

Mini Review

Holy Basil: A Medicinal Plant in India from Ancient Vedic Times

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Abstract

The Holy Basil, commonly known as Tulsi, is a perennial plant in India. It is well known in India for its medicinal properties since ancient Vedic times. Its botanical name is *Ocimum Sanctum*. It belongs to the plant family of Lamiaceae. Its leaves demonstrate multiple medicinal properties. It has been used in Ayurvedic medicine in India from ancient times for treatment of several adverse health conditions. It shows cardio-protective, anti-inflammatory and immunomodulatory effects. Its therapeutic effects in Ayurvedic medicine for cardiovascular diseases, diabetes as well as immunological, metabolic, neurological and psychological disorders has been reported in literature. No adverse health effects are reported. A recent study by Lopresti et al. published in 2022 concludes that supplementation with holy basil extract reduces stress, improves sleep quality and has health benefits. However more independent studies are required to reach this conclusion. More research is required on the health effects, mechanisms of action as well as the therapeutic and clinical use of the holy basil.

Keywords: Holy basil; Tulsi; *Ocimum sanctum*; Ayurveda; Medicinal plant

Introduction

Holy Basil, commonly known as Tulsi, is a perennial plant in India. It is known to Indians since ancient Vedic times. It is also commonly known as the holy basil. Its botanical name is *O. sanctum* [1] or *Ocimum tenuiflorum* [2]. It belongs to the plant family of Lamiaceae. Its leaves demonstrate multiple medicinal properties. It has been used in Ayurvedic medicine in India from ancient times for treatment of adverse health conditions [3]. Several *in vitro* and *in vivo* studies demonstrate multiple therapeutic properties for the leaves of this plant. They include antimicrobial, anti-inflammatory, cardioprotective and immunomodulatory properties and no significant adverse health effects [3]. A recent study by Lopresti et al. [4] conclude that supplementation with holy basil extract reduces stress and improves sleep quality.

Genomic Evaluation

Rastogi et al. [2] sequenced the nuclear and chloroplast genomes to understand the metabolic potential of this plant. Comparison of the chemical compounds and genes availability in this plant indicated the potential for the discovery of new active molecules. Their study showed new insights into the function of genes and the medicinal nature of the metabolites synthesized by this plant. This information is highly beneficial for mining biosynthetic pathways for important metabolites in related species [2].

Medicinal Effects

Tulsi is used in Ayurvedic medicine in India. Pattanayak et al. [5] reported that different parts of Tulsi such as leaves, stem,

flower, root, seeds and even whole plant are recommended for the treatment of bronchitis, malaria, diarrhea, dysentery, skin disease, arthritis, eye diseases, insect bites and so on. Also they show anti-fertility, anticancer, antidiabetic, antifungal, antimicrobial, cardio-protective, analgesic, antispasmodic and adaptogenic actions. Eugenol (1-hydroxy-2-methoxy-4-allylbenzene) is the active constituent of this plant is largely responsible for the therapeutic potential. The results of this study support the use of this plant for human and animal disease therapy.

Tulsi is used for cardiovascular diseases, diabetes as well as immunological, metabolic, neurological and psychological stress or disorders [1]. Gautam and Goel [6] evaluated the biochemical, hematological and histopathological effects of ethanolic extracts of Tulsi leaves orally administered to mice by gavage at the doses of 200 mg/kg/day, 400 mg/kg/day, and 800 mg/kg/day for 28 days. They did not observe any adverse health effects. This study demonstrated the safe medicinal use of Tulsi leaves.

Ponnusam et al. [7] used a power prepared from Tulsi as an antioxidant and hepatoprotective agent to treat liver injury in rats induced by oral administration of carbon tetrachloride for 7 days. They observed significant antioxidant activity as shown by decreased level of lipid peroxidation and increased levels of glutathione peroxidase, glutathione S-transferase, glutathione reductase, superoxide dismutase and catalase.

Baliga et al. [8] evaluated water soluble flavonoids against the radiation-induced sickness and mortality in mice. They reported that both Tulsi extract and its flavonoids selectively protected the normal tissues against the tumoricidal effects of radiation. Also preclinical studies showed that the aqueous extract of the Tulsi leaves; its flavonoids orientin and vicenin and eugenol present in Tulsi prevented radiation-induced clastogenesis. Mechanistic studies indicated that free radical scavenging, antioxidant, metal chelating and anti-inflammatory effects might have contributed for the observed protection. In addition, clinical studies with a small number of patients showed that Tulsi was effective as a radio protective agent.

