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A systemic review on tulasi (Ocimum sanctum Linn.)

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Abstract
Ocimum sanctum Linn is one of the important medicinal plants used in Ayurveda; commonly known as holy basil. It is generally available in tropical countries, and it is having many therapeutic usages. It is widely used in Ayurveda for Treatments of various disorders. It is extensively used as an antioxidant, immune-modulatory, antipyretic, anticancer, chemo-preventive, radio-protective, anti-hypertensive, and cardioprotective and antimicrobial activity, etc. The present article provides all the necessary information regarding its classical literature and research updates on Tulasi. It has been searched for studies published in books, theses, conference proceedings as well as electronic databases. All studies reported favorable clinical outcomes with no studies describing any significant adverse events. The reviewed studies highlight traditional uses and suggest Tulasi is an effective treatment for lifestyle-associated chronic diseases including diabetes, metabolic syndrome, and psychological stress.

Keywords: ocimum sanctum linn, ayurveda, tulasi

Introduction
Ocimum sanctum is widely used in the Indian system of medicine; known as holy basil and it is also called Vishnupriya means the one that pleases Lord Vishnu. Tulasi belongs to the plant family Lamiaceae and it is one of the popular home remedies for Swasa (Asthma) and Kasa (Cough). Bhruhattrayi has not used the term Tulasi to indicate it. Its synonym Surasa is mainly used by them in their work while Charaka quoted Apetaraksasi as the synonym and included under the name surasa in the Swasahara group. Susruta described two kinds of Surasa dwaya in the context of Surasadi gana.
Three types of tulsi are commonly described. Ocimum tenuiflorum (or Ocimum sanctum L.) includes 2 botanically and phytochemically distinct cultivars that include Rama or Sri Tulsi (green leaves) and Krishna or Shyama tulsi (purplish leaves), while Ocimum gratissimum is a third type of tulsi known as Vana or wild/forest tulsi (dark green leaves). The different tulsi types exhibit vast diversity in morphology and phytochemical composition including secondary metabolites, yet they can be distinguished from other Ocimum species by the color of their yellow pollen, high levels of eugenol, and smaller chromosome number. Despite being distinct species with Ocimum tenuiflorum having six times less DNA than Ocimum gratissimum, they are traditionally used in the same way to treat similar ailments. It is a perennial herb with a typical aromatic smell, which grows up to 30 – 60 cm high, much-branched. Stems and branches usually purplish, Sub quadrangular, sometimes woody below, Clothed with soft spreading hairs.
Stem: Erect, branched, quadrangular, slightly woody, solid, branches covered with soft hairs.
Leaves: 2.5 by 1.6 – 3.2 cm, Elliptic –oblong, obtuse or acute, entire or serrate, pubescent on both sides, minutely gland-dotted, base obtuse or acute, petioles 1.3 – 2.5 cm long, slender, hairy Inflorescence: Verticillaster.
Flowers: Racemes 15 – 20 cm long in close whorls, bract nearly 3 mm long and almost as broad as long, broadly ovate with a long slender acuminate, ciliate, pedicels longer than the flowering calyx, slender, pubescent.
Fruit: Nutlets 1.25 mm long, broadly ellipsoid, nearly smooth, yellow with black markings.

The present review attempts to compile information regarding Tulasi including synonyms, classification, properties, actions, and formulations from bhrihatrayee (classical texts), nighantu (lexicons) sangrahagranthas (compendia), text related to prayoga (therapeutic use) and ethno medical books in a systematic manner.
For consistency, this review uses the term tulsi to refer to both Ocimum tenuiflorum or Ocimum gratissimum. Tulsi has been the subject of numerous scientific studies and its pharmacological and wide range of therapeutic applications are the subject of more than one hundred publications during the last decade alone. Numerous in vitro and animal studies attest to tulsi leaf having potent pharmacological actions that include adaptogenic actions that include adaptogenic, metabolic, immunomodulatory effects, Anticancer, anti-inflammatory, antioxidant, Hepato protective, radioprotective, antimicrobial and antidiabetic effects that have been extensively reviewed previously.

