A REVIEW ON MEDICINAL USES OF OCIMUM TENUIFLORUM LINN (TULSI)

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ABSTRACT

Ocimum tenuiflorum Linn (Tulsi) is an aromatic perennial plant with numerous branches, subshrub and 30-60 cm tall hairy stems, which is found in all regions of India because tulsi is a worshiping plant in Hindus. Tulsi has been used from medieval times in Ayurveda and Siddha practices for its capability of treating various diseases which is confirmed by the scientist through different pharmacological screenings. Staggering endeavors have been made with the aid of experts to concentrate the concoction and natural capability of the plant. The detailed pharmacological effects of Ocimum tenuiflorum Linn are as an antibiotic, antiseptic, analgesic, CNS depressant, anthelmintic, antipyretic, combats respiratory ailments, lowers blood pressure and reduces stress, treats gastrointestinal disorders, regulates blood sugar, increases immunity and many other effects which are beneficial to human body. Ocimum tenuiflorum Linn is available formulations are available in the form of tulsi capsules, tulsi drops, tulsi powder, tulsi ras, dried leaves, tulsi green tea and tulsi seed balls.

KEYWORDS: Ocimum tenuiflorum Linn, Vernacular Names, Chemical Constituents, Medicinal Uses, Pharmacological Activities.

I. INTRODUCTION

Various types of Ocimum tenuiflorum which are referred to and used as pharmaceutical preparations in Indian arrangement of medicine. Within Ayurveda Ocimum tenuiflorum Linn is known with many names like “Queen of Herbs”, “The incomparable one”, “Mother medicine of nature”, “Elixir of Life”, etc. According to Ayurvedic wisdom Tulsi is a tonic for the mind, body and spirit which offers cure to many modern days illnesses.

The leaves of Ocimum tenuiflorum Linn are simple green or purple in colour, petioled and oval shaped with a 5 cm lengthy blade, which generally has a slightly toothed margin. These leaves are strong scented and have a decussate phyllotaxy. The purplish flora are located near whorls on elongated racemes. There are three morphotypes which are mainly cultivated in India –

- Rama tulsi (which is the most common one, with broad bright leaves which are slightly sweet in taste)
- Shyama tulsi (this is the least common one with purplish leaves)
- Vana tulsi (which is called wild tulsi and grows in the forests)

Ocimum tenuiflorum Linn are mostly grown from seeds and vegetative proliferation. Various helpful items for example- essential oils, herbal tea, wood are obtained from this medicinal plant. The plant bears aromatic leaves and small inflorescence which is cultivated or grown for its medicinal and worship purposes in India.

Botanical name

Ocimum tenuiflorum Linn

Taxonomy

- **Kingdom**: Plantae
- **Subkingdom**: Tracheobionta
- **Superdivision**: Spermatophyta
- **Division**: Magnoliophyta
- **Class**: Magnoliopsida
- **Subclass**: Asteridae
Order - Lamiales
Family - Lamiaceae
Genus - Ocimum Linn
Species - Ocimum tenuiflorum Linn

Vernacular Names

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<thead>
<tr>
<th>Languages</th>
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<tr>
<td>English</td>
<td>Holy Basil</td>
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<tr>
<td>Hindi</td>
<td>Tulsi</td>
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<td>Sanskrit</td>
<td>Tulasia</td>
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<td>Gujarati</td>
<td>Tulsi</td>
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<td>Tulsi</td>
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<td>Marathi</td>
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Chemical constituents

Some main chemical constituents of Ocimum tenuiflorum Linn which are present in the major amount are:

- Oleanolic Acid (C30H48O3), Ursolic Acid (C30H48O3), Rosemarinic Acid (C18H16O8), Eugenol (C10H12O2), Carvacrol (C10H14O), Linalool (C10H18O), Beta-Caryophyllene (C15H24), Estragole (C10H12O), Methyl Cinnamate (C10H10O2).

Essential oil consists mostly of Eugenol (~70%), Beta-Elemene (~11%), Beta-Caryophyllene (~8%), Germacrene (~2%).

