



***OCIMUM SANCTUM* (LINN.); THE QUEEN OF HERBS**

Shishir Maharjan*

Department of Pharmacy, Institute of Medicine, Tribhuvan University.

*Corresponding Author: Shishir Maharjan

Department of Pharmacy, Institute of Medicine, Tribhuvan University.

Article Received on 24/05/2019

Article Revised on 15/06/2019

Article Accepted on 04/07/2019

ABSTRACT

Ocimum sanctum, a religious and medicinal herb, is regarded as the queen of herbs. It is herbaceous, multi-branched, a 30-75cm plant belonging to Lamiaceae family and is cultivated throughout the native world tropics. The chemical constituents of the plant are very perplexing due to the presence of different nutrients and active compounds. The main chemicals present in fair amount are eugenol, carvacrol, ursolic acid, linalool, etc. Due to the presence of these chemicals, the plant shows diverse properties like antimicrobial, anticancer, antidiabetic, anti-inflammatory, antioxidant, etc.

KEYWORDS: *Ocimum sanctum*, Legendary herb, Eugenol.

INTRODUCTION

Ocimum sanctum (Tulsi) renowned as; “Queen of herbs”, the legendary “Incomparable one”, “The Mother medicine of nature”, is regarded as one of the holiest and most cherished of the many healing and health-giving herbs of the Orient. Medicinal, religious and culinary uses of Tulsi have been reported from the ancient times for centuries in China, India and the rest of the Asian countries, North Africa and Australia.^[1] Genus *Ocimum* was described in 1753 by Linnaeus, who listed five species in it.^[2] The *Pauranic* mythology calls Tulsi; *Vishnu Priya*, “Beloved of Lord Vishnu” and that’s one of the reasons that Hindus pray Tulsi as a goddess in the

form of a plant bestowed with great spiritual and healing powers.^[3]

ETYMOLOGY

The word “basil” comes from Greek word βασιλεύς (basileus), which holds the meaning as “king”, as it is believed to have grown above the spot where St. Constantine and his mother St. Helen discovered the Holy cross.^[4] Similarly, the generic name “*Ocimum*” is derived from ancient Greek word *okimon* which has the meaning of smell, referring to the strong fragrance of the plant.^[5] Likewise, Tulsi is a Sanskrit word which carries the meaning; “The Matchless one”.^[6]

GENERAL DESCRIPTION OF PLANT



Fig: Leaves and inflorescence of *Ocimum sanctum*.

Ocimum sanctum is an herbaceous, multi-branched, annual, erect, softy hairy, 30-75 cm. high found thoroughly up to 1800m. Its leaves are elliptical, oblong, acute or obtuse, entire or serrate, pubescent on both

sides, minutely gland-dotted.^[7] Inflorescence is verticillate^[8] and flowers are purplish in color, close whorl in the form of racemes. Nutlets are subglobose, slightly compressed, pale brown or red in color. Seeds

are reddish black and subglobose,^[9] rounded to oval mucilaginous, 0.1 cm long, slightly notched at the base, no odor and has a pungent smell.^[10] Generally, two types of Tulsi can be found cultivated viz. i> Sri Tulsi - having green leaves and ii> Krishna Tulsi – having purple leaves.^[11]

Distribution^[12]

Tulsi has cosmopolitan in distribution as it is found throughout the world tropic and is widely cultivated especially for religious, ethical purposes and extracting essential oil from its different parts for medical uses.