Jamshidi and Cohen [3] undertook both *in vitro* and *in vivo*

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animal and human studies to demonstrate the therapeutic actions of Tulsi. Their studies demonstrated beneficial clinical effects, but no adverse health effects [3]. The beneficial effects include anti-microbial, anti-inflammatory, cardio-protective, and immunomodulatory effects. They reported the therapeutic effects on metabolic disorders, cardiovascular diseases, immunity and neurological disorders.

Clinical Trials

Recently the studies of Lopresti et al. [4] suggest that supplementation with a holy basil extract has the potential of reducing stress, and improve sleep quality. However, further research using gold-standard objective sleep measures will be required to substantiate the sleep-related findings.

Dose-Effect and Routes of Exposure of Holy Basil

No systematic dose-effect studies on the ingestion of holy basil are reported in literature. Also no reports on the effects of different routes of holy basil exposure are available.

Mechanisms of Action

No studies on the mechanism of action for the holy basil ingestion are reported in literature. Such studies are required to determine its mechanism of action. Baliga et al. [8] speculated possible mechanism that free radical scavenging, antioxidant, metal chelating and anti-inflammatory effects might play some role. In addition, clinical studies with a small number of patients showed that Tulsi was effective as a radio protective agent.

Conclusion

Literature search provides excellent review articles on the beneficial medicinal effects of Tulsi. No adverse health effects have been demonstrated and reported. A recent study by Lopresti et al. [4] conclude that supplementation with holy basil extract reduces stress and improves sleep quality. However more independent studies are required to reach this conclusion. Much more information is not known about this ancient plant compared to the modern medicine. Molecular mechanism of its therapeutic activities is unknown and there are no systematic studies on its human clinical efficacy and safety. There is a need for more studies to explore and document about its (a) clinical use, (b) therapeutic effects, (c) mechanisms of action, (d) dosage, (e) different routes of exposure and (f) range of human population expected to benefit from its therapeutic effects. Therefore, much more studies are warranted to learn more about this medicinal plant.

References

1. Cohen MM. Tulsi - *Ocimum sanctum*: A herb for all reasons. *J Ayurveda Integr Med.* 2014;5(4):251-9.
2. Rastogi S, Kalra A, Gupta V, Khan F, Lal RK, Tripathi AK, et al. Unravelling the genome of Holy basil: an "incomparable" "elixir of life" of traditional Indian medicine. *BMC Genomics.* 2015;16(1):413.
3. Jamshidi N, Cohen MM. The Clinical Efficacy and Safety of Tulsi in Humans: A Systematic Review of the Literature. *Evid Based Complement Alternat Med.* 2017;2017:9217567.
4. Lopresti AL, Smith SJ, Metse AP, Drummond PD. A randomized, double-blind, placebo-controlled trial investigating the effects of an *Ocimum tenuiflorum* (Holy Basil) extract (Holixer™) on stress, mood, and sleep in adults experiencing stress. *Front Nutr.* 2022;9:965130.
5. Pattanayak P, Behera P, Das D, Sangram K, Panda SK. *Ocimum sanctum* Linn: A reservoir plant for therapeutic applications: An overview. *Pharmacogn Rev.* 2010;4(7):95-105.
6. Gautam MK, Goel RK. Toxicological Study of *Ocimum sanctum* Linn Leaves: Hematological, biochemical, and histopathological studies. *J Toxicol.* 2014;2014:135654.
7. Ponnusam Y, Louis T, Madhavachandran V, Kumar S, Thoprani N, Hamblin MR, et al. Antioxidant activity of the ancient herb, holy basil in CCl₄-induced liver injury in Rats. *Ayurvedic.* 2015;2(2):34-8.
8. Baliga MS, Rao S, Rai MP, D'souza P. Radio protective effects of the Ayurvedic medicinal plant *Ocimum sanctum* Linn. (Holy Basil): A memoir. *J Cancer Res Ther.* 2016;12(1):20-7.