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## Tulsi: A Miracle herb used in the Treatment of Many Illnesses: A Review

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#### ABSTRACT

Tulsi, the famous "unmatched" plant of India, is one of the most popular and beneficial of the numerous therapeutic and health-promoting herbs. Ayurvedic and Unani systems Medicinal natural products are increasingly being investigated in clinical trials for superior pharmacological responses and lack of side effects compared to symptomatic agents. *Ocimum sanctum*, often referred to as "Holy Basil" or "Tulsi," is known in the traditional Ayurvedic literature for its use in the treatment of many illnesses. The active ingredients obtained from plants, and their biological function in disease prevention have stimulated people's curiosity. This overview includes the nomenclature of plant vesicles, their components, and their use in the treatment of diseases.

**Key words:** Illness, Ayurveda, Diseases, Treat, Tulsi, Natural product, Plant.

#### 1. INTRODUCTION

Due to its medicinal properties such as anti-diabetic, anti-cyclic, antispasmodic, anti-inflammatory, hepatoprotective, immunomodulatory and anti-tumors effects, herbs are now more studied in formulation studies. It's important. In several forms. The sanctuary contains many chemicals that can affect the body. Tulsi is an adaptive substance, which helps the body adapt to stress by balancing various processes. In Ayurveda, it is considered a "elixir of life" with a strong smell and astringent taste and is said to prolong life Herbal tea, dried powder, and fresh leaves have all been used to absorb *O. sanctum* L. in the past. Tulsi leaves have been blended with stored grains to repel insects for centuries since the driest locations on earth are always the driest places<sup>4-10</sup>.



(a) Flowers in elongate racemes in close whorls



(b) *Ocimum Sanctum* tree

TAXONOMICAL CLASSIFICATION-	
Kingdom-	Plantae
Clade-	Tracheophytes
Clade-	Angiosperms
Clade-	Eudicots
Clade-	Asterids
Order-	Lamiales
Family-	Lamiaceae
Genus-	Ocimum
Species-	O.tenuiflorum
Binomial name	- Ocimum sanctum
Synonyms-	<i>Geniosporum tenuiflorum</i> <i>Lumnitzer atenuiflora</i> <i>Moschosm atenuiflorum</i> <i>Ocimum anisodorum</i> <i>Ocimum caryophyllum</i> <i>Ocimumhirsutum</i> <i>Ocimuminodorum</i> <i>Ocimum monachorum</i> <i>Ocimum sanctum</i> <i>Ocimum scutellarioides</i> <i>Ocimum subserratum</i> <i>Ocimum tomentosum</i> <i>Ocimum villosum</i> <i>Plectran thusmonachorum</i>

There is a petiole, and the leaf is oval, reaching 5cm in length, and there are saw teeth. The purple flowers grow in dense, rotating, long racemes. Tulsi is a tropical plant native to the tropics of the world, widely cultivated as an escape weed. It's grown for religious and therapeutic uses, as well as for essential oil. Tulsi is a holy plant linked with goddess shrines in Hindu religious traditions. In Sanskrit, the word "tulsi" implies "incomparable." Herbs are becoming extremely prevalent due to their medical

characteristics, which include anti-stress. Basil, one of the most revered and consumed herbs, is a perennial, aromatic, culinary, herbaceous shrub plant of approximately 60 species identified and assigned to the genus *Ocimum* of the Lamiaceae. It is a good source of vitamin A, vitamin C, calcium, zinc, iron and chlorophyll, has antibacterial and insecticidal properties, and the leaves have the ability to purify polluted water. Scientific research provides evidence for its anti-inflammatory, antioxidant, analgesic (analgesic), antipyretic (antipyretic), hepatoprotective (liver-protecting) anti-cancer, diabetes, circulatory, sedative, immune and other properties. Different types of basil are grown in many parts of the world, and some of the widely used varieties can be divided into two groups<sup>11-20</sup>.

### 1.1 Eighteen Types of Basil (Tulsi)

#### 1.1.1 Holy Basil

There are several varieties popular based on the regional religious beliefs which are known by a several vernacular and common names such as in Sanskrit it is named as Rama Tulsi and Krishna Tulsi, in Malayalam it is called Trittavu, in Marathi as Tulshi, Tulasi in Tamil, Thulsi in Telugu and Holy Basil in English. Not to be confused with *Ocimum Tenuiflorum*, it is a synonym for *Ocimum Sanctum*. There, 4 species popular of Holy basil<sup>20-25</sup>.

