



REVIEW ARTICLE

THE HERBAL SOVEREIGN: OCIMUM SANCTUM LINN (TULSI) AND ITS MEDICINAL SIGNIFICANCE

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ABSTRACT

Tulsi (*Ocimum sanctum*) owing to its numerous health benefits, is rightly named as 'Queen of Herbs' of India and one of the Holiest and Most Healthiness giving Herbs. also known as *holy basil*. It is commonly available and cultivated across the India and it is having many therapeutic usages. In India Tulsi is worshipped by Hindus and is abundantly found in all regions. Each part of a plant like stems, roots, seeds, leaves, flowers, and fruits have their own curative properties and functions reported by many researchers. The varieties of active chemical constituents; terpenoids, phenols, flavonoids, phenylpropanoids, fatty acid derivatives, essential oil, fixed oil, and steroids are extracted from the *Ocimum tenuiflorum* plant and are determined of great therapeutic activities. Eugenol, Oleanolic Acid, Linalool, Ursolic Acid, Beta-Caryophyllene, Rosemarinic Acid, Estragole, Carvacrol, Methyl Cinnamate are the major compounds which are leads to various actions against diseases. At concentrations of 4.5% and 2.25%, the oils completely halted the growth of *Staphylococcus aureus* (including MRSA) and *Escherichia coli*, whereas they only partially inhibited the growth of *Pseudomonas aeruginosa* at these concentrations. Among the 54 compounds identified in Tulsi leaves, flower spikes, or essential oil, three are believed to account for this antimicrobial activity: camphor, eucalyptol, and eugenol

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INTRODUCTION

The predominant cause of global morbidity and mortality is lifestyle-related chronic diseases, which emphasizes healthy lifestyle practices and the regular consumption of adaptogenic herbs. Among the herbs used India, tulsi (*Ocimum sanctum Linn*) is particularly notable, and scientific research is increasingly confirming its beneficial effects. There is growing evidence that tulsi can address physical, chemical, metabolic, and psychological stress through a unique combination of pharmacological actions. Tulsi has been found to protect organs and tissues against chemical stress from industrial pollutants and heavy metals, as well as physical stress from prolonged exertion, ischemia, physical restraint, and exposure to cold and excessive noise. It also counters metabolic stress by normalizing blood glucose, blood pressure, and lipid levels, and alleviates psychological stress through positive effects on memory and cognitive function, along with its anxiolytic and antidepressant properties. Tulsi's broad-spectrum antimicrobial activity, effective against a range of human and animal pathogens, suggests its potential use as a hand sanitizer, mouthwash, and water purifier. It can also be utilized in animal rearing, wound healing, food preservation, herbal raw material preservation, and traveler's health.

The cultivation of tulsi plants holds both spiritual and practical significance, connecting the grower to the creative powers of nature. Organic cultivation of tulsi offers solutions for food security, rural poverty, hunger, environmental degradation, and climate change. The incorporation of tulsi in daily rituals is a testament to Ayurvedic wisdom, showcasing how ancient knowledge can provide solutions to modern problems.⁽¹⁾ At concentrations of 4.5% and 2.25%, the oils completely halted the growth of *Staphylococcus aureus* (including MRSA) and *Escherichia coli*, whereas they only partially inhibited the growth of *Pseudomonas aeruginosa* at these concentrations. Among the 54 compounds identified in Tulsi leaves, flower spikes, or essential oil, three are believed to account for this antimicrobial activity: camphor, eucalyptol, and eugenol.⁽²⁾

VEGETATIVE PROPAGATION: Tulsi can also be propagated vegetatively using terminal cuttings, achieving about 90-100 percent success when planted between October and December. For this method, cuttings with 8-10 nodes and a length of 10-15 cm are used. All leaves are trimmed off except for the first 2-3 pairs. The cuttings are then planted in well-prepared nursery beds or polythene bags. Within 4-6 weeks, the cuttings develop roots and are ready for transplanting into the main field, with a spacing of 40 cm between rows⁽³⁾.

