

A REVIEW ON ETHNOMEDICAL USES OF *OCIMUM SANCTUM* (TULSI)Singh Vishwabhan\*, Vimal Kumar Birendra, Suvagiya Vishal  
Department of Pharmacy, Suresh Gyan Vihar University, Rajasthan, India

Article Received on: 06/08/11 Revised on: 14/09/11 Approved for publication: 04/10/11

\*Email: vmat1987@gmail.com

## ABSTRACT

Traditional remedies are an integral part of Indian culture. Here we present the result of study of ethnomedicine consist study of ancient medical practice which is native or indigenous to a place. It includes etiology of disease, practitioners and their role in health care, and types of treatment administered. It is a complicated system indulges the use of plants for healing diseases. Recently from few decades back, the use of ethnomedicine come into play as earlier there was fear of dosage, toxicity and composition but today ethnomedicine is integral part of research of new medicinal components. Here is review on ethnomedicinal uses of *Ocimum sanctum* widely used by the traditional medical practitioners for curing various diseases. Traditionally different parts (leaves, stem, flower, root and even whole plant) of *Ocimum sanctum* herb native to India, suggested for treatment of bronchitis, bronchial asthma, malaria, diarrhea, dysentery, dermal ailments, ophthalmic problems, insect bite etc. Research shown *Ocimum sanctum* possess antifertility, anticancer, antidiabetic, antifungal, antimicrobial, hepatoprotective, cardioprotective, antiemetic, antispasmodic, analgesic.

**KEYWORDS:** Ethnomedicine, Toxicity, Traditional, Antifertility, Indigenous.

## INTRODUCTION

Approx 80% of the populations of developing countries persist using traditional resources in health care.<sup>1, 6</sup> The main goal of ethnomedicine is to discover novel compounds derived from plants for use in indigenous medical systems. This information can be used in the development of new pharmaceuticals. Most of the literature in ethnomedicine describes medicinal plants used by people who have lived in the same ecological region for many generations. Ethnopharmacologists seek ways to improve the ethnomedical systems of the people whom they study by testing indigenous medicines for efficacy and toxicity. Through this kind of work, ethnopharmacology has contributed to the discovery of many important plant-derived drugs.<sup>7</sup> The curative use of plants is very old. The sculptures indicate that therapeutic use of plants is as old as 4000–5000 B.C. In India, however, most primitive references of use of plants as medicine appear in Rig-Veda which is supposed to be encrypted between 3500–1600 B.C. Afterwards the properties and therapeutic uses of medicinal plants were studied in detail and recorded by the ancient physicians in Ayurveda (an indigenous system of medicine) which is a basic establishment of ancient medical science in India.

In Ayurveda Tulsi (*Ocimum sanctum*L.) has been well known for its therapeutic potentials and described as Dashemani Shwasaharni (antiasthmatic) and antikaphic drugs (Kaphaghna).<sup>8</sup> Traditionally medical practitioners in India have been widely using this medicinal plant for management of certain disease state of affairs from primeval time, not much is acknowledged about the mechanism of action of Tulsi, and a realistic approach to this traditional medical practice with current system of medicine is also not available. In last few decades several studies have been carried out by Indian scientists and researchers to suggest the role of essential oils & eugenol in therapeutic potentials of *Ocimum sanctum* L. Eugenol is a major constituent of essential oils extracted from different parts of Tulsi plant. The therapeutic potential of Tulsi has been established on the basis of several pharmacological studies carried out with eugenol and extracts of different parts of Tulsi plant.<sup>9, 10</sup>

***Ocimum sanctum* Linn (tulsi)**

*Ocimum sanctum* Linn., the plants of genus *Ocimum* belonging to family Labiatae are very important for their therapeutic potentials.<sup>11, 12</sup> *Ocimum sanctum*L., known as ‘Tulsi’ in Hindi and ‘Holy Basil’ in English, is an erect softy hairy aromatic herb or under shrub found throughout India. Tulsi is commonly cultivated in gardens. Two types of *Ocimum sanctum* are met within cultivation: (i) Tulsi plants with green leaves known as Sri Tulsi & (ii) Tulsi plants with purple

leaves known as Krishna Tulsi.<sup>13</sup> *Ocimum sanctum* is held sacred by Hindus and is used as medicinal plants in day to day practice in Indian homes for various ailments.<sup>10</sup>

**Origin and distribution**

*O. sanctum* has a wide distribution, covering the entire Indian sub continent, ascending up to 1800 m in the Himalayas and as far as the Andaman and Nicobar islands. This plant occupies a wide range of habitats.<sup>14</sup>