- 1.1.1.1. Rama tulsi (*ocimum sanctum*)
- 1.1.1.2. Krishna tulsi (*ocimumtenuiflorum*)
- 1.1.1.3. Amrita tulsi (*ocimumtenuiflorum*)
- 1.1.1.4. Vana tulsi (*ocimumgratissum*)

#### 1.1.2 Mediterranean Basil

It is known as Sweet basil and is the most popular variety of basil, it is used in culinary preparations and used in several types of popular cuisines like Italian, Thai etc<sup>26-35</sup>.

- 1.1.2.1. Sweet basil (*ocimum basilicum*)
- 1.1.2.2. Thai basil (*ocimum thyriflora*)
- 1.1.2.3. Purple basil (*ocimum basilicum*)
- 1.1.2.4. Lemon basil (*ocimumcitriodorum*)
- 1.1.2.5. Vietnamese basil (*ocimum cinnamom*)
- 1.1.2.6. American basil (*ocimum americanum*)
- 1.1.2.7. African blue basil (*ocimum kilimandscharicum*)
- 1.1.2.8. Italian genovese basil (*ocimum basilicum*)
- 1.1.2.9. Lettuce basil (*ocimum basilicum*)

- 1.1.2.10. Green ruffles basil (ocimum basilicum)
- 1.1.2.11. Cardinal basil (ocimum basilicum)
- 1.1.2.12. Greek basil (ocimum basilicum)
- 1.1.2.13. Spicy globe basil (ocimum basilicum)
- 1.1.2.14. Summer long basil (ocimum basilicum)

Ocimum Sanctum has many chemical components that can affect the body. Some of these chemical compounds have antioxidant properties, while others may boost immune system function. In laboratory animals, some compounds appear to have antitumor effects. The majority of studies were conducted in vitro or in animals 5155. The medicinal properties of the Tulsi plant are the subject of this review. Various parts of Tulsi plant can be used<sup>36</sup>. (Fig.1).



(a)



(b)

**Figure:1** - (a) Seeds of Tulsi (b) Leaves of Tulsi

Despite science's and technology's many marvels, modern life is fraught with stress. Mobile devices and the internet have increased our exposure to unhealthy packaged and processed foods, as well as a multitude of pesticides. Despite the fact that industrialisation has resulted in a longer lifespan and a huge increase in the human population, it is now the norm. It is well acknowledged that avoidable chronic illnesses linked to lifestyle are the primary cause of mortality and disease globally. And exposure to a toxic industrial chemical, As a result, answers to

existing health problems are more likely to be found in people's homes and activities than in health clinics, hospitals, or government pharmacists. Many Many chemicals can be extracted for commercial use. Ancient scholarly writings such as Atharvaveda (an Indian sacred book), Ayurveda (traditional Indian medicine system) and others contain a wealth of knowledge about preventative measures. Prevention and treatment. By one estimate, about 13,000 species of plants have been used medicinally around the world. Natural elements obtained from plants can come from any part of the plant, including bark, leaves, flowers, roots, fruits, seeds, etc. Phytotherapeutic activities that are specific to certain species or groups of plants are compatible with this approach because the plant by-products are taxonomically different. In many laboratories, systematic screening of plant species to identify new bioactive chemicals is standard practice. The identification of active components of medicinal plants should be added to the study of medicinal plants. Scientific analysis of treatments can lead to standardization and quality control of products, ensuring their safety. They may be approved for use in primary care after such consideration. As in the past, such research initiatives can lead to the discovery of new drugs. Some examples of lead generated from naturally occurring furanochromone khellin analogues are sodium cromoglycate and sodium cromoglycate, both anti-asthmatic. Exploration of phytochemical constituents and pharmacological screening will be the basis for the development of new life-saving drugs<sup>37</sup>.

## 1.2 Origin and Distribution-

A group of researchers from Central University of Punjab, Bathinda, used chloroplast genome sequences to perform a large-scale phylogeographical investigation of this species and discovered that it is native to North-Central India. This basil has now escaped domestication and established itself as a global species<sup>38</sup>.