II. PHARMACOLOGICAL ACTIVITIES

Anticancer activity: The anticancer movement of Ocimum tenuiflorum Linn has been demonstrated and referred to by a few examiners. The alcoholic concentrate (Beer) of leaves of Ocimum tenuiflorum Linn affects cancer-causing agent utilizing compounds, for example, cytochrome P 450, cytochrome b5, aryl hydrocarbon hydroxylase and glutathione S-transferase (GST), which are significant in detoxification of cancer-causing agents and mutagens. The anticancer movement of operating system has been accounted for against human fibrosarcoma cells culture, wherein Beer of the medication prompted cytotoxicity @ 50 μg/ml or more. Morphologically, the phones indicated contracted cytoplasm and dense cores. The DNA was seen as divided on perception in agarose gel electrophoresis. Tulsi essentially diminished the frequency of benzo(a)pyrine instigated neoplasia of front stomach of mice and 3’-methyl-4-dimethylaminoazo-benzene actuated hepatomas in rodents. The Beer of the leaves of Ocimum tenuiflorum Linn was appeared to inhibitorily affect artificially actuated skin papillomas in mice. Topical treatment of Tulsi leaf separate in 7,12-dimethylbenz(a)anthracene (DMBA) initiated papillomagenesis altogether decreased the tumor occurrence, normal number of papillomas/mouse and total number of papillomas in mice. Topical use of the concentrate essentially raised diminished GSH substance and GST exercises. A comparative movement was watched for eugenol, a flavonoid present in numerous plants, including Tulsi. Oral treatment of new leaves glue of Tulsi may be able to forestall the early occasions of DMBA instigated buccal pocket carcinogenesis. Leaf concentrate of Ocimum tenuiflorum Linn squares or stifles the occasions related with compound carcinogenesis by hindering metabolic initiation of the cancer-causing agent. The anticancer movement of Ocimum tenuiflorum Linn was seen in Swiss pale skinned person mice bearing Ehrlich ascites carcinoma (EAC) and S 180 tumors.
Cell reinforcement activity / Antioxidant Activity: The cancer prevention agent movement of tusi has been accounted for by numerous workers. The cell reinforcement properties of flavonoids and their connection to film assurance have been observed. Cancer prevention agent movement of the flavonoids (orientin and vicenin) in vivo was communicated in a critical decrease in the radiation incited lipid peroxidation in mouse liver. Ocimum tenuiflorum Linn remove has critical capacity to rummage exceptionally responsive free radicals. The phenolic mixes, viz., cirsilineol, cirsiarin, isothymusin, apigenin and rosmarinic corrosive, furthermore, obvious amounts of eugenol (a significant segment of the unpredictable oil) from tuli concentrate of new leaves and stems had great cell reinforcement activity.

Antimicrobial activity: AqE of Ocimum tenuiflorum Linn demonstrated development restraint for Klebsiella, E. coli, Proteus and Staphylococcus aureus; while AIE of Ocimum tenuiflorum Linn demonstrated development hindrance for Vibrio cholerae. The AIE of Ocimum tenuiflorum Linn was moreover seen as dynamic against multidrug-safe strains of S. aureus that are additionally impervious to basic beta lactam antibiotics. Thus, Ocimum tenuiflorum Linn was seen as dynamic against safe Neisseria gonorrhea strains. Tulsi fixed oil indicated great antibacterial movement against Bacillus pumilus, Pseudomonas aeruginosa and S. aureus. Higher substance of linolenic corrosive in Ocimum tenuiflorum Linn fixed oil could contribute towards its antibacterial action.

Immunomodulatory activities: Steam refined concentrate from the new leaves of tulsi indicated alteration in the humoral resistant reaction in pale skinned person rodents which could be ascribed to such instruments as immunizer creation, arrival of middle people of extreme touchiness responses and tissues reactions to these middle people in the objective organs. Ocimum tenuiflorum Linn seed oil seems to adjust both humoral what's more, cell-intervened insusceptible responsiveness and GABAergic pathways may intercede these immunomodulatory effects.

Anti-inflammatory activity: Methanolic extract (500mg/kg) and aqueous suspension of Ocimum tenuiflorum Linn showed analgesic, antipyretic and anti-inflammatory effects in acute (carrageenan-induced pedal oedema) and chronic (croton oil induced granuloma and exudate formation) inflammations in rats. The fixed oil and linolenic acid possess significant anti-inflammatory activity against PGE2, leukotriene and arachidonic acid induced paw oedema in rats by virtue of their capacity to block both the cyclooxygenase and lipoxygenase pathways of arachidonic acid metabolism.

