

Review Paper

Medicinal Properties of *Ocimum Sanctum* Linn: Holy Basil

Sanjive kumar¹

¹ Department of Chemistry, K A P G College,
Allahabad, Uttar Pradesh, India

Abstract

Ocimum Sanctum is commonly known as Holy Basil or Tulsi (in Hindi). It is also known as “Queen of herbs” due to its medicinal properties. It has several medicinal properties like antioxidant, anticancer, radio-protective, anti-microbial, anti-inflammatory, gastro-protective, anti-diabetic, cardio-protective, immunomodulatory, anti-stress and anti-thyroid activities. This is proved by several scientific studies. *Key words- Ocimum Sanctum, Holy Basil, Medicinal property.*

1. Introduction

Ocimum Sanctum is commonly known as Holy Basil or Tulsi (in Hindi). It is a perennial plant of lamiaceae family. It is an erect branched sub-herb around 12-24 inches tall with hairy stem. Its leaves are green or purple in colour and filled with smell. Its flowers are also purple in colour and present in close whorls. It is commonly found in Indian subcontinent. It is consider as a religious plant in Hindu religion and commonly found in each Hindu family. It is also used as a medicinal plant in traditional systems of medicine including Ayurveda, Unani, Siddha, Greak, Roman. It is commonly known as “Queen of Herbs” due to its medicinal properties. The Aim of present work is to study the medicinal properties of Holy basil scientifically.

Table-1: Classification

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Asteridae
Order	Lamiales
Family	Lamiaceae
Genus	Ocimum L.
Species	Ocimum tenuiflorum L.

Table -2: Common Names of *Ocimum Sanctum*

Language	Name
English	Holy Basil
Hindi	Tulsi
Sanskrit	Tulasi, Gauri, Tulsi
Tamil	Nalla Thulasi
Telugu	Thulasi
Bengali	Pabitra Pudhina
Arabic	Raihan

2. Methodology

In this study first medicinal properties of holy basil were recognized. In the next step the literature related to these medicinal properties are collected with the help of organized search. The searches were performed using various data base including PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>), Scopus (<http://www.scopus.com>), Scirus (<http://www.scirus.com>), Science Direct (<http://www.sciencedirect.com>), Google Scholar (<http://www.scholar.google.com>).

3. Medicinal properties of Holy Basil

3.1. Antioxidant

Antioxidants are those substances which restrict oxidation process by removing free radicals from our body. These free radicals cause several problems like cancer in our body. Holy basil is a very common source of natural antioxidants. A study showed that leaves, stem and inflorescence of holy basil have phenolic compounds that are responsible for the antioxidant property of their extract (Hakkim et al. 2007). Another study showed that its leaves have antioxidant property and it is responsible for their hypoglycaemic effect (Sethi et al. 2004).

3.2. Anti Cancer

Cancer is a life threatening disease spreading very rapidly now a day. Holy basil is proved to be an anticancer agent by several studies. A study showed

that it has several phytochemicals like eugenol, rosmarinic acid, apigenin, myretanal, luteolin, β -sitosterol, and carnolic acid which can prevent chemical-induced skin, liver, oral, and lung cancers (Baliga et al. 2013). Another study showed that aqueous and ethanolic extract of holy basil shows significant reduction in sarcoma 180 solid tumours in mice (Kartikyan et al. 2008).

3.3. Radio protective

Radioactive substances are very harmful human being and it can damage human cells and also cause cancer. Holy basil also has radio protective nature. A study showed that polysaccharides isolated from holy basil can prevent γ -radiation-mediated cell deaths in mouse splenocytes (Subhramanian et al. 2013). Another study showed that both Tulsi extract and its flavonoids selectively protect the normal tissues against the tumoricidal effects of radiation in tumours bearing mice (Baliga et al. 2016).