## 1.3 Nutrition Value

It also aids in proper digestion, absorption and use of nutrients obtained from food and other herbs. Protein: 30 kcal; fat: 0.5 g; Carbohydrates: 2.3 g; Calcium: 25 mg; Phosphorus: 287 mg; iron: 15.1 mg; Food portion: 25 mg vitamin C per 100 g<sup>39-40</sup>.

## 1.4 Chemical Constituents of Tulsi

Phytochemical constituents of Tulasi-oleanolic acid, ursolic acid, rosmarinic acid, eugenol, carvacrol, linalool,  $\beta$ -caryophyllene (about 8%), eugenol (~ 70%),  $\beta$ -element (~ 11) caryophyllene (~8%), germacrene (~2%)<sup>67</sup>. Essential oils of the leaves include eugenol (1-hydroxy-2-methoxy-4-allylbenzene, euginal (eugenic acid), ursolic acid, carvacrol (5-isopropyl-2-methylphenol, linalool (3,7-dimethylocta-1, 6- diene-3-ol, limatrol,

caryo-methyl-1-methylene acid), the essential oil of the seeds is sitosterol, the mucus of the seeds contains some carbohydrates, and the green leaves contain anthocyanins xylose and polysaccharides 40-55.

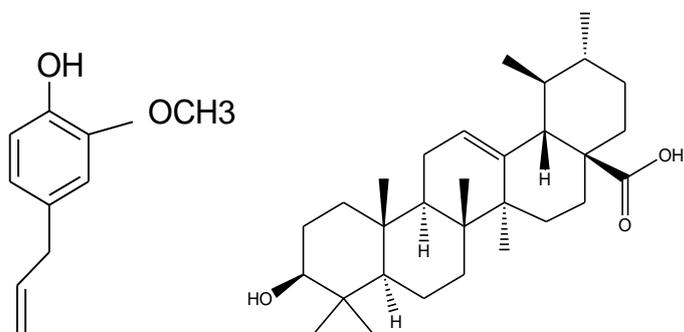


Figure-Eugenol

Figure-Ursolic acid

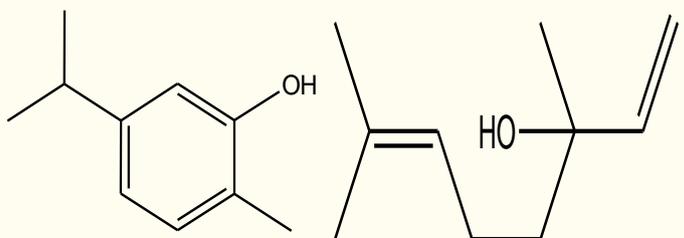


Figure-Carvacrol

Figure-Linalool

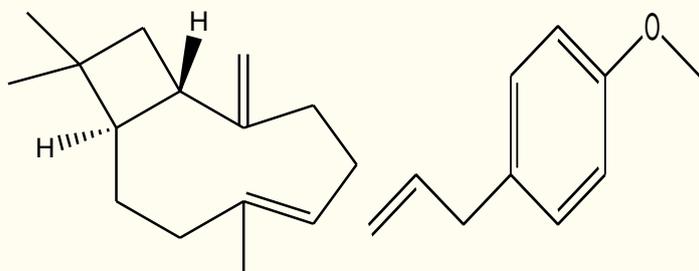


Figure-Caryophyllin

Figure-Estragol

Saponins, flavonoids, triterpenoids, tannins, rosmarinic acid, propanoic acid, apigenin, zirsimaritin, isothymusin and isothymonin are found in the stems and leaves of Holy Basil and may have biological effects<sup>55-60</sup>.

