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# A Review on Ethnobotanical, Phytochemical and Pharmacological Studies on Some Species of Ocimum

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**ABSTRACT:**
Plant species of the genus Ocimum are among the most popular medicinal plants and are used for various medicinal purposes. The genus Ocimum belongs to the family Lamiaceae and is one of the most famous culinary herbs. In the present study, an attempt has been made to summarize the various ethnomedicinal uses, phytochemicals, and pharmacological applications of various Ocimum species that have long been employed in traditional medicine for a range of therapeutic applications, encompassing antibacterial, antioxidant, anti-inflammatory, wound healing, and various other medicinal properties. Medicinal plants used in various ailments and diseases are the richest biological reservoirs of various phytochemicals. The various species of Ocimum exhibit variations in morphological characters, pharmacological activities, and natural bioactive compounds.

**Keywords:**

Ocimum sp., Cultural, Ethnomedicinal, Traditional, Phytochemicals activities

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## 1. Introduction:

For many centuries, plants have been the primary source of medicinal products. Ocimum is a successful whole dicotyledonous genus distributed worldwide. The genus Ocimum contains around 150 species that are found worldwide. Ocimum is also known as basil, and it is a scented plant from the family Lamiaceae. The morphological variation observed within the species of Ocimum comprises the shape of the stem, the shape and color of the leaves, hairiness, the color of the flowers, etc. It is used as a culinary and ornamental herb.

The genus Ocimum has a number of species that are used to treat various types of disorders and illnesses from ancient times. There are many types of basil. The popular types of basil are Ocimum sanctum,Ocimum basillicum, and Ocimum gratissimum. This species is popular based on regional religious beliefs and is known by several native and common names, e.g., Marathi as Tulshi, Sanskrit as Rama Tulsi, and Krishna Tulsi, in English as Holy Basil, Telugu as Thulsi, and Malayalam as Trittavu. Tulsi is revered throughout India as a sacred plant of the Hindu religion.

*Ocimum sanctum is an* aromatic plant found throughout India. Also known by its classical name, Tulsi. Basil is cultivated everywhere. In India, they are planted near temples and at home. The tulsi bush, 50–150 cm, grows tall. Tulsi has many branches and sub-branches; the leaves are simple and small; the flowers are pink or purple and small; and they occur in simple or branched panicles at the tips of the branches and main stems.

*Ocimum basillicum,* or Sabja, belongs to the family Lamiaceae.The seedlings of Sabja plants are small (30–90 cm) and grow tall. The plant has many branches; the leaves are simple and opposite, tapering at the ends; and the flowers are small and white.

*Ocimum gratissimum* is a synonym of Ocimum viride and Ocimum viridiflorum. It is much branched, leaves are opposite, ovate, racemes terminal, and flowers are pale green. This species has a very strong aroma.

Medicinal plants used in various ailments and diseases are the richest biological reservoirs of various phytochemicals. Phytochemical screening is the process of identifying the phytoconstituents present in the plant. Ocimum species are rich in secondary metabolites and essential oils that are important therapeutically. Some bioactive chemical constituents are present in these plants. It is a good source of vitamin A, vitamin C, calcium, zinc, iron, and chlorophyll, and it has antibacterial and insecticidal properties. Its leaves also have the ability to purify contaminated water. Traditional medicine relies on plants for their curative and preventive properties. Pharmacognosy mainly deals with information about the origin and composition of natural drugs. Phytochemical screening, species of Ocimum, is the process of identifying the phytoconstituents present in the plant parts, such as carbohydrates, proteins, alkaloids, flavonoids, glycosides, amino acids, proteins, phenolic compounds, and saponins. volatile oils, etc.

**2. Health Benefits:**

Herbal medicines have been used for thousands of years. *Ocimum sanctum* is an aromatic herbaceous plant of the Lamiaceae family. This plant is known in Ayurveda for its medicinal and spiritual properties. It adds flavor to food, and its nutrients can provide health benefits. Plant species of the genus Ocimum are among the most popular medicinal plants and are used for various purposes in ethnomedicine. Different parts of Ocimum species are used to treat different ailments. Ocimum sanctum. species is also a good home remedy for various ailments such as cold and cough, fever, headaches, skin disease, stomach disorders, oral infections, and inflammation. The tulsi plant has many medicinal properties. The leaves are tonic, enhance memory, and are specific to many fevers. In the rainy season, where malaria fever is commonly prevalent, soft leaves infused with tea are effective in preventing these diseases.