**Morphology**

It is an erect, herbaceous, much-branched, softy hairy, biennial or triennial plant, 30-75 cm high. The leaves are elliptic-oblong, acute or obtuse, entire or serrate, pubescent on both sides, minutely gland-dotted; the flowers are purplish or crimson, in racemes, close whorled; the nut-lets are sub-globose or broadly ellipsoid, slightly compressed, nearly smooth, pale-brown or reddish with small, black markings.<sup>14</sup>

**Traditional uses of *Ocimum sanctum* Linn (tulsi)**

Several medicinal properties have been attributed to *Ocimum sanctum*L.<sup>15</sup> Leaves, flowers, stem, root, seeds etc of Tulsi plant are known to possess therapeutic potentials and have been used, by traditional medical practitioners, as expectorant, analgesic, anticancer, antiasthmatic, antiemetic, diaphoretic, antidiabetic, antifertility, hepatoprotective, hypotensive, hypolipidmic and antistress agents.<sup>16, 17</sup> Tulsi has been found to be utmost effective in various types of animal models.

Preparations containing *Ocimum sanctum* have been suggested to shorten the course of illness, clinical symptoms and biochemical parameters in patients suffering from viral hepatitis. Ophthalmic preparations containing leaf juice of *Ocimum sanctum* beside triphala is used in Ayurveda, recommended for glaucoma, cataract, chronic conjunctivitis and other painful eye diseases. The juice of fresh leaves is also given to patients to treat chronic fever, dysentery, hemorrhage and dyspepsia. A decoction of Tulsi leaves is a popular remedy for cold. Tulsi leaves also prevent emesis and has been as anthelmintic.

**Antitussive properties**

Traditionally, the fresh fruit and leaf juice were commonly used in the treatment of cough as demulcent, mild upper respiratory tract infection, general stress syndrome, worm infestations. The crude forms of the plant and the extracts are used singularly or in combination with other herbs as a cough remedy and expectorant based on the traditional experience. *O. Sanctum* brings about its antitussive effect by central action probably mediated by both opioid

system & GABA-ergic system. Ursolic acid might be responsible for anti-tussive activity.<sup>18</sup>

#### Antidiabetic properties

Since time immemorial, individuals with diabetes have been treated orally in folk medicine with a variety of plant extracts. In India, a number of plants are mentioned in ancient literature (Ayurveda) for the treatment of diabetes and some of them have been tested experimentally.<sup>19, 20</sup> Recently, there has been increasing interest in the use of medicinal plants. The plant kingdom has become a target for multinational drug companies and research institutes for the discovery of new biologically active compounds and potential drugs. Leaves of *O. sanctum* have been shown to possess hypoglycaemic effects in experimental animals.<sup>21</sup> A study conducted on rats has suggested that constituent of *O. sanctum* leaf extracts have stimulatory effects on physiological pathways of insulin secretion.<sup>22</sup> Various studies have been performed on the antiglycemic properties of *O. sanctum* but its mechanism of action has not been elucidated as yet.

#### Anticancer agent

Cancer is one of the most dreaded diseases of the 20<sup>th</sup> century and spreading further with continuation and increasing incidence in 21<sup>st</sup> century. Multidisciplinary scientific investigations are making best efforts to combat this disease, but the sure-shot, perfect cure is yet to be brought into world medicine. Several studies have been conducted on herbs under a multitude of ethno botanical grounds. In Ayurveda cancer is described as inflammatory or non-inflammatory swelling and mentions them as either Granthi (minor neoplasm) or Arbuda (major neoplasm).<sup>23</sup> Surgery, radiotherapy and chemotherapy- the established treatment modalities for various cancers are costly, mutilating, having serious side effects and associated with residual morbidity as well as frequent relapses. It has been found that ethanolic extract of *O. sanctum* mediated a significant reduction in tumor cell size and an increase in lifespan of mice having Sarcoma-180 solid tumors.<sup>24</sup> Ursolic acid and oleanic acid possess anticancer property.

#### Anti-hyperlipidemic

*O. sanctum* fixed oil contains five kinds of fatty acids, of which alpha-linolenic acid was the major fatty acid. *O. sanctum* fixed oil depressed high serum levels of total cholesterol, triglyceride, LDL-C, and AI, whereas no significant effect on HDL-C was observed. *O. sanctum* fixed oil also suppressed high levels of liver cholesterol and triglyceride with no significant effect on both lipids in feces. In addition, *O. sanctum* fixed oil normalized the high serum levels of LDH and CK-MB but no significant effect on high serum levels of ALT, AST, and ALP was obtained. The anti-hyperlipidemic action of *O. sanctum* fixed oil was mainly resulted from the suppression of liver lipid synthesis. Linolenic acid and linoleic acid contained in *O. sanctum* fixed oil were possibly responsible for lipid-lowering against hyperlipidemia.<sup>20</sup>