Gana Vargeekarana
Tulasi has been classified under various Gana or Varga (groups) in the classical Sahmita's and Nighantu's (lexicons) of Ayurveda [1]

Table 1: Showing *Gana vargeekarana* of *Tulasi* in *Samhita's* and *Nighantu's*

Samhita* and *Nighantu	***Varga/Gana***
Charaka Samhita	*Shwasahara gana*
Susruta Samhita	*Surasadi gana*
Astanga Hridaya	*Surasadi gana* and *Kaphaghna gana*
Astanga Sangraha	*Shwasahara gana* and *Surasadi gana*
Bhavaprakasha Nighantu	*Pushpa Varga*
Raja Nighantu	*Karaviryadi Varga*
Dhanwantari nighnatu	*Karaviryadi Varga*
Madanapaala nighantu	*Karpuradi Varga*
Kaiyadeva Nighantu	*Oushadi Varga*
Shodala nighantu	*Karaviryadi Varga*
Priya Nighantu	*Shatapushpadi Varga*
Haritakyadi nighantu	*Pushpa Varga*
Saligrama nighantu	*Pushpa Varga*
Nighantu adarsha	*Tulsyadi Varga*

Synonyms

Synonyms are the different alternative names defined for particulars in various parts. These synonyms are having a specific meaning which gives an idea about the Mythological information Morphological features, Pharmacological properties, Traditional use, and Ethno botanical use.

Table 2: Showing of *Paryaya in Samhita's* and *Nighantu's* [2]

PARYAYA	BN[3]	DN[4]	RN[5]	KN[6]	MPN[7]	SN[8]	PN[9]	NA[10]
Tulasi	+	+	+	+	+	+	+	+
Surasa	+	+	+	+	+	+	+	+
Gramya	+	+		+		+	+	
Sulabha	+							
Bahumanjari	+	+			+	+		+
Apetarakshasi	+	+	+			+		+
Gowri	+	+	+	+	+	+		
Bhutaghi	+	+	+	+	+	+	+	
Devadundubhi	+	+		+		+	+	+
Surabhi		+	+	+		+		
Thivra			+					
Pavani			+					
Vishnuvallabha			+					
Surejya			+					
Kayastha			+	+				
Suradundubhi			+					
Bahupatri			+					
Manjari			+	+				
Haripriya			+					
Shyama			+					
Tridashamanjari			+					
Putapatri			+					
Putapriya				+				
Shrimanjari				+				
Burimanjari				+				
Nagamata				+				
Sumanjari				+				
Butapati				+				
Rajasi				+				
Dalasagrasi				+				
Grasa				+				
Pavitra								
Suravallari								
Patrapuspa								
Sugandha								
Andharohini								
Mala						+		
Swadugandhachhada				+				
Bhuteshta				+				
Chakraprni				+				
Sakrapatni				+				

Vernacular Names

Vernacular names are different names of the drug in different languages and hence helpful in identifying the drug in the other parts of the world.

Table 3: Showing the Vernacular names of *Tulasi* [11]

Languages	Vernacular Names
Hindi	Kalatulasi, Tulasi
Kannada	Vishnu tulasi, Kari tulasi, Sri tulasi, Tulashi-gida
English	Holy Basil
Malayalam	Tulasi, Trttavu karuttarttavu, Niella tirtua, Krishna - tulasi,Shiva tulasi
Telugu	Tulasi, Gaggera - chettu
Tamil	Tulaci.Karuttulaci
Bengali	Tulasi, Krishna tulasi
Gujarati	Tulasi, Talasi
Punjab	Bantulsi, Tulsi
Marathi	Tulasa, Tulasi
Konkani	Tulsi

Varieties

Classical *Nighantu's* of Ayurveda refers to different types/varieties of *Tulasi* based on the color of leaves [12].

Table 4: Showing Varieties of *Tulasi*

VARIETIES	BN	RN	KN	PN	Sh.N[13]	NA	HN[14]
Shweta tulasi	+	+	+	+	+	+	+
Krishna tulasi	+	+	+	+	+	+	+
Karpura tulasi			+				
Ram tulasi						+	

BN-*Bhavaprakasha Nighantu*, RN-*Raja Nighantu*, KN-*Kaiyyadevanighantu*, PN-*Priya nighantu*, Sh. N–*Shaligrama Nighnatu*, NA-*Nighantuadarsha*. HN-*Haritakyadi Nighantu*

Table 5: Showing Varieties of *Ocimum sanctum* Linn.