3.4. Antimicrobial

Anti microbial are those substances which are used to treat microbial infection. They can be classified on the basis of their role of action as antibacterial, antifungal, Antiviral and antiparasitics substances. Holy Basil shows antimicrobial property also. A study showed that holy basil act as antimicrobial agent against *Propionibacterium acnes* (Viyoch et al. 2006). Another study showed that essential oil of holy basil shows anti microbial activity against fungi causing biodegradation of food stuff and showed ability of natural food preservative (Kumar et al. 2010). Another study showed that leaf extract of holy basil have antibacterial property and it can be useful in the discovery of novel antibiotics (Goyal et al. 2011).

3.5. Anti-inflammatory

Anti-inflammatory are those substances that reduce inflammation or swelling. Holy basil is a natural anti-inflammatory substance. A study showed that the fixed oil of *Ocimum sanctum* possess significant anti-inflammatory activity against carrageenan- and different other mediator-induced paw edema in rats (Singh et al. 1996). Another study showed that methanol extract and an aqueous suspension of *Ocimum sanctum* inhibited acute as well as chronic inflammation in rats as tested by carrageenan-induced pedal edema and croton oil-induced granuloma (Godhwani et al. 1987).

3.6. Gastro protective

Holy basil also has the ability to prevent Gastric ulcer. A study showed that the *Ocimum sanctum* L. possess significant antiulcer activity against aspirin-, indomethacin-, alcohol-, histamine-, reserpine-,

serotonin- and stress-induced ulceration in experimental animal models (Singh et al. 1999). Another study showed that the aqueous extract of *O. sanctum* contains pharmacologically active substances with antidiarrheal properties (Maheshkumar et al. 2016).

3.7. Anti diabetic property

Diabetes is a life style disease growing day by day in our society. Holy basil also has anti-diabetic property. A study showed that Holy basil leaf extract stimulates insulin secretion from perfused rat pancreas, isolated rat islets and a clonal rat β -cell line (Hannan et al. 2006). Another study showed that the oral administration of aqueous extract of holy basil showed significant reduction in fasting blood glucose and improvement lipid profile in streptozotocin induced diabetic rat (Halim et al. 2001). Another study indicate that different fractions of *O. sanctum* have favorable effects in bringing down the severity of diabetes together with hepatoprotectivity in alloxan induced diabetic rats (Khan et al. 2010).

3.8. Cardio protective

Holy basil also has cardio protective nature. A study showed that holy basil has cardio protective property against isoproterenol induced myocardial infarction in rats (Sharma et al. 2001). Another study showed that basil strongly protected the myocardium against isoproterenol-induced infarction and suggested that the cardio-protective effects could be related to anti oxidative activities (Fatihazad et al. 2012).

3.9. Immunomodulatory activity

Immunomodulatory substances are those which increase the immunity of body. Holy basil has been used as immunity enhancer for a long time in ayurvedic system of medicine. A study showed that *Ocimum Sanctum* seed oil have immunomodulatory property (Mediratta et al. 2002). Another study showed that methanol and aqueous extract of basil leaves have immunoregulatory effect in albino rats (Godhwani et al. 1988).

3.10. Anti-stress activity

Stress is a very common problem of our society. Holy basil is proved to a very good natural source of Anti stress agent by several studies. A study showed that *O. sanctum* induces a state of non-specific increased resistance against a variety of stress-induced biological changes in rats and mice (Bhrgava et al. 2013). Another study showed that fresh leaves of holy basil shows anti stress activity against experimentally induced oxidative stress in albino rabbit (Sethi et al. 2007).

3.11. Anti-thyroid activity

Holy basil also has property to regulate thyroid. A study showed that *Ocimum sanctum* leaf extract at the dose of 0.5 g kg⁻¹body wt. for 15 days significantly decreased serum T₄ concentrations, hepatic LPO and G-6-P activity in male mouse (Panda et al. 1998).

