

An amazing health benefits and phytochemistry of Tulsi (*Ocimum sanctum*): A review

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Abstract

Tulsi (*ocimum sanctum*) is a sacred plant in Hinduism. It belongs to family *Lamiaceae*. Including India and other countries Tulsi is also called as Holy basil. There are various types of *ocimum sanctum* species found in India but mainly Ram Tulsi and Shyam Tulsi are common. Tulsi is most important plant in Hinduism because of its historical approach. Hindus regard Tulsi as a goddess and she is regarded as avatar of Lakshmi, hence Tulsi has another name Vishnupriya. Cultivation of *ocimum sanctum* requires healthy seed, well-drained soil, rainfall up to 80-120 cm. Tulsi is an erect, much branched shrub 30-60 cm tall with simple green or purple colour leaves. *Osmium sanctum* contains eugenol and flavonoids as a main chemical constituent. Tulsi has found to be beneficial for treatment of cancer, diabetes, malaria, and uses like wound healing, antifungal and antioxidant.

Keywords: *Ocimum sanctum*, holy basil, lamiaceae, anti-carcinogenic

Introduction

Tulsi (*ocimum sanctum*) is a sacred plant in Hinduism. Hindus regard Tulsi as a Goddess because she is regarded as avatar of Lakshmi hence Tulsi also called as Vishnupriya. In some areas Tulsi is known by her 'Vrinda' name. In Dharmagranthas the story about Tulsi is that Tulsi married with Jalandhara and later she is regarded as devi avatar. In India the offering of leaves of Tulsi is must during ritualistic worship of God Vishnu, Krishna and God Vithoba. Tulsi also called as Vishnupriya, Vaishnavi, Vishnu Vallabha, Haripriya, Shri Lakshmi, Ram Tulsi, Shyam Tulsi. Many Hindus have growing Tulsi plants in front of or near to their house often in special pots called as 'Tulsi Vrindavan'. Every part of Tulsi plant is considered as sacred and even soil around the plant is holy. The Padma Purana declares that after death of any human being can gain moksha if Tulsi leaves put it into that person's mouth. Vaishnava's traditionally used Japa malas made from Tulsi stems or roots. In Orissa, the Tulsi plant represents all deities. Apart from these the Tulsi is very useful plant for treatment of various types of diseases like fever, skin problems (acne), black heads, and aging. Traditionally the Tulsi is called 'Elixir of life'. *Cimum sanctum* is used as antifungal, antioxidant, antibacterial, skin protective; wound healing, anti-diabetic, and mainly anti-cancer treatments. There are lots of uses and health benefits of *ocimum sanctum* and hence Tulsi is 'Queen of green medicine'. *ocimum sanctum* has very interesting History in other countries, in French Tulsi is regarded as 'Herb royal' in Italian Tulsi is 'symbol of love' [1, 4, 5, 6].

Cultivation

Basil crop is planted in the month of April and May. It requires 10 kg seed to cultivate in one hectare. Generally two methods are used by sowing seed or plantation method. Basil plant is hard and hence no major diseases affecting it.

Tulsi seeds will take one to two weeks to grow and further germination. It requires well drained soil with good organic matter and climate require between 14-30°C. It requires sowing temperature 15-25°C, Harvesting temperature 25-30°C and rainfall up to 80-120 cm. Care should be taken that the avoid cultivation in highly saline, alkaline, or water loaded conditions which are not good for its better yield [2, 4, 7, 10].

Harvesting

Basil can grow up to height 30-130 cm tall with 3- 11 cm long and 1 -6 cm broad leaves. Plant starts yielding by 3 month after transplantation. Harvesting is done when there is full blooming period and for further generations of branches cutting should be done when plant is at least 15 cm above ground level. Leaves can be use fresh or it is Sun dried for further use [6, 7, 10, 15].

Morphology

Tulsi is an erect much branched shrub 30 -60 cm tall with simple purple coloured and green colour leaves with strong scented and hairy stem. Leaves have petiole and are ovate 5cm long 1-6cm broad. Flower is small purplish in elongate racemes in close whorls [3, 5, 8, 12].