**3. Cultural Importance:**

Tulsi is described as a sacred and medicinal plant in ancient literature, commonly known as Tulshi. The name Tulsi is derived from 'Sanskrit', which means "matchless one". Tulshi, the sacred plant dearest to Lord Vishnu, symbolizes purity and auspiciousness. Tulsi derives its name from Tulsi Devi. A Hindu house is considered incomplete without a tulsi plant in the yard. The tulsi plant is planted in Vrindavan. Tulsi is a sacred place in Hinduism; planting this plant in the courtyard of the house is considered auspicious. The tulsi plant is very important scientifically [1]. The leaves, stems, seeds, and even the soil are considered sacred. Tulshi is supposed to promote longevity and lifetime bliss. It is said in Ayurveda as well as Shastras that various plants growing in nature are useful in maintaining health.

**Traditional Uses:** Traditional medicines made from medicinal plants are widely used all over the world. Basil is an herb that is called basil in English. Especially in India, reliable sources include treating the effects of the common cold. The medicine made from the Ocimum species is

widely used to treat various diseases such as colds, coughs, fevers, and headaches. Traditional practitioners call tulshi the queen of herbs. Even science has accepted this. That's why tulshi is used in many things. Various parts of the plant are used in Ayurveda medicine for the prevention and healing of many diseases and ailments every day. The species of Ocimum, especially Ocimum tenuiflorum, has been widely recognized for its therapeutic potential since time immemorial (Singh et al., 2002). Tulsi leaves have antibacterial, antiviral, and anti-inflammatory properties and are also very effective in curing many diseases and boosting the body's immunity. This plant increases the body's immunity. It is used for skin diseases. Ocimum basilicum seed paste is applied to the forehead to reduce fever.

***Ocimum sanctum* L. :**

An aromatic plant found throughout India. Basil belongs to the Lamiaceae family. Ocimum tenuiflorum is a synonym of Ocimum sanctum. Basil is found growing naturally in moist soils almost all over the world. Ocimum sanctum is cultivated in India for medicinal and religious purposes. It is known by the name of Holy Basil, and its Marathi name is Tulshi. It is the most popular variety of basil that is found worldwide, including in India, Asia, Europe, America, etc. It is a sacred plant in India. Planted near houses and gardens, and also found near temples. It is an erect, many-branched, aromatic herb; they are simple; flowers are small, pale pink in color; leaves are green, elliptic-oblong; and fresh leaves are crushed and used in skin diseases called anjuri [2]. The green-leaved variety of Tulsi is called Shree Tulsi, and the red-leaved variety of Tulsi is called Krishna Tulsi.

| Scientific Classification | |
|---|---|
| Kingdom | Plantae |
| Division | Magnoliophyta |
| Class | Magnoliopsida |
| Order | Lamiales |
| Family | Lamiaceae |
| Genus | Ocimum |
| Species | sanctum |

**Vernucular names**

English : Holy basil
Marathi : Tulas
Hindi : Tulsi
Sanskrit : Tulsi

**Ethnomedicinal properties of Ocimum sanctum:** The term ethnobotany was first coined in 1895 by J. W. Harshberger. Ocimum sanctum has been used in Ayurveda for thousands of years due to its diverse healing properties. In Ayurveda, along with the tulsi plant, the trunk is also used. Every part of this plant (roots, leaves, branches, and seeds) is beneficial. From the available literature, the leaves of Ocimum sanctum are the most widely used part of ethnomedicine. Its leaves are rich in secondary metabolites, including steroids. The main uses are antistress, anti-ulcerogenic, antihypertensive, cough release, and insecticides. It is a very effective medicine, that can cure us of many diseases. Tulsi plays a significant role in Ayurveda and has a wide range of therapeutic benefits. Tulsi has advantages for our daily health. Fever and colds can be treated with tulsi leaves. 2-3 drops of Ocimum sanctum leaf decocation are recommended for ear problems thrice a day[3].

