Review Article Ocimum sanctum - A Religious and Medicinal herb

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Abstract

Ocimum sanctum, A medicinal herb, belongs to the family Lamiaceae. It is erect, branched and fragrant, having height of about 30-60 cm. Different part of the plant are used to cure so many diseases, such as headache, leucoderma, asthma, bronchitis, fever, vomiting, hiccups, ophthalmic, genitourinary disorders, ring worms and skin diseases, coughs, diarrhea, constipation, wart, worm, influenza, common cold, colic pain, hepatic diseases, arthritis, digestive disorders and kidney dysfunctions. It has variety of pharmacological activities such as Anti microbial activity, Antidiabetic activity, Antistress activity, Antifirtility activity, Hepatoprotective activity, Immunomodulatory activity, Psychopharmacological activity, Antioxidant activity, Antipyretic activity, Anticataract activity, Wound healing activity , Antiinflammatory activity, Antiarthritic activity, Anticoagulant activity , Chemopreventive activity, Antianalgesic activity, Mosquitocidal activity and Antilipidemic activity. The present review article includes the description of plant, distribution, botanical characteristics, chemicals, traditional uses and pharmacological activity.

Keywords: Tulsi, Ocimum, Medicinal, Ayurveda, Religious Plant.

Introduction

Ocimum sanctum, popularly known as Tulsi, is one of the sacred annual herb belongs to the genus Ocimum and mint family Lamiaceae. Tulsi is a native of Iran, Afganistan and India (Zargari, 1990; Mirhaidar, 1990; Volak and Jiri, 1997 and Mann *et al.* 2000). Tulsi is believed the "Queen of Herbs" (Verma, 2016). It is most therapeutic herbs distributed mainly in the all regions of India (Jeba *et al.* 2011). Tulsi is one of the chief sources of large number of drugs and medicine (Kumar *et al.* 2011). There were two main varieties of tulsi have been identified i.e. black (Krishna tulsi) and green (Rama tulsi), both have similar chemical constituents. Both the varities have common medicinal properties (Das and Vasudevan, 2006; Mondal *et al.* 2009; Verma, 2016). The essential oil of tulsi is extracted by steam distillation from the leaves (Guenther, 1949; Simon *et al.* 1990). Extracted essential oils have also been shown to contain biologically active constituents that are insecticidal (Chogo and Crank, 1981; Deshpande and Tipnis, 1997), nematicidal (Chatterjee *et al.* 1982), fungicidal (Reuveni *et al.* 1984) and antimicrobial properties (Yamasaki *et al.* 1998; Wannissorn *et al.* 2005).



Photoplate 1. Ocimum sanctum

Distribution

Ocimum genus have about 50 to 150 species of herbs and shrubs from the tropical regions of Asia (Bailey, 1924). Tulsi is found in environment having moist soil nearly all over the world (Naquvi *et al.* 2012). In India, the plant is grown throughout the country from Andaman and Nicobar islands to the Himalayas up to 1800 meters above the sea level (Verma, 2016). It is grown in houses, temples and gardens (Saikrishana *et al.* 2014). It is also abundantly found in Malaysia, Australia, West Africa, Egypt, France, Hungary, Italy, Morocco and USA. Naturally, it is found in the tropical and subtropical regions of the world (Mandal *et al.* 1993)(Photoplate 1).

Botanical Characteristics

Tulsi has square stems and fragrant opposite leaves (Darrah, 1980). The plant is erect, much branched, softly pubescent under shrub, 30-60 cm hight. Leaves are simple, opposite, decussate, exstipulate, ovate, serrate, pubcscent on both side, minutely gland dotted, with slender, hairy petioles, sharp tip. Inflorescence is Vertcillaster. Flowers are bracteate, pedicellate, complete, hermaphrodite, hypogynous, zygomorphic, pentamerous. Androecium; stemens 4, epipetlous, didynamous, posterior stemen absent, dithecous, dorsifixed, introse. Gynoecium ; Bicarpellary, syncarpous, superior, gynobasic style, axile plcentation, hypogynous, necter secreting disc present. Fruit is schizocarpic, having four nutlets. The fruits are small and the seeds are reddish-yellow in colour. (Mandal *et al.* 1993 ; Khanna and Bhatia, 2003; Sharma, 2012; Buddhadev *et al.* 2014; Saikrishana *et al.* 2014; Verma, 2016).