Fig 1: Tulsi plant

Taxonomy

Kingdom	:	Plantae
Class	:	Mangoliopsida
Order	:	Lamiales
Family	:	Lamiaceae
Genus	:	Ocimum
Species	:	O-tenuiflorum
Binomial name	:	<i>Ocimum sanctum</i> -L

Geographical Distribution

In India Tulsi mainly cultivated in Panjab, Bathinda, North central India. Other countries like Iran Egypt France, Hungary, Italy, Morocco and USA also cultivated *ocimum sanctum*. Generally Tulsi grow in warm and tropical climates. [2, 3, 4, 5]

Chemical Constituents

Fresh, green leaves and stem of *ocimum sanctum* extract contains some phenolic compounds which act as antioxidants are cirsilineol, circumaritin, isothymusin, apigenin, and rosameric acid. The leaves of Tulsi contain 0.7% volatile oil, 71% eugenol, 20% methyl eugenol. Tulsi contains Carvacrol, Sequiterpine hydrocarbon Caryophyllene. Two Flavonoids Orientin and vicenin from aqueous leaf extract of *ocimum sanctum*. [2, 4, 6, 11, 10]

Nutritional Components**Table 1**

Sr. No.	Nutritional Components	Content per 100 g
1	Carbohydrates	2.3 g
2	Calcium	25 mg
3	Carotene	2.5 ug
4	Chromium	2.9 ug
5	Copper	0.4 ug
6	Fat	0.5 mg
7	Iron	15.1mg
8	Nickel	0.73 ug
9	Phosphorus	28.7 mg
10	Protein	4.2 g/30 kcal
11	Vitamin c	25 mg
12	Vanadium	0.54 ug
13	Zinc	0.15 ug

Health Benefits

From the Ancient time Tulsi is use as a medicinal plant. In Ayurveda Tulsi has great value to treat various diseases hence called as 'Elixir of Life' and also called 'Queen of the green medicine'. Every part of the Tulsi is useful but mainly leaves and stem are use as medicine. [3, 4, 5, 15, 16]

1. Antioxidant Activity

Tulsi act as an antioxidant by increasing body's level of antioxidants biomolecules such as glutathione and enzyme like Catalase, Superoxide dismutase, glutathione s - transferase. It has strong effect on mental and Physical stress, metabolism, respiration and hypoxia. It acts as central nervous system stimulant.

2. Anticancer Activity

Anti-carcinogenic effect of Tulsi has been studied on various animal models and found to be effective on liver, pancreas, lungs, brain, skin, bone marrow, gastric ulcers and breast cancer. Tulsi has strong anti-cancer effect due to presence of eugenol, urosolic acid, oleanlic acid and ethanolic extract in Tulsi product.

3. Anti-Diabetic Activity

The extract of *ocimum sanctum* leaves shows strong anti-diabetic effect. Petroleum ether, Ethyl acetate, Chloroform fraction of *ocimum sanctum* induces diabetic rats by reducing the level of cholesterol, tri glycerol, SGOT; SGPT Tulsi reduces the severity of the diabetes and hepatitis. The constituents of the Tulsi leaves extract enhance insulin secretion and causes anti-diabetic effect.

4. Antimicrobial Activity

The extract of *ocimum sanctum* shows strong effect on various microorganisms which are responsible to cause diseases. Urosolic acid, oils, linoleic acid, eugenol shows maximum antibacterial effects. The essential oil, eugenol extract of Tulsi shows maximum Antinemic activity against caenorhabditis elegans. The Tulsi leaves extract has been effective against larvae Acedes aegypti, culex fatigans and act as larvicidal against microorganisms.

5. Wound Healing Activity

Some scientists and researchers have shown healing properties of *ocimum sanctum*. Mostly cold aqueous extract of Tulsi is found to be effective against wound healing and tumour necrosis factor (TNF) on experiment in Wistar Albino rats. Before this experiment in Ayurveda already they use Tulsi in wound treatment.

6. Mosquitocidal Activity

Mosquitocidal activity (to kill the mosquito) of Tulsi was investigated by using eugenol and triglycerides isolated from Tulsi hexane extract. When seeds of Tulsi kept in water for 1 hour, it produces mucilaginous substance (polysaccharide). When mosquito comes in contact with seeds is tightly attached with it and mosquito died due to throwing of larvae.

Precautions to be taken during intake of tulsi

Although Tulsi is safe herbal medicine, consult a doctor before consuming Tulsi in any form if you are pregnant. Also consult to physicians during prescription medication.

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Conclusion

From these all studies it is concluded that, *ocimum sanctum* has number of use in medicine and home remedies to treat number of different diseases. Due to its chemical constituents in future there are so many researches will be done for finding new drug.

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