Table-3: Experimental evidences of medicinal properties

S. No.	Medicinal Property	Experimental Evidences
1.	Antioxidant	Hakkim et al. 2007 Sethi et al. 2004
2.	Anti cancer	Baliga et al. 2013 Kartikeyan et al. 2008
3.	Radio protective	Subhranian et al. 2013 Baliga et al. 2016
4.	Antimicrobial	Viyoch et al. 2006 Kumar et al. 2010 Goyal et al. 2011
5.	Anti-inflammatory	Singh et al. 1996 Godhwani et al. 1987
6.	Gastro-protective	Singh et al. 1999 Maheshkumar et al. 2016
7.	Anti-diabetic	Hannan et al. 2006 Halim et al. 2001 Khan et al. 2010
8.	Cardio-protective	Sharma et al. 2001 Fatihazad et al. 2012
9.	Immunomodulatory activity	Mediratta et al. 2002 Godhwani et al. 1988
10.	Anti-stress activity	Bhrgava et al. 2013 Sethi et al. 2007
11.	Anti- thyroid activity	Panda et al. 1998

4. Conclusion

Ocimum Sanctum is commonly called holy basil, is considered as a religious plant widely used in several rituals in Hindu religion. It is also a very important medicinal plant in Ayurvedic system of medicine. The present study prove several medicinal properties of holy basil like antioxidant, anticancer, radio-protective, anti-microbial, anti-inflammatory, gastro-protective, anti-diabetic, cardio-protective, immunomodulatory, anti-stress and anti-thyroid activities. However more studies are required to explore other medicinal properties of *Ocimum Sanctum*.

References

- [1] Baliga M S, Jimmy R, Tilakchand K R, Sunitha V, Bhat N R, Saldanha E. *Ocimum Sanctum* L (Holy Basil or Tulsi) and Its Phytochemicals in the Prevention and Treatment of Cancer. *Nutrition and Cancer*. 65(1): 26-35, (2013).
- [2] Baliga M S, Rao S, Rai M P, D'souza P. Radio protective effects of the Ayurvedic medicinal plant *Ocimum sanctum* Linn. (Holy Basil): A memoir. *J Can Res Ther*. 12:20-27, (2016).
- [3] Bhargava K P, Singh N. Anti-stress activity of *Ocimum sanctum* Linn. *Indian Journal of Medical Research*. 137 (3): 443-451, (2013).
- [4] Fatihazad F, Matlobi A, Khorrami A, Hamedeyazdan S, Soraya H, Hammami M, Maleki-dizaji N, Garjani A. Phytochemical screening and evaluation of cardioprotective activity of ethanolic extract of *Ocimum basilicum* L. (basil) against isoproterenol induced myocardial infarction in rats. *DARU Journal of Pharmaceutical Sciences*. 20:87, (2012).
- [5] Godhwani S, Godhwani J L, Vyas D S. *Ocimum sanctum*: An experimental study evaluating its anti-inflammatory, analgesic and antipyretic activity in animals. *Journal of Ethno-Pharmacology*. 21(2):153-163, (1987).
- [6] Godhwani S, Godhwani J L, Was D S. *Ocimum sanctum*— A preliminary study evaluating its immunoregulatory profile in albino rats. *Journal of Ethno-pharmacology*. 24(2-3):193-198, (1988).
- [7] Goyal P, Kaushik P. In vitro Evaluation of Antibacterial Activity of Various Crude Leaf Extracts of Indian Sacred Plant, *Ocimum sanctum* L. *British Microbiology Research Journal*. 1(3): 70-78, (2011).
- [8] Hakkim F L, Shankar C G, Girija S. Chemical Composition and Antioxidant Property of Holy Basil (*Ocimum sanctum* L.) Leaves, Stems, and Inflorescence and Their in Vitro Callus Cultures. *J Agric. Food Chemistry*. 55(22):9109-9111,(2007).
- [9] Halim E, Hussain M A, Jamil K, Rao M. Hypoglycaemic, hypolipidemic and antioxidant properties of tulsi (*Ocimum sanctum linn*) on streptozotocin induced diabetes in rats. *Indian Journal of Clinical Biochemistry*. 16(2):190-194, (2001).
- [10] Hannan J M A, Marenah L, Ali L, Rokeya B, Flatt P R, Abdel-wahab Y H A. *Ocimum*