Scientific classification^[13]

- ❖ Kingdom - Plantae
- ❖ (Unranked) – Angiospermae
- ❖ (Unranked) – Eudicots
- ❖ (Unranked) – Asterids
- ❖ Order – Lamiales
- ❖ Family – Lamiaceae
- ❖ Genus – *Ocimum*
- ❖ Species – *O.sanctum*

Common names- Holy basil, sacred basil

*Latin- *Ocimum sanctum* (“sacred fragrant lipped basil”) but the species has recent names called as *Ocimum tenuiflorum* (“basil with small flowers”) or *Ocimum gratissimum* (“very grateful basil”).^[14]

PHYTOCHEMICAL CONSTITUENTS

The plant possesses highly complex chemical constituents due to the presence of many nutrients and biologically active components. However, these constituents significantly vary with time, cultivation process and storage.^[15] The essential oil or volatile oil consisting of phenols, terpenes, and the aldehyde is mainly responsible for providing unique aromatic odor to it. Besides the volatile oil, it also contains glycosides, alkaloids, saponins, and tannins.^[16] In dried leaf powder, 49 components were found. Major components found in methanolic extracts were 1-Methyl eugenol (89.20%), 2-Eugenol (5.29%), 1-Stigmast-5-en-3-ol (17.46%), 2-Stigmast-5, 22-dien-3-ol (13.13%), 3-Methyl eugenol (6.19%), in acetonic extract 1-Methyl eugenol (25.31%) and 2-Neophytadiene (7.77%) were found in majority, in petroleum ether extract 1-Methyl eugenol (20.97%), 2-Octadecane (17.50%) ,3-β-caryophyllene (8.22%) were found in majority.^[17]

No.	RT	Name of the compound	Molecular Formula	MW	Peak Area %
1.	6.12	Eugenol	C ₁₀ H ₁₂ O ₂	164	43.88
2.	6.56	Cyclohexane, 1,2,4-triethenyl-	C ₁₂ H ₁₈	162	15.31
3.	6.99	Caryophyllene	C ₁₅ H ₂₄	204	26.53
4.	7.73	10-Heptadecen-8-ynoic acid, methyl ester, (E)-	C ₁₈ H ₃₀ O ₂	278	1.02
5.	8.99	Cyclopentane, cyclopropylidene-	C ₈ H ₁₂	108	1.02
6.	14.95	Z,Z-4,16-Octadecadien-1-ol acetate	C ₂₀ H ₃₆ O ₂	308	1.02
7.	20.49	Benzene methanamine, N,N-a,4-tetramethyl-	C ₁₁ H ₁₇ N	163	2.04
8.	20.85	3',8,8'-trimethoxy-3-piperidyl-2,2'-binaphthalene-1,1',4,4'-tetrone	C ₂₈ H ₂₅ NO ₇	487	1.02
9.	24.36	Octadecane, 1,1-dimethoxy-	C ₂₀ H ₄₂ O ₂	314	2.04
10.	24.71	Pentanedinitrile, 2-methyl-	C ₆ H ₈ N ₂	108	6.12

Fig: Components identified in the leaf extract of *Ocimum sanctum*.^[18]

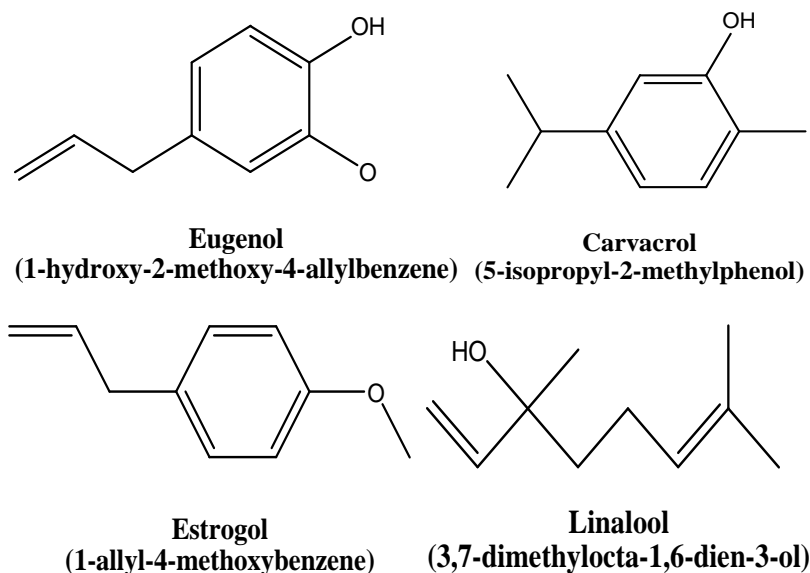


Fig: Important Phytochemicals of *Ocimum sanctum*.^[19]