S N	Lati N Name	Sanskrit Anme	English Name
1	*Ocimum sanctum*	*Tulasi*	Holy basil
2	*Ocimum basillicum*	*Barbari*	Sweet basil
3	*Ocimum gratissimum*	*Phanijjaka*	Shrubby basil
4	*Ocimum americanum*	*Sweta tulasi*	Common basil/American basil
5	*Ocimum Kilimandcharicum*	*Karpura tulasi*	Camphor basil
6	*Ocimum minimum*	*Marubaka*	Bush basil
7	*Ocimum pilosum*	*Kharapushpa*	Green basil

Rasa Panchaka

In Ayurveda, the actions of any herb are analyzed based on the five basic principles, *Rasa* (taste), *Guna*(properties), *Virya*(potency), *Vipaka*(aftertaste), *Prabhava*(special action). Table (06) shows the opinion on the pharmacological properties as stated in different lexicons.

Table 6: Showing *Guna karma of Tulasi (Ocimum sanctum* Linn.

GUNA		BN	RN	DN	KN	Sha. N	NA
Rasa	*Katu*	+	+		+	+	+
	Tikta	+	+		+	+	+
	Kasaya				+		
Guna	*Laghu*			+			
	Tikshna				+		
	Ushna	+				+	
	Ruksha			+	+		
Virya	*Ushna*		+	+	+		+
Vipaka	*Katu*				+		+
Doshagnata	*Vatakaphahara*	+	+		+	+	+
	Kaphahara			+			

BN-*Bhavaprakasha Nighantu*, RN-*Raja Nighantu*, DN-*Dhanwantarinighantu* KN-*Kaiyyadevanighantu*, Sh.N – *Shaligrama Nighnatu*, NA-*Nighantuadarsha*

***Karma* (Actions) and *Rogagnata* (Indications)**

The action of any herb is analyzed based on its effect on the *Dosha* (Humors) of the body. It has been stated that *Tulasi* has *Vatakapha* action, i.e. it mitigates *Vata* and *kapha dosha*

BN-*Bhavaprakasha Nighantu*, RN-*Raja Nighantu*, DN-*Dhanwantarinighantu*, MPN- *Madanapalanighantu*, KN-*Kaiyyadevanighantu*, SN- *Shodalanighantu*, PN-*Priyanighantu*, Sh.N – *Shaligrama Nighnatu*, NA-*Nighantuadarsha.*

Table 7

Karma and *Roghagnata*	BN	RN	DN	MPN	KN	SN	PN	Sh.N	N.A
Agnidipani	+		+	+	+	+	+	+	
Kushtajit	+			+	+			+	
Krcchrasrajit	+			+				+	
Parshwarukjit	+			+	+	+		+	
Pittakrut	+			+	+		+	+	
Hridya	+			+	+	+		+	
Dahakrut	+			+	+			+	
Krimidoshanihanti		+	+		+				
Ruchikrut		+	+						
Jantubhutakrumihara		+							
Shwasahara					+	+	+		
Kasahara	+			+	+	+	+		
Hikkahara	+			+	+	+			
Krumisudana	+			+					
Pratishyayaghna	+			+					
Vranyashodana	+			+					
Jwaraghna							+		
Chardighna					+				
Mutrakrcchra					+				
Ashmari					+				
Netraroga					+				
Vishaghna					+				
Putigandha						+			

Classical Therapeutic Uses

The juice of black *Tulasi* mixed with honey is useful in cough caused by *Kapha*. For *Kushta, Mula swarasa* should be taken daily in the early morning. Application of *Tulasi* juice is the best remedy for *Sheetapitta.* In *Vishamajwara*, leaves juice mixed with *Maricha* powder should be taken. Leaves juice is useful for Karnashoola, vranaprakshalana, krimidmsa and charmaroga. Thulasi seeds are useful in mutrakruchcha.The drugs of *surasadi gana* separately should be taken with honey for krimi roga. In case of poison located in the head, one should take as snuff, the roots of *Bandhuka, Bhargi* and black *tulasi*. Oil cooked with *surasadi* drugs should be filled in the ear. It removes pain. For *Pakshmashata Pushpakasisa* is powdered and impregnated with *Tulasi* juice in a copper vessel for ten days used as collyrium. Juice of *tulasi* mixed with honey should be used as collyrium for Conjunctivitis.[15]

Propagation and Cultivation

The plant grows in a variety of soil and climatic conditions. Well-sapped soil, humid weather, long days, and high temperature are favorable for good growth of the plant and a high yield of essential oil.