#### Antifertility agent

Tulsi had been reported for antifertility activity since it consists of ursolic acid responsible for it. The effect has been due to its anti-estrogenic activity which arrests spermatogenesis in males and inhibitory effect on implantation of ovum in females. It proven to be a promising anti-fertility agent devoid of side effects. The leaves of *O. sanctum* have been shown to possess anti-implantation activity in experimental albino rats. Ursolic acid is responsible for its anti-sterility property. In males, Tulsi leaves reduce spermatogenesis by retarding Sertoli cells activity.<sup>25</sup> Tulsi leaves have antiandrogenic property as well. Benzene extract of *O. sanctum* in albino rats decreases the total sperm count and sperm motility.<sup>19</sup>

#### Immunomodulatory agent

Tulsi strengthens the immune response by enhancing both cellular and humoral immunity.<sup>26, 27</sup> It shows anti-inflammatory action akin

to aspirin but doesn't show any side effects. It reduces the pain and dangerous inflammation that leads to arthritis. Studies conducted on Freund's adjuvant induced arthritis, formaldehyde-induced arthritis and also turpentine oil-induced joint edema in rats have shown that oil of Tulsi decreased significantly the symptoms of arthritis and edema.<sup>28</sup> Fixed oil of *Ocimum sanctum* (Labiatae) was found to possess significant anti-inflammatory activity against carrageenan and different other mediator-induced paw edema in rats. *Ocimum sanctum* may be a useful anti-inflammatory agent which blocks both the pathways, i.e. cyclo-oxygenase and lipoxygenase of arachidonic acid metabolism.

#### Stress relieving agents

Stress is a common phenomenon that is experienced by every individual. Stress is defined as "non specific result of any demand upon the body". *O. sanctum* leaves are regarded as an 'adaptogen' or anti-stress agent. Recent studies have shown that the leaves afford significant protection against stress.<sup>29</sup> If taken twice a day, Tulsi is a powerful calming herb. Animal research has verified that extracts of Tulsi leaves prevented changes in plasma levels of the stress hormone corticosterone induced by both acute and chronic noise stress. Stress can be either physical or psychological. When stress becomes extreme, it is harmful for the body and, hence, needs to be treated. Stress is involved in the pathogenesis of a variety of diseases that includes psychiatric disorders such as depression and anxiety, immune-suppression, peptic ulcer, hypertension and ulcerative colitis. Tulsi is an excellent rejuvenator, which has been known to help reduce stress, relax the mind and assist the body in improving memory. Tulsi has an antihypoxic effect and it increases the survival time during anoxic stress.<sup>17</sup>

#### Analgesic activity

The *O. sanctum* 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 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 combined inhibitory effects of prostaglandins, histamine and acetylcholine.<sup>30</sup>

#### Antibacterial, Antiviral activities

Essential oil present in most of the *Ocimum* species is responsible for its antibacterial and antiviral properties. Microorganisms develop resistance against various antibiotics and due to this an immense clinical problem develops in treatment of infectious diseases. Medicinal plants can be used to overcome this problem. *Ocimum sanctum* is effective against Klebsiella (causes pneumonia and urinary tract infections) *Escherichia Coli*, *Salmonella typhi*, *Pseudomonas pyocyaneus*, *Vibrio Cholerae*, *Shigella dysenteriae* and *Proteus Vulgaris* within specified contact time.<sup>31</sup> Studies have shown *O. basilicum* act as a strong antiviral agent against DNA viruses (herpes viruses (HSV), adenoviruses (ADV) and hepatitis B virus) and RNA viruses.<sup>32</sup> *O. tenuiflorum* also has been reported to be having antiviral activity against Bovine herpes virus -1. Essential oil from *Ocimum* sp which contain eugenol, carvacol, methyl eugenol, caryophyllene are considered mainly to be responsible for various antimicrobial properties.

#### CONCLUSION

There are thousands of herbal plants in the world but the *Ocimum sanctum* (Tulsi) is considered to be the queen of herbs due to its greater medicinal values. It is well documented in the Hindu mythology about the Tulsi. Considering the health beneficial effects of Tulsi our ancestors in India insisted to plant a Tulsi sapling in everyone's house. Keeping the various medical benefits in view, investigations are called for to be attempted towards purifications of Tulsi components and their characterization in terms of chemical nature and bio-pharmacological activities. Probably, such natural

components might prove to be potentially beneficial but comparatively less toxic. Eventually, plants belonging to *Ocimum* genus could contribute a lot towards economy and healthy problem.

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