**Phytochemical and pharmacological studies of Ocimum sanctum:** Different activities of Ocimum sanctum include pain-relieving activity, antidiabetic activity, anticataract activity, and anticancer activity. Tulsi contains many nutrients and other biologically active compounds. Contains many different active phytochemicals. The volatile oil of Tulsi leaves contains eugenol, carvacrol euginal, carvacrol, urosolic acid, limatrol, etc. The stem and leaves of tulsi may contain flovoids, tannins, and saponins. The volatile oil of the seeds contains fatty acids and sitosterol [4]. If there is vomiting, prepare the juice of the leaves and mix it with a spoonful of honey.Take this mixture for four days. For cough, boil two grams of tulsi leaves,

one inch of zinger, and two peppers in a glass of water. Take this mixture for two days[5]. Tulsi leaf juice is useful for colds, fevers, and night blindness. Also, the root of this herb is useful for abdominal pain and rheumatism[6]. It is also known as Krishna Tulasi. Since ancient times, the ancient medical science of Ayurveda has used medicinal plants to treat and cure infectious ailments. The antibacterial activity of Krishna Tulsi is important in preventing infectious diseases. It may be effective against the respiratory tract bacteria Staphylococcus aureus and Klebsiella pneumoniae, so it is effective against respiratory infections[7].It helps to loosen mucus in bronchitis and asthma. It also contains various phytoconstituents. Pharmacological activity includes antioxidant activity, anticancer activity, and chemopreventive activity[8]. Tulsi has cough suppressant properties as well as syrup and expectorant[9]. It has been found that the ethanolic extract of Ocimum sanctum significantly reduced the size of tumor cells and increased the lifespan of mice bearing Sarcoma-180 solid tumors.In Ayurveda, different plants are used as potential sources of anticancer and anti-tumor properties[10]. The phenotypic traits of the four Ocimum species varied significantly. Ocimum tenuiflorum, Ocimum basilicum, and Ocimum gratissimum wild are the species. The morphology and anatomy of four Ocimum species from India are compared in this article.Taste, odor, lamina length (cm), lamina form, lamina margin, stem and flower color, seed size, color, and weight, and plant height (cm) are all compared between these species[11]. The ethanolic extract of O. bascilicum is effective in treating anxiety disorders. It has been proven in an animal experiment that the time spent as well as the number of entries to the bright chamber are drastically induced after the administration of Holy basil ethanolic extract[12]. Ocimum sanctum leaf juice has expectorant, demulcent, and stimulant properties[13]. Tulsi enhances the body's antioxidant levels, safeguarding against harm caused by toxic chemical-induced injury. Tulsi can also aid in the prevention of cancer triggered by toxic compounds by reducing DNA damage[14]. Cultural and commercial value of basil (Ocimum tenuiflorum) in diasporic South Asian communities in the UK and authenticating basil samples using DNA barcoding techniques. Tulsi is increasing in value.Adulteration with plants used for medicinal purposes can have fatal consequences.So, choosing the right species is important. DNA analysis has proven to be a technique that can accurately identify and discriminate between O. species[15]. The phytochemical composition and antioxidant performance of the methanolic extract of dried leaves of the medicinally valuable herbaceous plant Ocimum sanctum were evaluated[16]. The leaves of Ocimum sanctum had the highest essential oil content. The presence of phenolic compounds in the leaves, stem, and root of Ocimum sanctum, Ocimum basilicum, and Ocimum gratissiumum indicates that these plants might be anti-microbial agents. This is because phenols and phenolic compounds have been extensively used in disinfection and remain the standard with which other bactericides are compared. The presence of phenolic compounds in the leaves, stem, and root of Ocimum sanctum, Ocimum basilicum, and Gratissiumum indicates that these plants may be anti-microbial agents. This is because phenols and phenolic compounds have been widely used in disinfectants. The leaves, stems, and roots of O. sanctum, O. basilicum, and O. gratissimum contain less amount of saponin. The presence of phenol further indicated that Ocimum species may act as an immune booster, anti-inflammatory, anti-oxidant, anti-clotting and harmonic modulator[17]. Ocimum sanctum is a water purifier with antibacterial and insecticidal properties. Alcoholic tulsi extract showed about 100 times better antimicrobial activity compared to aqueous leaf extract[18]. All parts of this plant species are of great medicinal use. It is useful in treating bronchitis, colds, stress, and digestive disorders. This plant has antimicrobial and antioxidant properties. It also has mosquito-repellent properties. It is a strong immunomodulator and adopter, according to Ayurveda, as this healing herb has the ability to increase the energetic resonance between the