Plants are bred by seeds. Direct planting and fresh seeds are preferred. Plants are spaced at a distance of 50cm×50 cm. A fertilizer dose containing of 80 kg N and P2O5 is optimum for a hectare. While preparing land 25 tonnes of FYM is to be absorbed with soil. For a higher yield of essential oil, leaves and tender shoots are to be harvested at the full bloom stage. It can be propagated through tissue culture technique by protecting axillary buds on MS medium supplemented with 1 mg/BAP. The shoots thus obtained, are rooted on half-strength MS medium augmented with 1 mg/1 NAA [16].

Substitute and Adulterants

The leaves of other species of *Ocimum* are often adulterated with the genuine drug.

Antioxidant Activity
Antioxidant activity of the flavonoids (orientin and vicenin) in vivo was expressed in a significant reduction in the radiation-induced lipid peroxidation in mouse liver.OS extract has a significant ability to scavenge highly reactive free radicals. [17] The phenolic compounds, viz., cirsilineol, rsimaritin, isothymusin, apigenin, and rosmarinic acid, and appreciable quantities of eugenol (a major component of the volatile oil) from OS extract of fresh leaves and stems possessed good antioxidant activity [18].

Immunomodulatory Activity
The steam distilled extract from the fresh leaves of OS showed modification in the humoral immune response in albino rats which could be accredited to such mechanisms as antibody production, the release of mediators of hypersensitivity reactions, and tissues responses to these mediators in the target organs [19]. OS seed oil appears to modulate both humoral and cell-mediated immune receptiveness and GAB ergic pathways may mediate these immunomodulatory effects [20].

Antipyretic Activity
The antipyretic activity of OS fixed oil was evaluated by testing it against typhoid paratyphoid A/B vaccine-induced pyrexia in rats. The oil on IP administration considerably reduced the febrile response indicating its antipyretic activity. At a dose of 3 ml/kg, the antipyretic activity of the oil was comparable to aspirin. Further, the fixed oil possessed prostaglandin inhibitory activity and the same could explain its antipyretic activity [21].

Anticancer Activity
The alcoholic extract (AlE) of leaves of OS has a modulatory influence on carcinogen metabolizing enzymes such as cytochrome P 450, cytochrome b5, aryl hydrocarbon hydroxylase, and glutathione S-transferase (GST), which are important in the purification of carcinogens and mutagens.[22] The anticancer activity of OS has been reported in human fibrosarcoma against cell culture, wherein AlE of this drug-induced cytotoxicity the cells indicated shrunken cytoplasm and condensed nuclei. The DNA was found to be fragmented on observation in agarose gel electrophoresis.[23]

Chemopreventive Activity
The chemo preventive effect of OS leaf extract is probably through the induction of hepatic/extrahepatic GST in mice. Elevated levels of reduced GSH in the liver, lung, and Stomach tissues in OS extract supplemented mice were also found [24]. Considerable antiproliferative and chemo preventive activities were observed in mice with a high concentration of OS seed oil [25]. The potential chemo preventive activity of seed oil has been partly attributed to its antioxidant activity [26].

Radioprotective Activity
The radioprotective effect of OS was firstly reported in the year 1995. Two isolated flavonoids, viz., orientin and vicenin from OS leaves showed better radioprotective effect as compared with synthetic radioprotectors. They have shown significant protection to the human lymphocytes against the clastogenic effect of radiation at low, nontoxic concentrations [27]. The combination of OS leaf extract with WR-2721 (a synthetic radioprotector) resulting in higher bone marrow cell protection and reduction in the toxicity of WR-2721 at higher doses, suggested that the combination would have promising radioprotection in humans [28].

Antihypertensive and Cardio Protective Activities
The transient cerebral ischemia and long-term cerebral hypoperfusion (causing cellular edema, gliosis, and perivascular inflammatory infiltrate) have been prevented by OS [29]. The OS fixed oil administered intravenously produced a hypotensive effect in an anesthetized dog, which seems to be due to its peripheral vasodilatory action. Essential fatty acids like linoleic and linolenic acids, contained in the OS oil produce series 1 and 3 (PGE1 and PGE3) prostaglandins and inhibit the formation of series 2 prostaglandins (PGE2) [30]. The long-term feeding of OS offers significant protection against isoproterenol-induced myocardial necrosis in Wistar rats through the enhancement of endogenous antioxidant [31].

Antimicrobial Activity
AqE of OS showed growth inhibition for Klebsiella, E. coli, Proteus, and Staphylococcus aureus; while AlE of OS showed growth inhibition for Vibrio cholerae [32]. The AlE of OS was also found to be active against multidrug-resistant strains of S. aureus that are also resistant to common beta-lactam antibiotics [33]. Similarly, OS was found to be active against resistant Neisseria gonorrhea strains [34]. OS fixed oil showed good antibacterial activity against Bacillus pumilus, Pseudomonas aeruginosa, and S. aureus. Higher content of linolenic acid in OS fixed oil could contribute towards its antibacterial activity [35].