Classification

(Bentham & Hooker, 1862-1883)

Dicotyledones, Gamopetalae, Bicarpellatae, Lamiales, Lamiaceae (Labiatae) The Mint Family.(Sharma, 2012)

Religious Value

Tulsi plant presence symbolizes the religious bent of a Hindu family. A Hindu household is considered incomplete if it doesn't have a tulsi plant in the courtyard. Many families have the tulsi planted in a specially built structure, which has images of deities installed on all four sides, and an alcove for a small

earthen oil lamp (Sen, 1993; Khanna and Bhatia, 2003; Saikrisnna *et al.* 2014). *O. sanctum* is the most prominent species of the genera. The leaves of the plant are considered to be very holy and often form a consistent part of the Hindu spiritual rituals.

Tulsi in Ayurveda

In India Ayurveda is a system of traditional Hindu medicine and renowned as one of the major systems of alternative and complementary medicine. According to Hindu mythology, Dhanvantari, the physician of the God's, is attributed with the origin of ayurvedic medicine. Ayurveda traces its origin to the Vedas particularly Atharva veda and it stresses the use of indigenous plant based medicines for the treatment of diseases (Patwardhan *et al.* 2005). It is mentioned in the Charaka Samhita, an ancient Ayurvedic text. Its strong aroma and astringent taste, it is regarded in Ayurveda as a kind of "elixir of life" and believed to promote longevity. If sprinkled over cooked food in stored water, tulsi leaves prevent bacterial growth during the eclipses (Siddiqui, 1993; Saikrishana *et al.* 2014).

Chemicals

The plant is bitter and acrid (Prjapati et al. 2003, Gupta et al. 2002). O. sanctum leaves contains volatile oil eugenol and methyl eugenol (Saikrishana et al. 2014). The oil also contains carvacrol and sesquiterpine hydrocarbon caryophyllene (Shah and Qadry, 1998). Ursolic acid has been isolated from the leaves (Balanchru and Nagarajan, 1991; Nair et al. 1982). Apigenin, luteolin, apigenin -7-O-glucuronide, luteolin- 7-O-glucuronide, orientin, molludistin are also isolated from leaves (Nair et al. 1982). Two flavonides orientin and vicenin from aqueous leaf extract of O. sanctum also reported (Devi et al. 1998). Phenolic compounds from the fresh leaves and stem of O. sanctum cirsilineol, cirsimaritin, isothymusin, isothymonin, apigenin, rosmarinic acid and eugenol also reported (Kelm et al. 2000). Vicenin-2, rosmarinic acid, galuteolin, cirsilineol gallic acid, gallic acid methylester, gallic acid ethylester, protocatechic acid, vanillic acid, 4-hydroxybenzoic acid, vanillin, 4-hydrixybenzaldehyde, caffic acid, chlorogenic acid from the ethanolic extract O. sanctum (Norr and Wagner, 1992). The leaves of O. sanctum are also contain traces of Zinc, Manganese and Sodium (Samudralwar and Garg, 1996). O. sanctum has specific aromatic odour because of the presence of essential or volatile oil, mainly concentrated in the leaf. This aromatic volatile oil mainly contains phenols, terpenes and aldehydes. The oil extracted from seeds is called fixed oil and mainly composed of fatty acids. Besides oil, the plant also contains alkaloids, glycosides, saponins, steroids, phenols, flavonoids, resins, gums and tannins (Joshi et al. 2009). The leaves contain ascorbic acid and carotene as well (Kothari et al. 2004 and Bakkali et al. 2008).

Traditional Uses

Tulsi has pungent, bitter in taste and has hot potency. On the contrary the seed have a cold potency(William, 1996; Siddiqui, 1993; Saikrishana *et al.* 2014).Different parts of plant are used for prevention and cure of many illnesses and everyday ailments 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, flatulence, migraine headaches, fatigue, skin diseases, wound, insomnia, arthritis, digestive disorders, night blindness, diarrhea, teeth disorders, kidney disorder and influenza (Sikman *et al.* 1990). The leaves are good for nerves, and to sharpen memory. Chewing of tulsi leaves also cures ulcers and infections of mouth. (Shah and qadry, 1998; Pandey and Madhuri 2010; Chandra *et al.* 2016).

Pharmacological Activity

Tulsi has so many pharmacological activities. On the basis of various experimental and clinical researches the following pharmacological activities have been reported (Gupta *et al.* 2002; Pandey and Madhuri, 2010; Mishra and Mishra, 2011; Krishna *et al.* 2014; Chandra *et al.* 2016 and Verma, 2016) (Table 1).