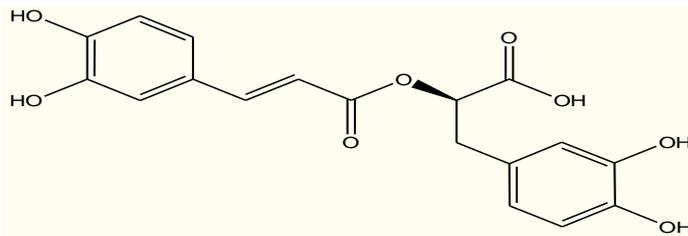


Figure-Rosmarinicacid

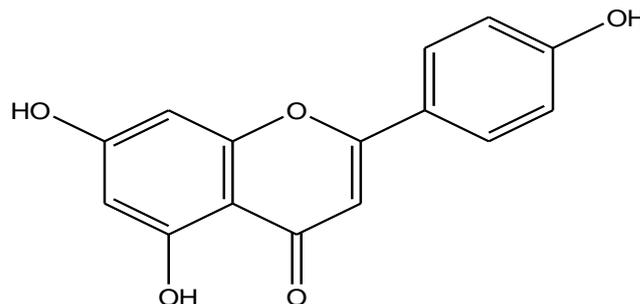


Figure-Apigenin

## 2. THERAPEUTIC APPLICATIONS

### 2.1 Antidiabetic

An ethanolic extract of *O. sanctum* L. decreases blood sugar, glycosylated haemoglobin, and urea while increasing glycogen, haemoglobin, and protein levels in rats with streptozotocin-induced diabetic mellitus. Insulin and peptide levels, as well as glucose tolerance, were all enhanced by the extract. The physiological mechanism of insulin secretion is stimulated by *sanctum* L., which may explain its possible anti-diabetic properties<sup>61</sup>.

Grovel and his colleagues It was shown that giving *O. sanctum* L. extract to normal rats fed fructose for 30 days lowered blood sugar levels considerably compared to controls. *o. Sacred* L., on the other hand, has no impact on hyperinsulinemia<sup>62</sup>.

### 2.2 Heart Activity

Tulsi helps treat heart problems. Oral administration of an aqueous-alcoholic extract (100 mg/kg) of *O. sanctum* L. to male Wister rats exposed to chronic resistant stress (6 h/day for 21 days) significantly decreased the increase in the activity of cAMP, a myocardial superoxide<sup>63</sup>.

### 2.3 Wound Healing

Tulsi accelerates wound healing. The effects of alcoholic extracts of *O. sanctum* L. leaves on normal wound healing and wound healing inhibited by dexamethasone were investigated<sup>64</sup>.

## 2.4 Antioxidant

*O. sanctum* The OPPH test, which uses hypoxanthine xanthine oxidase and high-performance liquid chromatography, was used to assess it (HPLC). In a hypoxanthine xanthine oxidase<sup>109</sup> assay, *O. sanctum* L. shown remarkable antioxidant capacity. Another research found that an aqueous extract of *O. sanctum* L. improved the activity of antioxidant enzymes such as superoxide dismutase and catalase in the extract group compared to the control group<sup>65</sup>.

## 2.5 Hyperlipidemia

In rabbits receiving cholesterol (100 mg/kg bw/day), administration of *O. sanctum* L. seed oil (0.8 g/kg bw/day) for 4 weeks reduced serum cholesterol levels, triacylglycerols, and LDL + VLDL. decreases significantly. Compared to the cholesterol group without cholesterol treatment, *O. sanctum* L. Seed oil hashypocholesterolemic activity<sup>66</sup>.

## 2.6 Antimicrobial

Singh et al. In their study, it was suggested that the higher linoleic acid content of non-volatile *O. sanctum* L. oil may contribute to its antimicrobial activity. The oil exhibits excellent antibacterial activity against the organisms to which *S. aureus* is most sensitive: *Staphylococcus aureus*, *Bacillus pumius* and *Pseudomonas aeruginosa*<sup>67</sup>.

## 2.7 Effect on gene transcription

LDRL, LxRalpha, PPAR, and CD36 are genes that alter lipid metabolism, cytotoxin generation, and cellular activity inside the arterial wall, and hence play a direct role in atherogenesis. Human mononuclear cells produced in the presence of polyphenols from *O. sanctum* L., Kaul et al. To test if polyphenols have an effect on these genes' transcription. The transcriptional expression of these genes was determined using RTPCR and SCION IMAGE analysis software. The capacity of these polyphenol extracts to suppress the transcriptional expression of these genes<sup>116</sup> has been demonstrated<sup>68</sup>.

## 2.8 Gastroprotective Agent

Standardized Methanol Extract of *O. sanctum* L. Leaves (OSE) Dose-dependent prophylactic efficacy of ulcers against gastric ulcers induced by cold stress was shown when administered orally twice a day for 5 days at a dose of 50-200 mg/kg<sup>69</sup>.

## 2.9 Immunomodulatory Effects

After an intramammary injection of an aqueous extract, *O. sanctum* L. Extracts from asymptomatic bovine mastitis (SCM) in leaves were explored for their immunotherapeutic potential. Treatment with an aqueous extract of *O. sanctum* L. reduced total bacterial count while boosting neutrophil and lymphocyte levels, phagocytic activity, and index, as per the studies<sup>70</sup>.