Essential oil from leaves	Alcoholic Extract from leaves	Fixed oil form seeds	Mineral Content Per100 gm
Thujene	Ursolic acid	Palmitic acid	Carotene(215mg)
Octane	Apigenin	Steric acid	Vit c (83mg)
Nonane	Apignin	Linoleic Acid	Ni(0.7)
Benzene	Glucuronide	Sitosterol	Cu(0.4)
Z-(3)-hexanol	Luteolin	Linolenodi-Linolin	Ca(3%)
-Pinene	Orientin	Hexouren	P(0.34%)
Ethyl 2-methyl	Molludistin		V(0.5 mg)
Butyrate Tolune	Rosanilic Acid		Cr((3 mg)
			Fe(2.3 mg)

Fig: Chemical constituents of *Ocimum sanctum*.^[20]

Uses of *Ocimum sanctum*

• Traditional Uses

Ocimum sanctum is regarded as “the elixir of life” since it has the potential to promote longevity. Different parts of the plant are used traditionally for different purposes like common cold, headache, cough, flu, earache, fever, colic pain, sore throat, bronchitis, asthma, hepatic diseases, malaria fever, as an antidote for snake bite and scorpion sting, etc.^[21] Traditionally, different forms of Tulsi have been found to be led in practice as an herbal tea, dried powder, fresh leaf, or mixed with ghee.^[22] It has one of the main ingredients in the formulation of different ayurvedic medicine for the treatment of a wide range of disorders of mouth, throat, lungs, heart, blood, liver, kidney, and the digestive, metabolic, reproductive and nervous system.^[23] In Ayurveda; an ancient system of medicine, it is described as “rasayana” (plants having adaptogen like properties)^[24] and it is well known for its therapeutic potentials and described as Dashemani Shwasahami (antiasthmatic) and Kaphaghna (antikaphic drugs).^[25]

• Medicinal Uses

Tulsi is commonly used for curing skin diseases, hepatic disorders, cold, cough, malarial fever and so on. Several recent investigations using the extracts of *O. sanctum* have indicated that they possess significant anti-stress, anti-fungal and anti-carcinogenic properties.^[26] Due to presence of different phytochemicals, it shows versatile properties as; antimicrobial, anticancer,^[27] anti-inflammatory,^[28] analgesic, antipyretic,^[29] antioxidant,^[30] antidiabetic,^[31] adaptogenic^[32] and anti-stress,^[33] hepatoprotective,^[34] etc. Through research, it was found that dried leaf of the plant carries caliber to normalize high serum profile in the diet and also protects the liver which had tested in diabetic rats.^[35] In addition, alteration of sperm count, motility, velocity, fructose contained in cauda epididymis have been reported in the leaves of the plant.^[36] Likewise, leaves of the plant are carminative, diaphoretic and used for the treatment of skin diseases and pulmonary infection.^[37] Even though, Tulsi is considered as general vitalizer and increases physical endurance, it doesn't contain caffeine and other stimulants.^[38]

CONCLUSION

In a nutshell, Tulsi is indeed one of the important medicinal as well as religious herbs, which is boon to our natural world providing essential constituents for

eradicating different kinds of diseases and disorders of our body parts. The evidence that the plant has been in use for different purposes from ancient human civilization up to now has proven its name truly as the king of herbs and the matchless one.