body and the environment, thereby protecting the body from opportunistic infections. The major chemical constituents of Ocimum species are mono- and sesquiterpenes such as camphor, eugenol, camphene, Limonenesabinene, p-cymene, linalool, borneol, terpin-4-ol, a terpineol, methyl chavicol, cubebrne, a Clemens, and methyl eugenol. In this article, pharmacognostic evaluation includes macroscopic evaluation and microscopic evaluation. The macroscopic evaluation of the whole plant was studied by observing organoleptic characters like color, taste, smell, shape, touch, texture, etc. Microscopic evaluation is very useful in the identification of medicinal plants as well as adulteration detection by tissue characteristics. Ocimum sanctum leaf microscopy shows unicellular covering trichomes, glandular trichomes, upper epidermis, upper palsied cells, vascular bundles containing xylem and phloem, collenchymatous cells, parenchyma cells, and epidermal cells. The stem shows cork, collenchymatous cells, pith and medullary rays[19]. Phytochemical analysis of the leaves of O. sanctum was carried out using a Soxhlet apparatus, and methanol was used as a solvent. The methanol leaf extracts of medicinal plants were active-agent staphylococcus species. The use of O. sanctum plant material as an alternative method to control pathogens and several components of the plant product have been shown to be specifically targeted against resistant pathogenic bacteria. A secondary metabolite has its own antimicrobial effect on bacteria and fungi[20]. Medicinal plants are a rich source of various drugs. They produce a variety of bioactive molecules. Extracts of herbal plants are very useful and are a major source of drugs against a wide variety of pathogens (Doss, 2009). A large number of phytochemicals are widely used in human therapy, agriculture, veterinary medicine, and various scientific research in different areas (Vasu et al.,2009), along with inhibitory effects on all types of microorganisms in vitro (Cowan,1999). The leaf extract of Ocimum sanctum affected both specific and non-specific immune responses and disease resistance against fungal and bacterial infection (Santra et al.,2017)[21]. The mosquitocidal activity of Tulsi was investigated using its eugenol and triglyceride (isolated from hexane extract of Tulsi) on fourth instar Aedes aegypti larvae. When basil seeds are placed in water, they exude within an hour a mucilaginous substance, and the larvae that come into contact with the seeds become firmly attached to them and die due to the drowning the larvae[22]. The phenolic and flavonoid content of Ocimum tenuiflorum was analyzed quantitatively and qualitatively. Use of separation of paper chromatography for the identification of flavonoids in the ocimum plant. Flavonoid content was higher in leaf and flower extracts of Ocimum. The chemical components of plants, known as phytochemicals, have specific physiological effects on the human body[23]. The leaves help to calm the nerves and improve memory. Tulsi leaves can be chewed to treat oral infections and ulcers. Ocimum sanctum leaves contain 0.7% volatile oil, comprising about 71% eugenol and 20% methyl eugenol. Carvacrol and the sesquiterpene hydrocarbon, caryophyllene, are also present in the oil. Fresh tulsi leaves and stem extract produced significant amounts of eugenol and certain phenolic components such as cirsilineol, circimaritin, isothymusin, and apigenin. The pharmacological activity or medicinal properties of Ocimum santum have been reported as follows: antimicrobial activity, radioactive activity, central nervous system depressant activity, anticancer activity, antiulcer activity, antipyretic activity, chemopreventive activity, memory enhancer activity, anticoagulant activity, antifertility activity, and antihypertensive activity[24]. Methanol and an aqueous extract of Ocimum sanctum leaf have antibacterial properties. Methanol was shown to be ineffective against Escherichia coli,while an aqueous extract of Ocimum sanctum leaf had no impact either[25]. This therapeutic plant is rich in phytochemicals and antioxidants and has a pleasant scent. The pharmaceutical, cosmetic, agricultural, and food industries all use medicinal plants. A positive response with the appropriate reagent during phytochemical screening of the aqueous, methanolic, and