## 2.10 Analgesic

The analgesic effect of alcohol extract of mouse leaf was investigated in mice using glacial acetic acid-induced seizure test (50, 100 mg/kg, intraperitoneal; 50, 100, 200 mg/kg, oral) ... Reduced number of seizures in the presence of *O. sanctum* L. Improved tail bouncing delay in *O. sanctum* L. mice (50 and 100 mg/kg intraperitoneal)<sup>71</sup>.

## 2.11 Anti-Fertility

*O. sanctum* L. (250 mg/kg bw) decreased total sperm count, sperm motility and rate of advancement for 48 days, indicating a reversible contraceptive effect. The proportion of abnormal sperm in the tail fluid of the epididymis increased, while fructose levels in the epididymal plasma and seminal vesicles decreased<sup>72</sup>.

## 2.12 Anti-inflammatory Activity

Apigenin, rosmarinic acid and eugenol were extracted from *O. sanctum* L. extract and tested for anti-inflammatory and cyclooxygenase inhibitory activity<sup>73</sup>.

## 3. CONCLUSION

### 3.1 Benefits of Tulsi (Holy Basil)

Tulsi is worshipped in Hindu culture not just due to mythological reasons. Tulsi is also a potent herb that has many health benefits and cures many ailments. This easy to grow herb strengthens immunity, fights bad viruses and bacterias<sup>151</sup>. In Ayurveda, Tulsi is given great importance and has been discussed extensively. Even modern science has admitted most of the benefits of Tulsi. Let's list some of these benefits<sup>152-200</sup>.

- 3.1.1. Improves skin complexion when applied topically and also when consumed
- 3.1.2. Beneficial to treat skin disorders like ringworm, pimples, and itching
- 3.1.3. Beneficial to control high blood pressure and cholesterol
- 3.1.4. Improves digestive system
- 3.1.5. Help in mouth diseases, dental health, and ulcers
- 3.1.6. It has antibiotic and anti-bacterial properties

- 3.1.7. Help is lung issues like Asthma or chest congestion
- 3.1.8. Rich source of Vitamin A and C
- 3.1.9. Provides relief during fever, cold, headache, cough, sore throat
- 3.1.10. Regulates high sugar levels in the blood
- 3.1.11. Helpful for joint pain and arthritis

**4.2 KRISHNA TULSI (OCIMUM TENUIFLORUM)**



**4.3. AMRITA TULSI (OCIMUM TENUIFLORUM)**



**4.4. VANA TULSI (OCIMUM GRATISSUM)**



**Health Benefits of Tulsi**

Anti inflammatory	Anti stress	Anti bacterial	Anti oxidant	Analgesic	Immuno modulators
Blood purifier					Carminative
Antipyretic					Cardiac toner
Anti fungal					Beautifying
Anti diabetic					Digestive
Stimulant	Anti cancer	Anti allergic	Anti aging		

**4. Figure of 18 Types of Tulsi<sup>86-113</sup>.**

**4.1. RAMA TULSI(OCIMUM SANCTUM)-**



**4.5. SWEET BASIL (OCIMUM BASILICUM)**



**4.8. LEMON BASIL (OCIMUM CITRIODORUM)**



**4.6. THAI BASIL (OCIMUM THYRSIFLORA)**



**4.9. VIETNAMESE BASIL (OCIMUM CINNAMON)**



**4.7. PURPLE BASIL (OCIMUM BASILICUM)**



**4.10. AMERICAN BASIL (OCIMUM AMERICANUM)**



**4.11. AFRICAN BLUE BASIL (OCIMUM KILIMANDSCHARICUM)**



**4.14. GREEN RUFFLES BASIL(OCIMUM BASILICUM)**



**4.12. ITALIAN GENOVESE BASIL (OCIMUM BASILICUM)**



**4.15. CARDINAL BASIL(OCIMUM BASILICUM)**



**4.13. LETTUCE BASIL**



**4.16. GREEK BASIL(OCIMUM BASILICUM)**



#### 4.17. SPICY GLOBE BASIL(OCIMUM BASILICUM)



#### 4.18. SUMMER LONG BASIL(OCIMUM BASILICUM)



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