

“TULSI”- the Wonder Drug

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ABSTRACT:

Tulsi (*Ocimum tenuiflorum*) is annual herb belongs to mint family with 150 varieties worldwide. It belongs to the genus *Ocimum*. Tulsi is bitter to taste, has hot potency and pungent in the post digestive effect. The seeds, roots and leaves of Tulsi possess medicinal properties. Eugenol is the most important bioactive compound for reducing blood glucose level. It has pharmacological activities such as antiviral, antibacterial, antifungal, anti-malarial, anti-protozoal, anthelmintic, analgesic, anti-diarrheal, anti-inflammatory, antipyretic, antihypertensive, anti-allergic, central nervous system (CNS) depressant, cardio protective, memory enhancer, hepatoprotective, antidiabetic, anti-hypercholesterolemia, anti thyroidic, anti-asthmatic, antioxidant, anticancer, radio protective, immunomodulatory, chemo preventive, anti-fertility. Its leaves are helpful in sharpening memory and in curing common cold and fever. This plant increases physical endurance and prevents stress-induced ulcers.

Keywords: Leaf, *Ocimum*, Tulsi.



INTRODUCTION: Tropical plant Tulasi or Tulsi (*Ocimum tenuiflorum*) belongs to the family Lamiaceae, which is cultivated throughout India as a medicinal herb and seen as a weed (1). It is worshipped as a goddess in temples, houses of Hindus. Plant has great medicinal and therapeutic value in Hindu belief (2). This is commonly known as Vishnu-Priya, Kala Tulsi in Hindi, Tulsi in Sanskrit, and India's Holy Basil in English. She (Tulsi) is regarded as a great worshipper of the Lord Vishnu. Usually, plant leaves are offered in every ritualistic worship of Vishnu and his incarnation god Krishna (3). The seeds, roots and leaves of this plant used as indigenous ayurvedic medicine. Tulsi has two varieties – **Green** (Ram Tulsi) Rama is one of the prominent avatars of Vishnu. **Black** (Krishna Tulsi) as its color is like Krishna's dark color. They both have similar medicinal and chemical properties (4). Genus *Ocimum* has various species like *Ocimum gratissimum* (Ram Tulsi), *O. sanctum* L (Tulsi), *O. basilicum* (Ban Tulsi), *O. canum* (Dulal Tulsi), *O. camphora*, *O.*

americanum, *O. micranthum* and *O. kilimandschicum* (5). According to the World Health Organization, approximately 80% of patients in India, 85% in Burma and 90% in Bangladesh are served by practitioners of traditional medicine systems (6). People of India treat tulsi as a sacred plant and as a healing and cleaning agent of spirit, mind and brain. It is grown in different parts of the world and mostly known for their medicinal properties. Plant is useful in the treatment of eye diseases, dengue, malaria, cold, cough, mouth infections, influenza, bronchitis, asthma, heart disorders, insect bites, stress, sore throat, and kidney stones etc. (7)

Taxonomy: Division : Magnoliophyta

Class : Magnoliopsida

Order : Lamiales

Family : Lamiaceae

Genus : Ocimum

Species : Sanctum

Morphology: Tulsi is an aromatic plant, it belongs to the family Lamiaceae. It is native of the Eastern tropics. The plant is an erect, branched, 30–60 cm tall with hairy stems (7). The flowers are elongated racemes in close whorls, inflorescence is long spike i.e., 12-14cm. The two main species cultivated in India and Nepal is ram Tulsi and green Tulsi (8). The fruits are small, nut lets, smooth, reddish grey in color. Leaves are simple, opposite and are ovate, have petioles up to 5 cm long, usually toothed slightly they contain an essential oil, which contains eugenol, carvacrol, limatrol, methyl chavicol and caryophyllene. The seeds contain oil composed of sitosterol and fatty acids (9).



Fig2: Krishna Tulsi

Fig3: Ram Tulsi



Fig4: Different types of tulsi leaves

Table1: Phytochemicals in Ocimum sanctum: ‘THE ELIXIR OF LIFE’

contents	Phytochemicals	part of the plant
Mineral Contents	Vitamin A, C, Copper, phosphorus, Calcium, iron, Chromium, Zinc.	Present all over the plant (10)
Fixed oil	Oleic acid, Linolenic acid, stearic acid and Palmitic acid.	Seeds (11)
Alcoholic extracts	Aesculin, Chlorogenic Acid, galuteolin, Circineol, Gallic Acid, Luteolin, Galuteolin, Isorientin, procatechuic acid, caffiec acid, Isovitexin, Molludistin, Orientin, Procatechuic acid, rosmarinic acid, Stigmsterol, Vallinin acid, Vitexin, vallinin and vicenin-2.	Leaf and aerial parts (12, 13,14)

Essential oils	Aromadendrene oxide, Benzaldehyde, octane, Borneol, Camphor, γ -terpene, cis- α Terpineol, Caryophyllene oxide, Heptanol, Eugenol, D-Eugenol, Cubenol, Limonene, Eucalyptol, Cardinene, Eicosane, β Gurjunene, Farnesene, α -Thujene, Farnesol, α -Camphene Furaldehyde, β -Guaiene, Germacrene, Phytol, Humulene, n-butylbenzoate, Ocimene, methyl chavicol, Oleic acid, linalool, Sabinene, Veridifloro, Selinene, α Myrcene, α -Pinene and β -Pinene.	Leaves (15,16,17)
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Therapeutic Uses:

- Basils contain beta carotene like antioxidants that prevents cell damage.
- basils help in purifying blood and act as an anti-stress agent. This, in turn, lowers the cholesterol level, helps in reducing the heart attacks. (18)
- Tulsi-the holy basil is famous for its medicinal and other healing properties. Its leaves are helpful in curing fever, common cold and sharpening memory. (19)
- The leaves of the basil are effective in reducing mouth ulcer and other mouth infections. (20)

Anti-Hyperglycemic effect: In the *Ocimum* species, different chemical components have been shown to have anti-hyperglycemic effects. Out of all eugenol has highest potential (22). The phenolic compound eugenol (1-hydroxy-2-methoxy-4-allylbenzene) found in species of *Ocimum*, with the highest proportion in *O. tenuiflorum* L. (84 percent) and *O.* followed by *Gratissimum* (74.80 percent) (21), Almost 10 percent of eugenol present in *O. baselicum* (23). Eugenol is the compound which can reduce the glucose level in blood (24). A diabetic research was performed in-vivo, it has shown that eugenol has 38% capability to reduce glucose level in blood by inhibiting α -glucosidase where the levels of insulin and glycated hemoglobin were the same (22). phenolic component Chicoric acid found in *O. gratissimum* reduced 53% of glycemic level after 120 min of treatment (25). Leaves of *O. sanctum* contain p-coumaric acid, caffeic acid, polyphenols which showed anti-diabetic effect (26).

Anti-Microbial Effects: Tulsi resists the growth of *E. coli*, *S.aureus*, *P.aeruginosa*, *S. typhimurium* and Tulsi removes parasites and worms, when fresh juice of leaves or strong tea is taken with honey (27).

Digestive System: (Esophagus, intestine, stomach, pancreas and liver) Tulsi generally contributes to healthy functions of liver and counteracts liver diseases. It has ulcer healing properties against peptic ulcer diseases and decreases incidence of gastric ulcer. Reduces the effect of drugs on stomach lining and increases the production mucous in stomach (28).

Antifertility effect: Benzene extract obtained from the leaves of *O. sanctum* is treated to albino rats it has been reported that overall sperm count, motility of sperm has been decreased and reduced estrogen levels in females, this is due to anti-androgen property of *O. sanctum* leaves (29).

Antipyretic: It Prevents or reduces fever Treatments like malaria and typhoid. The Imperial Malarial Conference has finalized that tulsi is remedy for malaria. Tulsi oil is used as Drug, nicotine withdrawal also used as ear drops in case of pain. Boil the fresh leaves of Tulsi in mustard oil and then place this warm oil in the ears to remove earaches. The fresh juice of Tulsi mixed with black pepper powder to cure periodic fevers. In case of acute fevers, the leaves boiled with cardamom powder in half liter of water and mixed in milk reduces the temperature (30).

Hepatoprotective Activity: Studies on Hepatoprotective function of *Ocimum sanctum* alcoholic leaf extract against paracetamol-induced liver damage in Albino rats synergy with silymarin concluded that *Ocimum sanctum* alcoholic leaf extract showed important hepatoprotective activity and synergy with silymarin (31).

Cardiovascular-Circulatory System: (Heart, blood and its circulation) tulsi prevents heart attack by Lowering high blood pressure, it promotes even circulation, protects blood vessels and heart. It checks the cholesterol level, hypertension and protects against the damage caused by foreign toxins in the blood (such as industrial chemicals) (32).

Muscular System: (smooth, skeletal and cardiac muscles) Anabolic activity, Anti-arthritis activity enhances synthesis of proteins, Tulsi is remedy for night blindness and sore eye, the juice of Tulsi mixed with honey is used to treat conjunctivitis (33).

Nervous System: (Brain, spinal cord, nerves) Influences the neurochemistry of brain, the level of neurotransmitter in brain is normalized by analgesic activity in Tulsi, increased motor activity by effect of anti-convulsions potential on central nervous system and it sharpens memory (34).

Other Health Benefits: Scientists have discovered that tulsi has anti-inflammatory properties and antioxidant properties. It has evidence that tulsi reduces cholesterol, relieves inflammation, eliminates toxins, prevents gastric ulcers, protects against radiation, lowers fevers, improves digestion and supply antioxidants and other nutrients. Tulsi especially reduces blood pressure and blood sugar (30,35).

Table2: Extract and part of the plant used for medicinal purpose.

Therapeutic activity	Part of the plant	Extract
Anti-Hyperglycemic	Leaves	Ethanolic
Anti-Microbial	Leaves	Ethanolic
Antifertility	Leaves	Benzene
Antipyretic	Leaves	Methanolic
Hepatoprotective	Aerial part of plant	Ethanolic
Anti-cancer	Root	Ethanolic
Anti-inflammatory	Leaves	Methanolic
Anti-stress	Whole plant	Ethanolic
Anti-ulcer	Leaves	Ethanolic

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

CONCLUSION: Tulsi is used in home as a remedy for treating fever like malarial fever, liver diseases, bronchitis, hiccup, gastric disorders, genitourinary disorders, wounds, skin diseases and various forms of psychosomatic stress disorders. It has also aromatic, demulcent, diuretic, diaphoretic, stomachic, expectorant, febrifuge, alexiteric, carminative, vermifuge properties. Tulsi promotes longevity known as "the elixir of life". Different parts of tulsi plant are used in Ayurvedic Systems for prevention and cure of everyday ailments like headache, common cold, cough, earache, flu, fever, sore throat, asthma, bronchitis, hepatic diseases and used as an antidote for scorpion sting and snake bite, migraine headaches, skin diseases, fatigue, insomnia, digestive disorders, arthritis, night blindness, influenza and diarrhea.

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