| Sr. No. | Activity | Plant parts | References |
|------------|-------------------------|---------------------------|---|
| 1 | Anti microbial Activity | Leaves and Whole Plant | Phadke and Kulkarni, 1989; Rai, 1996; Kumar <i>et al.</i> 1997; Jayshree and Subramaniyam ,1998; Rangnathan and Balajee, 2000 Singh <i>et al.</i> 2005; Pandey and Madhuri, 2006. |
| 2 | Antidiabetic Activity | Leaves and seeds | Dhar <i>et al.</i> 1968; Patil <i>et al.</i> 1983; Giri <i>et al.</i> 1987; Mandal <i>et al.</i> 1993; Agrawal, 1996; Halder <i>et al.</i> 2003; Vats <i>et al.</i> 2002; Hannan, 2006; Singh <i>et al.</i> 2007; Kochhar <i>et al.</i> 2009; Parasuraman <i>et al.</i> 2015. |
| 3 | Antistress Activity | Leaves | Brekhman and Dardymov,1969; Godhwani and Godhwani, 1988; Sembulingam <i>et al.</i> 1997; Sembulingam <i>et al.</i> 1999; Archana and Namasivayam, 2000; Kelm and Nair, 2000; |
| 4 | Antifirtility Activity | Leaves | Seth <i>et al.</i> 1981 ; Nagarjun <i>et al.</i> 1989; Kashinathan <i>et al.</i> 1972; Raghunandan <i>et al.</i> 1997; Batta and Santhakumari,2000; Prakash and Gupta, 2005. |

Table 1. Pharmacological activities and plant parts.

| 5 | Hepatoprotective Activity | Leaves | Bhargava and Singh,1981; Seethalakshmi, 1982; Chattopadhyay <i>et al.</i> 1992. |
|----|---------------------------|---------------------|--|
| 6 | Immunomodulatory Activity | Leaves | Mediratta <i>et al.</i> 1988; Godhwani <i>et al</i> .1988; Mukharjee <i>et al</i> .2005; |
| 7 | Psychopharmacological | Leaves | Singn et al. 2007. |
| - | Activity | - | |
| 8 | Antioxidant Activity | Leaves | Hussain <i>et al</i> .1987; Robak and Gryglewski, 1988; Rios <i>et al</i> .1992; Hu <i>et al</i> .1995; Saija <i>et al</i> .1995; Shyamla and Devki, 1996; Devi, 2001. |
| 9 | Antipyretic Activity | Seed oil | Singh and Majumdar,1995; Singh and Majumdar,1996; Singh <i>et al</i> .1996; Singh <i>et al</i> . 2007; Singh and Majumdar, 1996 |
| 10 | Anticarcinogenic Activity | Leaves and seed oil | Banergee, 1996; Panda and Kar, 1998; Karthikeyan <i>et al.</i> 1999; Devi, 2001; Somkuwar, 2003; Nakamura <i>et al.</i> 2004; Pandey and Madhuri, 2006; Madhuri, 2008; Pandey, 2009; Monga, 2011. |
| 11 | Antiasthmatic Activity | Leaves and seed oil | Singh and Agrawal, 1991. |
| 12 | Antiulcerogenic Activity | Leaves and seed oil | Mandal <i>et al</i> .1993; Singh and Majumdar,1999 ; Singh <i>et al</i> .2007. |
| 13 | Radioprotective Activity | Leaves | Ganasoundari <i>et al</i> .1997; Devi and Ganasoundari, 2000; Devi, 2001. |
| 14 | Anticataract Activity | Leaves | Singh and Majumdar,1996; Gupta <i>et al.</i> 2000. |
| 15 | Wound healing Activity | Leaves | Somashekar, 1999. |

| 16 | Antiinflammatory Activity | Leaves and oil | Godhwani and Godhwani 1987; |
|----|---------------------------|--------------------------|-----------------------------|
| | | | Singh and Majumdar,1997; |
| | | | Singh, 1998. |
| 17 | Antiarthritic Activity | Oil | Singh and Majumdar,1996; |
| | | | Sharma <i>et al</i> .1998, |
| | | | Singh <i>et al</i> . 2007. |
| 18 | Anticoagulant Activity | Oil | Singh <i>et al.</i> 2001. |
| 19 | Chemopreventive Activity | Leaves and Seed oil | Prasher and Kumar, 1995; |
| | | | Prakash et al. 1999; |
| | | | Prakash and Gupta, 2000. |
| | | | 1 / |
| 20 | Antianalgesic Activity | Oil | Singh and Majumdar, 1995; |
| 21 | Mosquitocidal Activity | Leaves and seeds | Hassan and Deo, 1994; |
| | | The second second second | Kem et al. 1998. |
| | | | |
| 22 | Antilipidemic Activity | Leaves | Pandey and Anita, 1990; |
| | | | Paul et al. 2005. |
| | | | |

Conclusion

It has been observed from various studies and literature that *O. sanctum* is small religious herb and so many therapeutic actions. It has health promoting properties. The herb is very effective in the treatment of common diseases.

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