Anti-Inflammatory Activity
Methanolic extract (500 mg/kg) and an aqueous suspension of OS showed analgesic, antipyretic and anti-inflammatory effects in acute (carrageenan-induced pedal edema) and chronic (croton oil-induced granuloma and exudate formation) inflammations in rats [36]. The fixed oil and linolenic acid possess significant anti-inflammatory activity against PGE2, leukotriene, and arachidonic acid-induced paw edema in rats by their capacity to block both the cyclooxygenase and lipoxygenase pathways of arachidonic acid metabolism [37].

Analgesic Activity
The OS oil was found to be devoid of analgesic activity in experimental pain models (tail-flick, tail clip, and tail immersion methods). However, it was effective against the acetic acid-induced writhing method in mice in a dose-dependent manner. The writhing inhibiting activity of the oil is suggested to be peripherally mediated due to the combined inhibitory effects of prostaglandins, histamine, and acetylcholine [38].

Memory Enhancer Activity
The AlE of dried whole plant of OS ameliorated the amnesic effect of scopolamine (0.4 mg/kg) and aging-induced memory deficits in mice. The passive avoidance paradigm served as the exteroceptive behavioral model. OS extract increased step-down latency (SDL) and acetylcholinesterase inhibition significantly. Hence, OS can be employed in the treatment of cognitive disorders such as dementia and Alzheimer's disease [39].

Hepatoprotective Activity
Oral administration of hydro-ethanolic extract of OS leaves @ 200 mg/kg in male Wistar albino rats gave protection against liver injury induced by paracetamol [40]. The cold water extract (3g/100 g, orally for 6 days) of OS was found to be effective against carbon tetrachloride (0.2 ml/100 g, subcutaneously) induced liver damage in albino rats [41].

Antifertility Activity
Benzene extract of fresh OS leaves in male rats showed decreased total sperm count, sperm motility, and weight of testis [42]. The long-term feeding (up to 3 months) of OS leaves (200 and 400 mg/kg) to adult male and female albino rats along with normal diet decreased sperm count, sperm motility, and weight of male reproductive organs [43].

Antidiabetic Activity
Oral administration of OS extract led to a marked lowering of blood sugar in normal glucose fed hyperglycemic and streptozotocin-induced diabetic rats [44]. A randomized, placebo-controlled, cross-over single-blind human trial indicated a significant decrease in fasting and postprandial blood glucose levels by 17.6% and 7.3%, respectively. Urine glucose levels showed a similar trend. Further, OS has aldose reductase activity, which may help in reducing the complications of diabetes such as cataracts, retinopathy, etc [45].

Antiulcer Activity
The fixed oil of OS administered intraperitoneally elicited significant antiulcer activity against aspirin, indomethacin, alcohol (ethanol 50%), histamine, reserpine, serotonin, or stress-induced ulcers in rats. The fixed oil significantly possessed antiulcer activity due to its lipoxygenase inhibitory, histamine antagonistic, and antisecretory effects [46].

Antiarthritic Activity
The anti-arthritic activity of OS fixed oil was evaluated against formaldehyde-induced arthritis in rats. The fixed oil significantly reduced the diameter of the inflamed paw. On intra- peritoneal administration of the fixed oil daily for 10 days, there was a marked improvement in the arthritic conditions in rats. The anti-arthritic effect at 3 ml/kg dose was comparable to aspirin 100 mg/kg, ip41. The fixed oil inhibited carrageenan and inflammatory mediators (e.g., serotonin, histamine, bradykinin, and PGE2) induced inflammation. Naturally, the oil could inhibit any inflammatory response involving these mediators. The result suggests the potentially useful anti-arthritic activity of the inflammation models; including adjuvant as well as turpentine oil-induced joint edema in rats [47].

Adaptogenic Activity/Antistress Activity
The immune-stimulant capacity of OS may be responsible for the adaptogenic action of the plant. The AlE of OS whole plant increased the physical endurance (survival time) of swimming mice, prevented stress-induced ulcers, and milk-induced leucocytosis, respectively in rats and mice, indicating induction of non-specifically increased resistance against a variety of stress-induced biological changes by OS in animals [48].