REFERENCES

1. P Sundaramurthi, S Dhandapani, S Ponnusamy, M Subbaiyan, Effect of Tusli (*Ocimum sanctum*) as a disinfecant for water treatment. Hitek J Bio Sci & Bioengg, 2012; 1(1): 7.
2. F Bast, P Rani, D Meena, Chloroplast DNA Phylogeography of Holy Basil (*Ocimum tenuiflorum*) in Indian Subcontinent The Scientific World of Journal, 2014; 6.
3. K McGuire *Holy Basil, Ocimum sanctum*, 2012 [cited].
4. H G Tilebeni, Review to Basil Medicinal Plant. International journal of Agronomy and Plant Production, 2011; 2(1): 5-9.
5. M Meyers, Basil An Herb Society of America Guide, 2003; 45.
6. P Alam, J Gupta, S Firdouse, A Firdouse and J Afshan, HPTLC Method for qualitative and quantitative estimation of eugenol from *Ocimum sanctum* Linn. in polyherbal formulation. International Journal of comprehensive pharmacy, 2012; 10(07): 1-3.
7. Prof. I C Dutta(Ph.D), Non timber forest products of Nepal, 2007; 484.
8. C G Bihari, B Manaswini, J P Kumar and T S Kumar Pharmacognostical and phytochemical investigation of various tulsi plants available in south eastern odisha International Journal of Research in Pharmaceutical and Biomedical Sciences, 2011; 2(2): 605-610.
9. Dr. C K Kokate, A P Purohit, S B Gokhale, Pharmacognosy. 47th ed. Vol. I & II. January 2012: Nirali Prakashan.
10. V R Joshi, C S Mehta, B J Pattagiri and P K Prajapati, Pharmacognostic and scientific evaluation of the plant- Tulsi (*Ocimum sanctum*). International Journal of Green and Herbal Chemistry, 2012; 1(1): 90.
11. S Vishwabhan, V K Birendra, S Vishal, A review on ethnomedical uses of *Ocimum sanctum*(tulsi). International Research Journal of Pharmacy, 2011; 2(10): 1-3.

