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Study of medicinal uses of *Ocimum sanctum* (Tulsi)

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Abstract

Herbal drugs are the best, as they have good efficacy, safety and less side effect. Herbal drug have great importance and demand at worldwide levels for health care. India is core of herbal drug because it have large biodiversity and rich traditional knowledge of herbal medicine. As we are talking about the herbal medicine, *Ocimum Sanctum* is commonly called as Tulsi which is also called as “Queen of herbs”. All the part of this plant have its own important in Ayurveda and Siddha systems of medicine. Plant has many pharmacological actions such as anti-diabetic, anticancer, anti-arthritis, wound healing, anti-inflammatory, antiviral, antifungal, antioxidant, anti-asthmatic, antipyretic, memory enhancer, anticoagulant antiulcer. This review article give the information on synonyms, chemical constituents, uses and pharmacological actions of *Ocimum sanctum* (Tulsi).

Keywords: *Ocimum sanctum* (OS, Tulsi), pharmacological activities

Introduction

Herbal medicine are in use from many decades. Near about 80% of population of the world use herbal medicine as a primary health care. Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products that contain as active ingredients parts of plants, or other plant materials, or combinations and are used especially for the prevention and treatment of diseases. Tulsi is sacred trees of Hindu mythology. It is a form of Basil and is sometimes called the Holy Basil. It is very important in Hindu mythology as the goddess consort of Lord Vishnu. There is a complete festival in which Tulsi is married to Lord Vishnu which also proclaims the start of the marriage season. *Ocimum sanctum* is known as Holy basil in English and Tulsi in Sanskrit. Padmapurana and Tulsi Kavacham describes Tulsi as a protector of life, accompanying human beings from birth to death. *Ocimum sanctum* is aromatic perennial plant. It is commonly known as Tulsi. This plants have many pharmacological actions such as,

Anti-diabetic, anticancer, anti-arthritis, antiviral, antifungal, antioxidant, anti-asthmatic, antipyretic, memory enhancer, anticoagulant, antiulcer, anti-inflammatory, wound healing [1, 3-7]. The medical use of Tulsi is well documented in the Indian traditional systems of medicine, that is, Ayurveda, Unani, Siddha, and the Asian folk medicine in India, Nepal, Sri Lanka, Malaysia, Indonesia and Burma for treating various diseases either alone or in combination with other herbal plants. Tulsi in Ayurveda is also called as “elixir of life” [2].

Material and methods

The author done a survey to tribal area and other interior village's areas to collect information about the traditional medicinal properties of *Ocimum sanctum* used by the tribal for primary health care. Some information are collected from the classical text of Ayurveda, internet, research paper, books, publication, Journal.

Plant profile

Table 1: Plant profile

1	Kingdom	Plantae
2	Class	Magnoliopsida
3	Order	Lamiales
4	Family	Lamiaceae
5	Genus	Ocimum
6	Species	<i>Ocimum tenuiflorum</i>

Synonyms: *Ocimum tenuiflorum*, Tulsi, Holy basil

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Fig 1: Plant of *Ocimum sanctum* (Tulsi)



Fig 2: Leaves of *Ocimum sanctum*



Fig 3: Flower of *Ocimum sanctum*

Botanical description

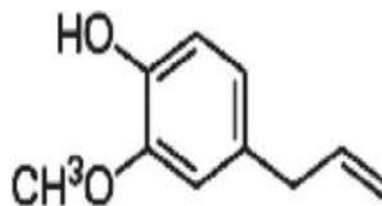
Tulsi is tall plant has an height of 30 to 60 when mature with hairy stem. It is erect and has many-branched subshrub. Leaves of Tulsi are green and purple in colour and they are simple, petiole, with an ovate blade up to 5 cm long, which has a slightly toothed margin. Tulsi also have a flower and they are of purple to reddish colour, present in small compact clusters on cylindrical spikes. The fruits of Tulsi are small and seed colour is yellow to reddish ^[8].

Commonly there are three types of Tulsi and they are

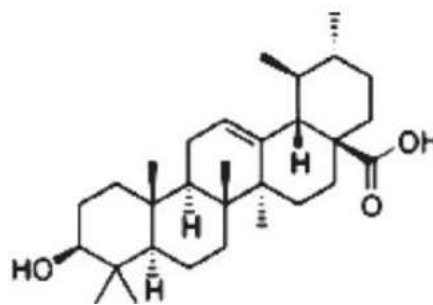
1. Shyam or Krishna Tulsi and has a purple colour leaf
2. Rama Tulsi or Sri Tulsi and has green colored leaf regularly used for worshipping.
3. Vana Tulsi (or forest Tulsi).