ethanol extracts identified the presence of flavonoids, saponins, alkaloids, and protein[26]. Ocimum santum is used as a nervine tonic, adaptogen, improving health during most cancers and having beneficial consequences in stress launch.The culinary, medicinal, and commercial significance of this plant led us to explore its chemical and pharmacological properties. More than 60 chemical substances have been pronounced from Ocimum sanctum, together with phenolics, flavonoids, phenyl propanoids, terpenoids, fatty acid derivatives, critical oil, fixed oil, and steroids[27]. Ocimum tenuiflorum leaves extract was evaluated in methanol, acetone and water solvents and evaluated for the phytoconstituents found in them.Those leaves consist of alkaloids like morphine, boldine, tannins, saponin, terpenoid, glycosides, phenols, and steroids.Methanolic extracts of Ocimum teniflorum possess antimicrobial capacity against both gram-positive and gram-negative microorganisms.It is therefore confirmed as a beneficial antimicrobial agent. The solvent extract of Ocimum tenuiflorum incorporates medicinally vital bioactive compounds, which justifies the usage of plant species as traditional remedies for the treatment of numerous illnesses[28]. The nutritional and pharmacological properties of the whole herb in its natural form because it has been historically used. end result from the synergistic interactions of many exclusive active phytochemicals. Distinct elements of the Ocimum sanctum plant, such as stems, leaves, vegetation, seeds, roots, and so forth, are recognized to possess therapeutic potential and have been used, via traditional medical practitioners, as expectorant, analgesic, anticancer, antiasthmatie, antiemetic, diaphoretic, antidiabetic, antifertility, hepatoprotective, hypotensive, hypolipidmic, and antistress agents[29]. The high-performance liquid chromatography identification of energetic crude extracts and lively fractions showed the possible bioactive compounds in these plant extracts, which can also control diabetes[30]. Pharmacological properties like decation of root act as a diaphoretic in malarial fever, anti-larvicidal (against mosquitoes), and antifungal (Aspergillus niger). Leaves act as antistress, antichronic, anti-hypolipidemic, antioxidant, anthelmintic, antifungal, and antiviral activity. Seeds reduce blood and urinary uric acid levels in albino rabbits[31]. The leaves of Ocimum santum comprise 0.7% volatile oil, comprising approximately 71% eugenol and 20% methyl eugenol. The oil additionally consists of carvacrol and sesquiterpine hydrocarbon, caryophyllene[32]. Leaves crushed in goat's urine and combined with coconut oil are used to treat skin allergies. According to "Charaka Samhita" it is used for the treatment of snake bites (the entire plant is used) and scorpion stings (leaves paste)[33]. The medicinal plant Ocimum sanctum is traditionally used for the remedy of irritation, wound healing, toothache, antiseptics, carminatives, cough, expectorant, stomatitis, and a few fungal contaminations[34]. Ocimum sanctum has been chronicled, and it is described as having many pharmacological activities. Asha et al., Ocimum sanctum essential oil has shown significant antihelmintic activity using the Caenorhabditis elegans model. Rahman et al. show that O. sanctum shows antimicrobial activity against various types of bacteria, including E. coli, Staphylococci sp., S.aureus, Enterobacteria uric sp., P.aernginosa, and Staphylococci sp. According to Ravindran et al., Ocimum sanctum normalizes noise-stress-induced alteration in neurotransmitter levels, and this is evidence of its anti-stress activity[35].

***Ocimum basilicum* L. :**

Ocimum basilicum is also known as Sabja, it belongs to the family Lamiaceae, Synonyms: Ocimum nigrum, Ocimum thyrsiflorum. It is an aromatic herb; the stem is erect and branched. Leaves is green, ovate, lamina is broad base with slight narrow top. Inflorescence is simple. The flowers of the basal are white and small. Normally found in roads, railway lines, and wasteland fields.

| Scientific Classification | |
|---|---|
| Kingdom | Plantae |
| Division | Magnoliophyta |
| Class | Magnoliopsida |
| Order | Lamiales |
| Family | Lamiaceae |
| Genus | Ocimum |
| Species | basilicum |