12. A N M Mamun-or-Rashid, M Azam, B K Dash, F B Hafiz, M K Sen Ethnomedicobotanical study on *Ocimum sanctum* L. (Tulsi)- a review. *Mintage journal of Pharmaceutical & Medical Sciences*, 2013; 2(2): 37-42.
13. S Rahman, R Islam, M Kamruzzaman, K Alam, A H M Jamal, *Ocimum sanctum* L.: A Review of Phytochemical and Pharmacological Profile. *American Journal of Drug Discovery and Development*, 2011; 1-15.
14. S Maimes, *Maimes report on Holy Basil*, 2004; 12.
15. L Mohan, Amberkar MV, M Kumari, *Ocimum sanctum* Linn(tulsi) -an overview *International Journal of Pharmaceutical Sciences Review and Research*, 2011; 7(1): 51-53.
16. B Joseph, V M Nair, Ethnopharmacological and Phytochemical Aspects of *Ocimum sanctum* Linn-The Elixir of Life. *British Journal of Pharmaceutical Research*, 2013; 3(2).
17. A Kumar, A Rahal , S Chakraborty, R Tiwari, S K Latheef , K Dhama, *Ocimum sanctum* (Tulsi): a miracle herb and boon to medical science – A Review. *International Journal of Agronomy and Plant Production*, 2013; 4(7): 1580-1589.
18. G Devendran, U Balasubramanian, Qualitative phytochemical screening and GC-MS analysis of *Ocimum sanctum* L. leaves. *Asian Journal of Plant Science and Research*, 2011; 1(4): 44-48.
19. P Pattanayak, P Behera, D Das and S K Panda, *Ocimum sanctum* Linn. A reservoir plant for therapeutic applications: An overview. *Pharmacognosy Review*, 2010; 4(7): 95-105.
20. J Bhore, B Gatkul, The Therapeutical Uses of Tulsi and Remedies in India. *International Indexed & Referred Research Journal*, 2012; IV(38): 53-55.
21. E Singh, S Sharma, J Dwivedi and S Sharma Diversified potentials of *Ocimum sanctum* Linn (Tulsi): An exhaustive survey. *Scholars Research Library*, 2012; 2(1): 39-48.
22. P S Sadashiv, Acute Toxicity study of *Ocimum sanctum*. *International Research Journal of Pharmacy*, 2010; 1(1): 409-413.
23. R Miller, S Miller, Tulsi Queen of Herbs India's Holy Basil, 2003.
24. I Tabassum, Z N Siddiqui, S J Rizvi, Protective effect of *Ocimum sanctum* on lipid peroxidation, nucleic acids and protein against restraint stress in male albino rats *Biology and Medicine*, 2009; 1(2): 42-53.
25. P Prakash and N Gupta, Therapeutic uses of *Ocimum sanctum* Linn(tulsi) with a note on eugenol and its pharmacological actions: a short review *Indian J Physiol Pharmacol*, 2005; 49(2): 125-131.
26. J M A Hannan, B K Das, A Uddin , R Bhattacharjee, B Das, H S Chowdury and A S M Mosaddek Analgesic and anti-inflammatory effects of *Ocimum sanctum* (Linn) in laboratory animals. *International journal of Pharmaceutical Sciences and Research*, 2011; 2(8): 2121-21245.
27. G Pandey and S Madhuri, Pharmacological activities of *Ocimum sanctum* (tulsi): a review *International Journal of Pharmaceutical Sciences Review and Research*, 2010; 5(1): 61-66.
28. K Thakur and K S Pitre, Anti-inflammatory activity of extracted eugenol from *Ocimum sanctum* L. leaves *Rasayan journal*, 2009; 2(2): 472-474.
29. S Singh, M Taneja and D K Majumdar, Biological activities of *Ocimum sanctum* L. fixed oil - An overview. *Indian Journal of Experimental Biology*, 45: 403-412.
30. V D Nair, A J Cheruth, R Gopi, M Gomathinayagam, R Panneerselvam, Antioxidant potential of *Ocimum sanctum* under growth regulator treatments. *EurAsian Journal of BioSciences*, 2009; 3: 1-9.
31. S Mondal, B R Mirdha and C Mahapatra, The science behind sacredness of tulsi (*Ocimum sanctum* Linn.) *Indian J Physiol Pharmacol*, 2009; 53(4): 291-306.
32. Anju, Adaptogenic and anti-stress activity of *Ocimum sanctum* in mice *Research Journal of Pharmaceutical, Biological and Chemical*, 2011; 2(3): 670-678.
33. A Ahmad , N Rasheed , K Chand , R Maurya , N Banu & G Palit, Restraint stress-induced central monoaminergic & oxidative changes in rats & their prevention by novel *Ocimum sanctum* compounds. *Indian J Med Res*, 2012; 548-554.
34. N Akilavalli, J Radhika, P Brindha, Hepatoprotective activity of *Ocimum sanctum* Linn. against lead induced toxicity in albino rats *Asian Journal of Pharmaceutical and Clinical Research*, 2011; 4(2): 84-87.
35. T Suanarunsawat, W D N Ayuthaya, T Songsak, J Rattanamahaphoom, Anti-lipidemic actions of essential oil extracted from *Ocimum sanctum* L. leaves in rats fed with high cholesterol diet. *Journal of Applied Biomedicine*, 2009; 7: 45-53.
36. M Ahmed, R N Ahamed, R H Aladakatti, M Ahmed, G Ghodesawar, Effect of benzene extract of *Ocimum sanctum* leaves on cauda epididymal spermatozoa of rats *Iranian Journal of Reproductive Medicine*, 2011; 9(3): 177-186.
37. W C Evans, *Trease and Evans pharmacognosy*, 15 ed. 585.
38. B Gupta, V N Kumar, S Mallaiah, Assessment of Antimicrobial Activity of Various Concentrations of Commercially Available Tulsi (*Ocimum sanctum*) Powder against *Streptococcus Mutans* *Open Journal of Dentistry and Oral Medicine*, 2013; 1(2): 19-24.