- sanctum* leaf extracts stimulate insulin secretion from perfused pancreas, isolated islets and clonal pancreatic β -cells. *J Endocrinol.* 189:127-136, (2006).
- [11] Kartikeyan K, Gunasekaran P, Ramamurthy N, Govindasamy S. Anticancer activity of *Ocimum sanctum*. *Pharmaceutical Biology.* 37(4): 285-290, (1999).
- [12] Khan M R I, Islam M A, Hossain M S, Asadujjaman M, Wahed M I I, Rahman B M, Anisuzzaman A S M, Shaheen S M, Ahmed M. Antidiabetic Effects of the Different Fractions of Ethanolic Extracts of *Ocimum sanctum* in Normal and Alloxan Induced Diabetic Rats. *Journal of Scientific Research.* 2(1):158-168, (2010).
- [13] Kumar A, Shukla R, Singh P, Dubey N K. Chemical composition, antifungal and antiaflatoxicogenic activities of *Ocimum sanctum* L. essential oil and its safety assessment as plant based antimicrobial. *Food and Chemical Toxicology.* 48(2):539-543, (2010).
- [14] Maheshkumar K, Tamilmani S, Sheeladevi R. The effects of *ocimum sanctum* aqueous extract on intestinal motility of wistar albino rats by *in vitro* study. *Int J Health Allied Sci.* 5:263-266, (2016).
- [15] Mediratta P K, Sharma K K, Singh S. Evaluation of immunomodulatory potential of *Ocimum sanctum* seed oil and its possible mechanism of action. *Journal of Ethno-pharmacology.* 80(2):15-20, (2002).
- [16] Panda S, Kar A. *Ocimum sanctum* leaf extractin the regulation of thyroid function in male mouse. *Pharmacological Research.* 38(2):107-110, (1998).
- [17] Sethi J, Singh S, Sood S, Talwar A, Seth S. Antistressor activity of *Ocimum Sanctum* (Tulsi) against experimentally induced oxidative stress in rabbits. *Methods Find Exp Clin Pharmacol.* 29(6): 411, (2007).
- [18] Sethi J, Sood S, Seth S, Talwar A. Evaluation of hypoglycemic and antioxidant effect of *Ocimum sanctum*. *Indian J Clinical Biochem.* 19(2):152-155, (2004).
- [19] Sharma M, Kishore K, Gupta S K, Joshi S, Arya D S. Cardioprotective potential of *Ocimum sanctum* in isoproterenol induced myocardial infarction in rats. *Molecular and Cellular Biochemistry.* 225(1-2):75-83, (2001).
- [20] Singh S, Majumdar D K, Rehan H M S. Evaluation of anti-inflammatory potential of fixed oil of *Ocimum sanctum* (Holybasil) and its possible mechanism of action. *Journal of Ethno-Pharmacology.* 54(1):19-26, (1996).
- [21] Singh S, Majumdar D K. Evaluation of the gastric antiulcer activity of fixed oil of *Ocimum sanctum* (Holy Basil). *Journal of Ethno-Pharmacology.* 65(1):13-19, (1999).
- [22] Subramanian M, Chintalwar G J, Chattopadhyay S. Antioxidant and radioprotective properties of an *Ocimum sanctum* polysaccharide. *Redox Report.* 10(5):257-264, (2013).
- [23] Vioyoch J, Pisutthanan N, Faikreua A, Nupangta K, Wantorpol K, Ngokkuen J. Evaluation of *in vitro* antimicrobial activity of Thai basil oils and their micro-emulsion formulas against *Propionibacterium acnes*. *International Journal of cosmetic science.* 28(2):125-133, (2006).