, lowers cholesterol, eliminates toxins, protects against radiation, prevents gastric ulcers, lowers fevers, improves digestion and provides a rich supply of antioxidants and other nutrients. Tulsi of especially blood pressure and blood sugar.

**Tulsi and Swine Flu:**

Doctors have postulated yet another benefit of tulsi, that it can help prevent and also decreases the severity and duration of the swine flu. Dr.U.K. tiwari, an herbal medicine practitioner comments, The anti flu property of tulsi has been discovered by medical experts across the world quite recently. Tulsi improves the body's overall defence mechanism including its ability to fight viral diseases. It was successfully used in combating Japanese Encephalitis and the same theory applies to swine flu. Even when a person has already contracted swine flu. Tulsi can help in speeding up the recovery process and also help in strengthening the immune system of the body.

**Stress:**

Tulsi has been used extensively throughout its history in India as a supreme anti stress solution, used for claiming the distraught and dealing with long-term irritants. In a 2000 study performed at the University of Madras, in Madras, India, researchers tested Tulsi extract on rats who were also subjected to acute levels of noise. The stress altered levels of several brain chemical makers including corticosterone were lowered after feeding the rats.

**Immunity:**

Tulsi is close to being unsurpassed in traditional Ayurvedic medicine as a general overall tonic for the immune system. A team of researchers conducted a reviews of the studies done on Tulsi and published their results in the Indian Journal action to a compound within the essential oil of Tulsi called eugenol.

**3. Conclusion**

Tulsi is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, catarrhal fever, otalgia, lumbago, hiccough, ophthalmia, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress disorders<sup>1-2</sup>. It has also aromatic, stomachic, carminative, demulcent, diaphoretic, diuretic, expectorant, alexiteric, vermifuge and febrifuge properties. 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, diarrhea and influenza. This review will definitely help for the researchers as well as clinicians dealing with *O. sanctum* to know its proper usage as this herb is seemed to be highly valuable, possessing many pharmacological / medicinal properties.

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