Chemical constituents of *Ocimum sanctum*

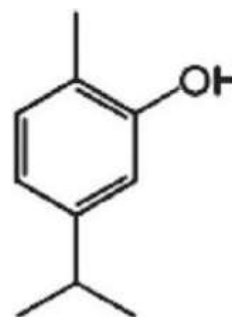
- Eugenol (1-hydroxy-2-methoxy-4-allylbenzene)
- Urosolic acid
- Carvacrol (5-isopropyl-2-methylphenol)
- Linalool (3,7-dimethylocta-1,6-dien-3-ol)
- Caryophylline (4,11,11-trimethyl-8-methylene-bicyclo[7.2.0]undec-4-ene)
- Estragol (1-allyl-4-methoxybenzene)
- phenolic compounds (antioxidants) :Cirsilineol, circimaritin, isothymusin, apigenin and Rosameric acid,
- Others: α -Terpinene, p-Cymenene, Terpin-4-ol, Carvacrol and α -Humulene
- Structur of chemicals constitution of the tulsi



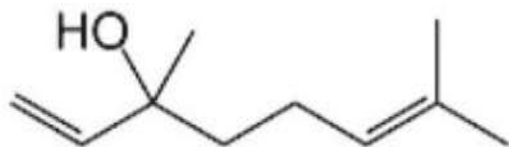
Eugenol



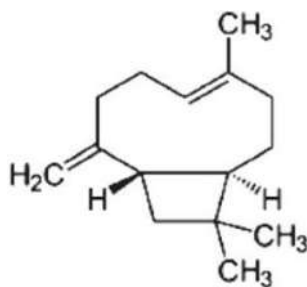
Urosolic acid



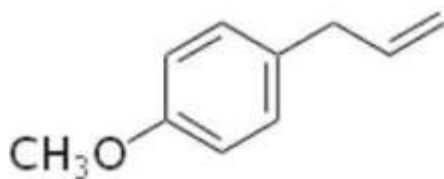
Carvacrol



Linalool



Caryophyllene



Estragol

Pharmacological activities

In the Ayurveda, the Charaka Samhita, the tulsi is used in the treatment of the headaches, rhinitis, stomach disorders, inflammation, heart diseases, various forms of poisoning and malaria. Each part of this plant has its own importance in the world of pharmacy and it is proved. The aqueous and alcoholic extract from the leaves have various pharmacological activities as follows... [9].

- Antimicrobial activity
- Anti-inflammatory activity
- Antidiabetic activity
- Anticancer activity
- Antiulcer activity
- Antifungal/anticandidal Activity
- Thyroid activity

Antimicrobial activity

Ocimum sanctum (Tulsi) inhibits the growth of the *Klebsiella*, *E. coli*, *Proteus*, *Staphylococcus aureus*, *Vibrio cholerae* by its phytoconstituents isolated from various parts. It is also found active against multidrug-resistant strains of *S. aureus* that are also resistant to common beta lactam antibiotics. The fixed oil of *Ocimum sanctum* contains antibacterial activity against *S. aureus*, *Bacillus pumilus*, and *Pseudomonas aeruginosa*, where *S. aureus* was the most sensitive organism [9-12].

Anti-inflammatory activity

Methanol extract and an aqueous suspension of *Ocimum sanctum* were found to inhibit acute as well as chronic inflammation tested by carrageenan-induced pedal edema and croton oil-induced granuloma and exudate, respectively. The anti-inflammatory response of the 500 mg per kg methanol extract of the *Ocimum sanctum* is comparable to the anti-inflammatory response observed with 300 mg per kg of sodium salicylate.

Various studies show that the *Ocimum sanctum* fixed oil and linolenic acid possessed significant anti-inflammatory activity

against PGE₂, leukotriene and arachidonic acid-induced paw edema. Linolenic acid present in the *Ocimum sanctum* has the ability to stop the cyclooxygenase and lipoxygenase pathways of arachidonate metabolism and might be accountable for the anti-inflammatory activity of the oil [14-15].

Antidiabetic activities

Oral administration of OS extract led to marked lowering of blood sugar in normal, glucose fed Hyperglycemic and streptozotocin-induced diabetic Rats. Leaves of *O. sanctum* show Hypoglycaemic effects in experimental animals. A study conducted on Rats has suggested that constituent of *O. sanctum* Leaf extracts have stimulatory effects on Physiological pathways of insulin secretion. Various studies, research has been carried out on the antidiabetic activity of the *Ocimum* but its mechanism of action has not been elucidated as yet [15, 16, 17].

Anticancer activity

In Ayurveda there are a lot of plants which are used as a potential source of anticancer and antitumor properties and *Ocimum sanctum* is one of them. Ethanolic extract of *Ocimum sanctum* reduced the tumor cell size and an increase in lifespan of mice having Sarcoma-180 solid tumors. Similar results were also obtained by others where leaf extract administered orally (200 mg/kg, p.o.). *Ocimum sanctum* has the ability to protect the DNA of the body from dangerous radiations [18, 19, 20].

Antiulcer activity

The fixed oil significantly possessed antiulcer activity due to its lipoxygenase inhibitory, histamine antagonistic and antisecretory effect. The fixed oils significant Antiulcer activity against the aspirin, indomethacin, alcohol (ethanol 50%), Histamine, reserpine, serotonin or stress-induced ulcers in Rats [21-22].

