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, Antifertility activity, Hepatoprotective activity, Immunomodulatory activity, Psychopharmacological activity, Antioxidant activity, Antipyretic activity, Anticarcinogenic activity, Antiasthmatic activity Antiulcerogenic activity, Radioprotective 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).

References

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 height. Leaves are simple, opposite, decussate, exstipulate, ovate, serrate, pubescent on both side, minutely gland dotted, with slender, hairy petioles, sharp tip. Inflorescence is Verticillaster. Flowers are bracteate, pedicellate, complete, hermaphrodite, hypogynous, zygomorphic, pentamerous. Androecium; stemens 4, epipetlous, didynamous, posterior stemen absent, dithecos, dorsi fixed, introse. Gynoecium; Bicarpellany, 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, Bacarpellatae, 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 (Prajapati 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 sesquiterpined 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, moliudistin 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 ethylester, protocatechic acid, vanillic acid, 4-hydroxybenzoic acid, vanillin, 4-hydrxybenzaldehyde, 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).

Table 1. Pharmacological activities and plant parts.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Activity</th>
<th>Plant parts</th>
<th>References</th>
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<tbody>
<tr>
<td>2</td>
<td>Antidiabetic Activity</td>
<td>Leaves and seeds</td>
<td>Dhar et al. 1968; Patil et al. 1983; Giri et al. 1987; Mandal et al. 1993; Agrawal, 1996; Halder et al. 2003; Vats et al. 2002; Hannan, 2006; Singh et al. 2007; Kochhar et al. 2009; Parasuraman et al. 2015.</td>
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<tr>
<td>3</td>
<td>Antistress Activity</td>
<td>Leaves</td>
<td>Brekhman and Dardymov, 1969; Godhwani and Godhwani, 1988; Sembulingam et al. 1997; Sembulingam et al. 1999; Archana and Namasivayam, 2000; Kelm and Nair, 2000;</td>
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<td>Activity</td>
<td>Parts</td>
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<td>6</td>
<td>Immunomodulatory Activity</td>
<td>Leaves</td>
<td>Mediratta et al., 1988; Godhwani et al., 1988; Mukharjee et al., 2005; Singh et al., 2007.</td>
</tr>
<tr>
<td>7</td>
<td>Psychopharmacological Activity</td>
<td>Leaves</td>
<td>Sakina et al., 1990.</td>
</tr>
<tr>
<td>8</td>
<td>Antioxidant Activity</td>
<td>Leaves</td>
<td>Hussain et al., 1987; Robak and Gryglewski, 1988; Rios et al., 1992; Hu et al., 1995; Saija et al., 1995; Shyamla and Devki, 1996; Devi, 2001.</td>
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<tr>
<td>9</td>
<td>Antipyretic Activity</td>
<td>Seed oil</td>
<td>Singh and Majumdar, 1995; Singh and Majumdar, 1996; Singh et al., 1996; Singh et al., 2007; Singh and Majumdar, 1996</td>
</tr>
<tr>
<td>10</td>
<td>Anticarcinogenic Activity</td>
<td>Leaves and seed oil</td>
<td>Banerjee, 1996; Panda and Kar, 1998; Karthikeyan et al., 1999; Devi, 2001; Somkuwar, 2003; Nakamura et al., 2004; Pandey and Madhuri, 2006; Madhuri, 2008; Pandey, 2009; Monga, 2011.</td>
</tr>
<tr>
<td>12</td>
<td>Antiulcerogenic Activity</td>
<td>Leaves and seed oil</td>
<td>Mandal et al., 1993; Singh and Majumdar, 1999; Singh et al., 2007.</td>
</tr>
<tr>
<td>14</td>
<td>Anticataract Activity</td>
<td>Leaves</td>
<td>Singh and Majumdar, 1996; Gupta et al., 2000.</td>
</tr>
<tr>
<td>15</td>
<td>Wound healing Activity</td>
<td>Leaves</td>
<td>Somashekar, 1999.</td>
</tr>
</tbody>
</table>
16. **Antiinflammatory Activity**
Leaves and oil
Godhwani and Godhwani 1987;
Singh and Majumdar, 1997;

17. **Antiarthritic Activity**
Oil
Singh and Majumdar, 1996;
Sharma et al., 1998;
Singh et al., 2007.

18. **Anticoagulant Activity**
Oil
Singh et al. 2001.

19. **Chemopreventive Activity**
Leaves and Seed oil
Prasher and Kumar, 1995;
Prakash et al., 1999;

20. **Antianalgesic Activity**
Oil
Singh and Majumdar, 1995;

21. **Mosquitocidal Activity**
Leaves and seeds
Hassan and Deo, 1994;
Kem et al. 1998.

22. **Antilipidemic Activity**
Leaves
Pandey and Anita, 1990;

**Conclusion**

It has been observed from various studies and literature that *O. sanctum* is a 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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