CHEMISTRY: Tulsi leaves contain a bright yellow volatile oil that is effective against insects and bacteria. The main constituents of this oil are eugenol, eugenol methyl ether, and carvacrol. This oil is known for its antibacterial properties and acts as an insecticide. It has been reported to inhibit the in vitro growth of *Mycobacterium tuberculosis* and *Micrococcus pyogenes* var. *aureus*.⁽³⁾

CHEMICAL COMPOSITION: Tulsi is cultivated for religious and traditional medicine purposes, and also for its essential oil. The Tulsi plant contains numerous active compounds and the major compounds are linalol, eugenol, methylchavicol, methylcinnamat, linolen, ocimene, pinene, cineol, anethol, estragol, thymol, citral, and camphor⁽⁴⁾ The aerial parts of the plant yield an essential oil, with eugenol being the major constituent. Other identified compounds include nerol, terpinene, pinene, and carvacrol. Additionally, the leaves are reported to contain ursolic acid, apigenin, luteolin, and orientin⁽⁵⁾.

DIFFERENT VARIETIES OF TULSI: This versatile plant comes in different varieties, each with its unique set of properties and benefits.

- **Green Leaf Tulsi:** (*OcimumTenuiflorum*) also called Rama Tulsi. This variety has light green leaves and a clove-like scent. Its flavour is mellow and cooling, making it perfect for use in teas, salads, and other culinary dishes. Rama Tulsi is known for its ability to increase mental clarity, reduce stress, and promote a healthy immune system.
- **Krishna Tulsi:** (*OcimumSacntum*) also known as Purple Leaf Tulsi, is another popular variety. Its leaves are purple and have a strong, peppery flavour. Krishna Tulsi is widely used to treat respiratory problems, throat infections, and skin diseases. The oil extracted from this plant is used as an ear drop to cure earaches.
- **VanaTulsi:** (*OcimumGratissimum*) is a wild type of Tulsi that grows in the Himalayas and plains of India. It has light green leaves and a lemony aroma. Vana Tulsi is known for its ability to increase physical and mental endurance and improve the body's oxygen and nutrient absorption.
- **KapoorTulsi:** (*OcimumAmericanum*) also known as Holy Basil, is an annual plant that is commonly grown in the US. It has heavily flowered plants that attract bees. Kapoor Tulsi is known for its ability to reduce stress, promote healthy sleep, and improve respiratory and digestive health.⁽⁶⁾

NUTRITIONAL VALUE OF TULSI: Here's a table summarizing the nutritional value of Tulsi:

Nutrient	Amount per 100g
Calories	23 kcal
Protein	3.2 g
Fat	0.6 g
Carbohydrates	2.7 g
Fibre	1.6 g
Vitamin A	766 µg
Vitamin C	18 mg
Calcium	177 mg
Iron	3.2 mg
Magnesium	64 mg
Potassium	295 mg

It's worth noting that these values can vary depending on factors such as the growing conditions and processing of the Tulsi.⁽⁷⁾

BENEFITS OF TULSI

- **STRESS RELIEF:** Acts as an adaptogen, helping to reduce stress and promote mental relaxation.-
- **IMMUNE SUPPORT:** Boosts the immune system, enhancing the body's ability to fight infections.
- **ANTI-INFLAMMATORY:** Contains anti-inflammatory properties that help reduce inflammation and pain.
- **ANTIOXIDANT:** Rich in antioxidants, which protect the body from damage caused by free radicals.
- **RESPIRATORY HEALTH:** Aids in relieving respiratory conditions like asthma, bronchitis, and allergies.
- **HEART HEALTH:** Supports cardiovascular health by improving blood circulation and reducing cholesterol levels.
- **LIVER PROTECTION:** Protects the liver from toxin-induced damage and supports liver function.
- **KIDNEY HEALTH:** Promotes kidney health and helps prevent kidney stones.
- **BLOOD SUGAR REGULATION:** Helps in lowering blood sugar levels, beneficial for diabetics.
- **DIGESTIVE HEALTH:** Enhances digestion and relieves symptoms of indigestion and gas.
- **SKIN HEALTH:** Improves skin health by preventing acne and infections.
- **ORAL HEALTH:** Maintains oral hygiene and prevents bad breath and dental issues.⁽⁸⁾