Chemopreventive activity: The chemopreventive impact of Ocimum tenuiflorum Linn leaf separate is most likely through the enlistment of hepatic-extra hepatic GST in mice. Raised degrees of diminished GSH in liver, lung and stomach tissues in tulsi separate enhanced mice were likewise found. Critical antiproliferative and chemopreventive exercises were seen in mice with high grouping of Ocimum tenuiflorum Linn seed oil. The expected chemopreventive movement of seed oil has been mostly ascribed to its cancer prevention agent activity.

Radio protective activity: The radioprotective impact of Ocimum tenuiflorum Linn was right off the bat revealed in the year 1995. Two segregated flavonoids, viz., orientin and vicenin from tuli leaves demonstrated better radioprotective impact as contrasted and engineered radioprotectors. They have indicated noteworthy insurance to the human lymphocytes against the clastogenic impact of radiation at low, non poisonous concentrations. The mix of Ocimum tenuiflorum Linn leaf separate with WR-2721 (a manufactured radioprotector) bringing about higher bone marrow cell insurance and decrease in the harmfulness of WR-2721 at higher portions, proposed that the blend would have promising radioprotection in humans.

Antihypertensive and cardioprotective activities: The transient cerebral ischemia and long haul cerebral hypoperfusion (causing cell oedema, gliosis and perivascular provocative invade) have been forestalled by Ocimum tenuiflorum Linn. The Ocimum tenuiflorum Linn fixed oil controlled intravenously created hypotensive impact in anesthetized hound, which is by all accounts because of its fringe vasodilatory activity. Basic unsaturated fats like linoleic and linolenic acids, contained in the Ocimum tenuiflorum Linn oil produce arrangement 1 and 3 (PGE1 and PGE3) prostaglandins and restrain the arrangement of prostaglandins (PGE2) . The drawn out taking care of Ocimum tenuiflorum Linn offers huge assurance against isoproterenol-incited myocardial putrefaction in Wistar rodents through upgrade of endogenous antioxidant.
**Analgesic activity:** The tulsi 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.

**Central Nervous System (CNS) depressant activity:** The lager of Ocimum tenuiflorum Linn delayed the hour of lost reflex in mice due to pentobarbital (40 mg/kg, IP), diminished the recuperation time furthermore, seriousness of electroshock and pentylenetetrazole-prompted spasms. It additionally diminished apomorphine prompted battling time and ambulation in "open field" preliminaries. At high portions, Ocimum tenuiflorum Linn remove expanded swimming time proposing a CNS energizer or potentially antistress action. The impact was equivalent to that of desipramine, an energizer drug. Ocimum tenuiflorum Linn fixed oil (2-3 ml/kg, IP) has been reported to increment pentobarbitone-prompted dozing time in rodents. The hindrance of hepatic digestion of pentobarbitone/renal freedom by fixed oil could be aswerable for potentiation of pentobarbitone-initiated dozing time.

**Memory enhancer activity:** The Brew of dried entire plant of Ocimum tenuiflorum Linn improved the amnesic impact of scopolamine (0.4mg/kg) and maturing initiated memory shortfalls in mice. Detached shirking worldview filled in as the exteroceptive social model. Ocimum tenuiflorum Linn remove expanded advance down dormancy (SDL) and acetylcholinesterase restraint essentially. Thus, Ocimum tenuiflorum Linn can be utilized in the treatment of psychological issue, for example, dementia and Alzheimer's disease.

**Antipyretic activity:** The antipyretic effect of Ocimum tenuiflorum Linn fixed oil was assessed by testing it against typhoid-paratyphoid A/B antibody instigated pyrexia in rodents. The oil on IP significantly diminished the febrile reaction demonstrating its antipyretic effect. At a portion of 3 ml/kg, the antipyretic action of the oil was similar to ibuprofen. Further, the fixed oil had prostaglandin inhibitory action and the equivalent could clarify its antipyretic activity.

**Hepatoprotective activity:** Oral administration of hydroethanolic extract of tulsi leaves @ 200 mg/kg in male Wistar albino rats gave protection against liver injury induced by paracetamol43. The cold water extract (3g/100g, orally for 6 days) of Ocimum tenuiflorum Linn was found to be effective against carbon tetrachloride (0.2 ml/100 g, subcutaneously) induced liver damage in albino rats.