Anticataract Activity
The AqE of fresh leaves of OS delayed the process of cataractogenesis in experimental models of cataract (galactosemic cataract in rats by 30% galactose and naphthalene cataract in rabbits by 1 g/kg naphthalene). OS 1 and 2 g/kg delayed the onset as well as subsequent maturation of cataract significantly in both the models [49].

Discussion
Tulasi has been attributed with *Katu, Tikta* and *kashaya rasa*, *Ushna virya*, *Katu vipaka* and it have *Laghu, Tikshna, Ushna*, and *Ruksha guna*. It pacifies *Kapha, Vata doshas. Tulasi* is being used as an ingredient in many formulations and it is used both internally and externally. It has been investigated for antioxidant, immune-modulatory, antipyretic, anticancer, chemo-preventive, radio-protective, antihypertensive, cardioprotective, antimicrobial, anti-inflammatory, analgesic, memory enhancer, hepato-protective, anti-fertility, anti-diabetic, antiulcer, anti-arthritic, adaptogenic /antistress, and anti- cataract activities. The finding that the reviewed studies reported favorable clinical effects across these domains suggests that tulsi may indeed be an effective adaptogen with a role in helping to address the psychological, physiological, immunological, and metabolic stresses of modern living. Interestingly, tulsi has important clinical effects across diverse therapeutic domains, all of which may have inflammation as an underlying factor. The anti-inflammatory effects of tulsi have been previously documented in many in vitro and in vivo studies, and tulsi likely has multiple bioactive secondary metabolites that act alone or synergistically to inhibit inflammatory pathways. There is also evidence to suggest that tulsi may be useful as an adjunct to pharmacotherapy and nutrition in the treatment of metabolic disorders thereby reducing the need for high doses of drugs, which may have adverse effects. The clinical effects demonstrated in the reviewed studies suggest tulsi may have an important role in addressing other inflammatory disorders and that the Ayurvedic tradition of consuming tulsi daily may be an effective lifestyle measure to address many modern chronic diseases. The most commonly used part of the herb was tulsi leaf (dried or fresh), which is known to contain several bioactive compounds including eugenol, ursolic acid, βcaryophyllene, linalool, and 1,8-cineole. Eugenol is the major bioactive metabolite common to all three tulsi varieties with varying amounts in each cultivar and has recently been suggested to act via dual cellular mechanisms to lower blood glucose levels. These include competitively preventing the binding of glucose to serum albumin and inhibiting the conversion of complex carbohydrates to glucose. However, while eugenol is bioactive, the phytochemical composition of tulsi is very complex and varies depending on different conditions and there are many other potential active secondary metabolites such as other phenylpropanoids (methyl eugenol, Rosmaric acid), monoterpenes (ocimene) and sesquiterpenes (germacrene) that could alone or synergistically produce therapeutic benefits. All reviewed studies reported favorable clinical effects with minimal or no side effects irrespective of tulsi dose, formulation, or the age or gender of participants, with only one clinical trial reporting transient mild nausea. As the longest study was only 13 weeks, the failure to report any adverse effects does not preclude the presence of any long-term side effects, however; the long traditional history of regular tulsi use suggests any serious long-term effects are unlikely and that daily ingestion of tulsi is safe. Furthermore, the results of this review are

consistent with previous evidence for the clinical efficacy and safety of tulsi, which includes multiple in vitro and in vivo studies and many human clinical trials in addition to traditional use.

Conclusion

The present review indicates the importance of Tulasi as one of the important medicinal plant described for its pharmacological actions and indications in the Ayurvedic texts and it is widely used in treating various types of fever, bronchial asthma, cough and hiccough. The many research has proved many of its activities mentioned in Ayurvedic classics and demonstrate its effectiveness in various diseases.

Tulsi is a popular home remedy for many diseases such as a wound, bronchitis, liver diseases, catarrhal fever, otalgia, lumbago, hiccough, ophthalmic diseases, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning, and psychosomatic stress disorders. It has also aromatic, stomachic, carminative, demulcent, diaphoretic, diuretic, expectorant, alexiteric, vermifuge, and febrifuge properties. Tulsi is also known as "the tonic of life" since it promotes longevity. Different parts of the plant are used in Ayurveda and Siddha systems of Medicine for prevention and cure of many illnesses and everyday ailments like the 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, flatulence, migraine headaches, fatigue, skin diseases, wound, insomnia, arthritis, digestive disorders, night blindness, diarrhea, and influenza.

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