MEDICINAL PROPERTIES OF TULSI

- It helps cure fever, common cold, cough, and headaches.
- It aids in treating insect bites.
- Tulsi helps treat asthma and kidney stones.
- It has anti-inflammatory properties.
- Its antiemetic properties aid in relieving nausea and vomiting.
- Its antidiabetic properties help manage diabetes.
- Its hypotensive properties help manage blood pressure and heart problems.
- Tulsi's hypolipidemic properties lower cholesterol.
- Tulsi's analgesic properties relieve pain.
- Its antiasthmatic properties help reduce asthma symptoms.
- Its hepatoprotective properties promote liver health.
- Tulsi's anti-stress properties promote relaxation.
- Tulsi's anticarcinogenic properties help prevent cancer progression.⁽⁹⁾

USES OF TULSI

Tulsi is not only a sacred plant in Hinduism but also a versatile herb that can be used in various forms. Here are some Tulsi plant uses that you should know:

- **AS A SEASONING:** With its sweet and minty flavor, Tulsi is an excellent herb for garnishing foods, sauces, and soups. It's a staple in Indian and Thai cuisines, often cooked to enhance dishes with its distinctive flavor and aroma.

- **AS A TEA:** Tulsi tea is a widely enjoyed beverage in India, often replacing coffee. Easy to prepare, it offers numerous health benefits and serves as a great way to start your day while boosting your immune system.
- **AS A SUPPLEMENT:** Dried Tulsi is available in capsule form, offering a convenient option for those who may not enjoy the taste or aroma of basil. Some sources recommend fermented varieties for improved digestibility.
- **AS AN ESSENTIAL OIL:** Holy basil essential oil, extracted from the Tulsi plant, is utilized in lotions, soaps, perfumes, shampoos, and conditioners. Known for its calming and immune-boosting properties, it can be diffused at home or inhaled for its beneficial effects.
- **IN BATHS:** Enhance organ function and combat bacterial or fungal infections by adding Tulsi tea to your bath. You can also incorporate holy basil essential oil into your skincare routine to help improve acne.
- **TO FIGHT ILLNESSES:** Tulsi is renowned for boosting the immune system and protecting against various illnesses. Its antibacterial properties alleviate cold symptoms and help maintain stomach pH balance to reduce acidity. Additionally, Tulsi contains phytochemicals associated with cancer prevention.
- **FOR DETOXIFICATION:** Tulsi acts as an antioxidant, aiding in the detoxification process by eliminating toxins and free radicals from the body.
- **FOR CLEAR SKIN:** Achieve clear skin by using an invigorating homemade honey face wash infused with holy basil essential oil.
- **AS A PLANT:** You can buy and care for a Tulsi plant or purchase Tulsi powder from a health food store. When buying fresh holy basil, choose leaves that are vibrant green without holes or dark spots.
- **DRINKING TULSI-INFUSED WATER:** Consuming water infused with Tulsi leaves is an excellent way to gain the herb's benefits. Known for its numerous health advantages, it makes a great addition to your morning routine.⁽¹⁰⁾

RECOMMENDED DAILY DOSE

Experts suggest that consuming two to three tulsi leaves on an empty stomach is beneficial for overall health. Here are the recommended daily dosages for various forms of tulsi:

- Tulsi Capsule/Tablet: 1-2 capsules per day.
- Tulsi Tablet: 1-2 tablets per day.
- Tulsi Powder: ¼ - ½ teaspoon twice a day.
- Tulsi Juice: 5-10 ml per day.
- Tulsi Drop: 1-2 drops twice a day.