**Antidiabetic activity:** Oral intake of Ocimum tenuiflorum Linn extricate prompted stamped bringing down of glucose in typical, glucose taken care of hyperglycemic and streptozotocin (0.2 ml/100 g, subcutaneously) induced liver injury induced by paracetamol43. The cold water extract (3g/100g, orally for 6 days) of Ocimum tenuiflorum Linn was found to be effective against carbon tetrachloride (0.2 ml/100 g, subcutaneously) induced liver damage in albino rats.

**Antiarthritic activity:** The antiarthritic movement of tulsi fixed oil was assessed against formaldehyde-initiated joint inflammation in rodents. The fixed oil essentially diminished the distance across of aroused paw. On intraperitoneal administration of the fixed oil day by day for 10 days, there was stamped improvement in the ligament conditions in rodents. The antiarthritic impact at 3 ml/kg portion was equivalent to headache medicine @ 100 mg/kg, IP. The fixed oil restrained carrageenan and incendiary middle people (e.g., serotonin, histamine, bradykinin and PGE2) prompted aggravation. It is normal that the oil could hinder any fiery reaction including these go betweens. The outcome proposes possibly helpful antiarthritic movement of the aggravation models, counting adjuvant just as turpentine oil-actuated joint oedema in rodents.

**Antifertility activity:** Benzene concentration of Ocimum tenuiflorum Linn leaves in male rodents indicated diminished all out sperm tally, sperm motility and weight of testis. The drawn out intake (up to 3 months) of tulsi leaves (200 and 400 mg/kg) to grown-up male and female pale skinned person rodents alongside typical eating regimen diminished sperm check, sperm motility and weight of male regenerative organs.

**Adaptogenic activity/antistress activity:** The immunostimulant limit of Ocimum tenuiflorum Linn might be liable for the adaptogenic activity of plant. The lager of Ocimum tenuiflorum Linn entirety plant expanded the physical perseverance (endurance time) of swimming mice, forestalled pressure prompted ulcers and milk...
actuated leukocytosis, individually in rodents and mice, demonstrating acceptance of vaguely increased resistance against an assortment of stress actuated organic changes by Ocimum tenuiflorum Linn in animals.

**Antiallergic activity:** The fixed oil of tulsi controlled intraperitoneally evoked noteworthy antiallergic movement against anti-inflammatory medicine, indomethacin, liquor (ethanol half), histamine, reserpine, serotonin or stress-instigated ulcers in rats. The fixed oil essentially had antiallergic action because of its lipoperoxidase inhibitory, histamine opposing and antisecretory effects.

**Anticoagulant activity:** The tulsi fixed oil (3 ml/kg, IP) drawn out blood coagulating time and the reaction was practically identical to that got with anti-inflammatory medicine (100 mg/kg). The impact has all the earmarks of being expected to the anti-aggregator activity of oil on platelets.

**Anticoagulant activity:** The tulsi fixed oil (3 ml/kg, IP) delayed blood thickening time and the reaction was practically identical to that acquired with headache medicine (100 mg/kg). The impact seems, by all accounts, to be expected to the anti-aggregator activity of oil on platelets.

**Anticataract activity:** The AqE of new leaves of Ocimum tenuiflorum Linn deferred the procedure of cataractogenesis in exploratory models of cataract (galactosemic cataract in rodents by 30% galactose and naphthalene cataract in bunnies by 1g/kg naphthalene). Ocimum tenuiflorum Linn 1 and 2 g/kg postponed the beginning too as ensuing development of cataract altogether in both the models.

**Toxicity:** The middle deadly portion (LD50) of Ocimum tenuiflorum Linn fixed oil was decided after IP administration in mice. The fixed oil was very much endured up to 30 ml/kg, while 100% mortality was recorded with a portion of 55 ml/kg. The LD50 of oil was 42.5 ml/kg. There was discovered no untoward impact on subacute toxicity investigation of Ocimum tenuiflorum Linn fixed oil at a portion of 3 ml/kg/day, IP for 14 days in rats.

### III. CONCLUSION

In this survey/review study which is concentrated on the phytochemical and diverse pharmacological properties of Ocimum tenuiflorum Linn (Tulsi) gives the data about the medicinal uses of this plant in different illnesses and diseases.

### IV. REFERENCES


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