Antifungal/anticandidal Activity

Mycosis is the common fungal infection caused in human and animal by inhalation of fungal spores or contact of fungal colony with skin. The fungal infection can be avoided by keeping the body hygienic. Fungal infection can be avoided by keeping the body hygienic. However, there is a need for natural fungicide. The GC-MS analysis of *Ocimum sanctum* essential oil showed a high content of methyl chavicol (44.63%) and linalool (21.84%). As so many studies revealed that the *sanctum* essential oil has significant Antifungal activity against *Candida* and hence it can be applied in treatment of fungal infections [23-24].

Wound healing activity

Ethanolic extract of leaves of *O. sanctum* L. was investigated for normal wound healing and dexamethasone-depressed healing. The extract significantly increased the wound breaking strength, wound epithelializes fast and wound contraction was significantly increased along with increase in wet and dry granulation tissue weight and granulation tissue breaking strength. The extract also significantly decreases the anti-healing activities of dexamethasone in all wound healing. [25].

Thyroid activity

Various studies show that the extract of the *Ocimum sanctum* is antithyroidic in nature. *Ocimum sanctum* extract at the dose of 0.5 g/kg body weight for 15 days significantly decreased serum T₄ concentration and no marked changes were

observed in serum T3 level, T3/T4 ratio and in the concentration of serum cholesterol^[26].

Anticoagulant activity

Ocimum sanctum prolonged the blood clotting time due to the anti-aggregator action of oil on platelets^[27].

Health Benefits of *Ocimum sanctum* Cough

As we all know that the Chewing tulsi leaves relieves cold and flu. It also help to mobilize the mucus in bronchitis and asthma. *Ocimum* important constitution of the cough syrup in Ayurveda.

Eye diseases

The juice of leaves of *Ocimum sanctum* along with with triphala is used in preparation of Ayurvedic eye drop which is use for the treatment of glaucoma, conjunctivitis and other painful eye disease. Tulsi oil along with honey is also use to improve the eye sight^[28].

Skin Disorders

Osmium juice is applied locally on many skin disorder like ringworm. Also use in the treatment of the leucoderma.

Heart disorder

Ocimum reduce the level of blood cholesterol.

Stress

Ocimum is regarded as anti-stress agent. Healthy persons can chew 12 leaves of basil, twice a day, to prevent Stress.

Mouth infection

The leaves are quite effective for infection in mouth.

Kidney stone

Ocimum sanctum is effective against the kidney stone. Juice of Tulsi and honey is most effective against kidney stones and if it taken regularly 6 month once a day it will expel them via the urinary tract.

Sore Throat

Ocimum is effective on sore throat. Boil the Leaves of Tulsi and take it as drink to cure sore throat.

Teeth disorder

Tulsi is effective in various teeth disorder. Power of Tulsi leaves can be use for brushing the teeth.

Insect bite

Ocimum is prophylactic or preventive and curative for insect stings or bites. A paste of fresh roots is effective in case of bites of insects and leeches.

Others: Respiratory Disorder, Fever, etc.

Preparation of Aqueous, methanol and ethanol extract of *Ocimum sanctum*

Firstly the dried Tulsi powered (50g) was placed in thimble of Soxhlet apparatus and add 500- 700 ml of distilled water methanol and ethanol was used for extraction procedure and the experiment was done separately for all the two solvents and distilled water. The extraction is carried out still the clear solvent or water was seen in the thimble. Then the extract is concentrated in rotary evaporator. Then that extract is dried in digital water bath until dark green colour residue obtain^[31].

$$\text{Percentage yield of extract} = \frac{\text{Final weight of the dried extract}}{\text{Initial weight of the powder}} \times 100$$

Conclusion

Ocimum has been used from many decades in Ayurveda because of its pharmacological importance. On the basis of information presented above it is conclude that the *Ocimum sanctum* is medically an important drug. The aqueous and alcoholic extract from the leaves have various pharmacological activities such as anti-diabetic, anticancer, anti-arthritis, antiviral, antifungal, antioxidant, antiasthma tic, Antipyretic, memory enhancer, Anticoagulant Antiulcer, anti-inflammatory, wound healing. *Ocimum sanctum* is use in treatment of various disorder such as eye disorder, respiratory disorder, kidney stones, teeth disorder, stress and also use in treatment of the mouth infection, sore throat.

Result and Discussion

As we all know that the *Ocimum sanctum* (Tulsi) is “Queen of herbs”, as each and every part of this plant has its own important in Ayurveda. On the basis of the information presented above, the chemical constituents for *Ocimum sanctum* has very enormous potential as a antimicrobial, anticancer, anti-inflammatory, antidiabetic, antifungal, Antiulcer, etc. and it was experimental proved on various animals and in future there will be lot of research on *Ocimum sanctum* to posses it all medicinal properties. And because of its all health Benefits it also called as “elixir of life”.

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Carvacrol:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249909/figure/F5/>
Linalool:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249909/figure/F6/>
Caryophylline:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249909/figure/F7/>
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