Tulsi Oil: 3-4 drops, 4-5 times a day⁽⁹⁾ Holy basil has most often been used by adults in doses of 500 mg daily, for 1.5-3 months. A 4% holy basil leaf extract mouthwash has also been used twice daily for 30 days. Speak with a healthcare provider to find out what dose or product might be best for a specific condition.⁽¹¹⁾

SPECIAL PRECAUTIONS AND WARNINGS

When taken by mouth: Holy basil is possibly safe when used short-term. Holy basil leaf extract has been safely used at a dose of 500 mg daily for 60-90 days. Taking holy basil might

cause nausea or diarrhea. There isn't enough reliable information available to know if it is safe to use long-term.

When applied to the skin: Holy basil is possibly safe when used as a mouthwash, short-term.

Pregnancy: Holy basil is possibly unsafe when taken during pregnancy or when trying to become pregnant. In animals, large doses of holy basil seem to reduce the chance of getting pregnant or having a full-length pregnancy. It is not known if this happens in humans. Stay on the safe side and avoid using.

Breast-feeding: There isn't enough reliable information to know if holy basil is safe to use during breast-feeding. Stay on the safe side and avoid use.

Hypothyroidism: People with hypothyroidism have low levels of the thyroid hormone called thyroxine. Holy basil might lower thyroxine levels. In theory, this could worsen hypothyroidism.

Surgery: Holy basil might slow blood clotting, so there is a concern that it could increase the risk of bleeding during and after surgery. Stop using holy basil at least 2 weeks before a scheduled surgery.⁽¹¹⁾

SIDE EFFECTS OF TULSI LEAVES

- **Effects on Male and Female Fertility:** A study on animals, published in the International Journal of Ayurveda Research in 2010, found that consuming large quantities of tulsi could reduce sperm motility and count. Although this effect has not yet been confirmed in humans.
- **Potential Liver Damage:** Tulsi contains eugenol, a substance that can protect the liver from toxin-induced damage. However, excessive consumption of eugenol can harm the liver and cause adverse effects such as vomiting, diarrhea, rapid heartbeat, and convulsions.
- **Lowers Blood Sugar:** Tulsi is known to reduce blood sugar levels. However, if someone is taking diabetes medication, consuming tulsi leaves may enhance the medication's effect and cause blood sugar levels to drop too low.
- **Pregnancy:** Tulsi leaves can affect the health of a pregnant woman and her unborn child, potentially causing harmful uterine contractions and, in extreme cases, miscarriage. The herb may increase blood flow to the pelvis and uterus, which could lead to contractions. Due to the lack of sufficient data to definitively support or refute the use of tulsi during pregnancy, specialists advise pregnant women to avoid consuming tulsi to be on the safe side.
- **Nausea:** A clinical study observed temporary moderate nausea as a side effect of tulsi use. The 13-week trial reported few adverse consequences, but this does not eliminate the possibility of long-term side effects. Despite this, the traditional history of tulsi use indicates that significant long-term effects are rare and that daily ingestion may be safe. However, further research is needed to confirm this.
- **Damages Tooth Enamel:** It is often recommended to swallow tulsi leaves rather than chewing them, and this advice has a scientific basis. Chewing tulsi leaves can release mercury, which can harm and discolor tooth enamel. Additionally, tulsi leaves are acidic, and when chewed, they interact with the alkaline environment of the

mouth, potentially accelerating the deterioration of tooth enamel. To prevent tooth discoloration and enamel damage, it is better to swallow tulsi leaves whole.⁽¹²⁾

CONCLUSION

Holy basil, or tulsi (*Ocimum sanctum*), is recognized in Ayurvedic medicine as an adaptogen herb that can address various ailments, particularly those related to stress. Tulsi leaves offer numerous medical benefits, promoting the healthy functioning of organs such as the liver, kidneys, and heart. Additionally, tulsi can help relax the mind and reduce tension, making daily consumption of two to three leaves potentially beneficial for overall health. However, it is crucial to consult a doctor before adding holy basil or any supplement to your diet. The FDA does not regulate the quality, purity, or effectiveness of supplements and herbs made from tulsi. Therefore, it is best to grow holy basil at home or seek organically grown tulsi from reputable sources in rural, unpolluted environments. Basil grown in polluted areas can be twice as toxic.

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