**Vernucular names**

English : Sweet basil

Marathi : Subja

Hindi : Ram tulsi

Sanskrit : Barbari

**Ethnomedicinal properties of Ocimum basilicum:** The plant has a strong aromatic flavor and is employed as a seasoning for culinary purposes. The plant Ocimum basilicum is locally known as sajba, and a few drops of leaf juice are dropped into ears to treat earache[36]. It is antibacterial, antioxidant, nutritious, and antidiabetic. Seed paste of Ocimum basilicum is applied to the forehead to reduce fever[37]. The Ocimum basilicum leaf decoction is beneficial for hepatic and gastrointestinal diseases, as well as catarrh, bronchitis, and coughs brought on by heat. The best therapy for inflammation is typically to make a paste out of the leaves and apply it directly to the affected areas. It has diuretic and tonic properties and is useful for gastrointestinal issues. Mucilaginous and demulcent seeds are also utilized as natural therapies for urino-genital disorders like gonorrhea. Syphilis, otitis, and otorrhea are best treated with the oil of seeds, while perfumes and cosmetics employ the aromatic oil of basil leaves and seeds. The flowering tops are used in dental and oral products and in fragrances[38]. The seeds are used medicinally by the natives in many parts of India[39].

**Phytochemical and pharmacological studies of Ocimum basilicum:** Ocimum basilicum mainly contains about 20 compounds such as linalool, estragole, methyl eugenol, 1,8-cineole, etc., which have been identified by GC-MS30. Camphor, limonene, thymol, citral, α-linalool, β-linalool, and estragole are the monoterpenes from Ocimum basilicum[40]. Mucilage separated from Ocimum basilicum can be used as a launch retardant withinside the tablet formulations because it indicates excellent swelling capacity[41]. The extracted mucilage of Ocimum basilicum has the ability to act as a pharmaceutical excipient[42]. The therapeutically active compound eugenol is found as a main compound in Ocimum basilicum (26.76%), and overall, 24 compounds characterized and identified[43]. The biological activities of various extracts or individual compounds include antibacterial, anti-inflammatory, anti-hyperglycemic, antinociceptive, and antioxidant properties both in vitro and in vivo[44]. Ocimum basilicum var. Ocimum basilicum exhibits a greater amount of chemical markers, namely eugenol and ursolic acid, in comparison to Ocimum basilicum var. O. thyrsiflorum. Phytochemical studies allow us to conclude that the basilicum variety is more effective than the thyrsiflorum variety[45]. Anti-ulcerative action: Ocmium basilicum (aerial part) powder and its aqueous and methanolic extracts reduce the dexofaspirin-induced gastric ulcers in rats model[46]. Traditional medical systems have recently received attention as a useful resource to address the increasing incidence of chronic, degenerative, and stress-related diseases[47]. Ocimum basilicum is cultivated on an industrial scale in India for the manufacturing of an important oil containing methyl chavicol (70–75%).The oil of basil reveals extensive use in the condimentary products, toiletry, cosmetics, and perfumery industries[48]. In a study of the genetic distances between nine Ocimum basilicum L. varieties, Labra (2004) examined the potential of the amplified fragment length polymorphism (PCR-BASED MARKER) approach in the research of genetic variability within the Ocimum genus [49]. The Ocimum basilicum extracts present in the herbal immunomodulator play a significant role in enhancing the immune system of Clarias batrachus. The findings derived from the current investigation suggest that Ocimum basilicum Linn. possesses significant immunostimulatory properties, effectively stimulates both specific and nonspecific immune mechanisms[50]. Ocimum basilicum fragrant leaves are a rich source of volatile oils, flavonoids, and phenolic compounds[51]. Alkaloids, phenols, flavonoids, and essential

oils are among the compounds found in Thai basil leaves (Ocimum bailicum var. thyrsiflorum). The SEM technique has been used to study the morphology of Thai basil leaves at various magnifications.The powder exhibits an agglomerate structure and a highly branched structure[52]. Phosphate, carbonates, silicates of sodium, magnesium, potassium, and other inorganic radicals are found in ash[53]. In this study, different solvent extracts of Ocimum species, including Ocimum basilicum, Ocimum tenuiflorum, and Ocimum gratissimum, were evaluated for their phytochemical and biological potential. Ocimum species extracts, both acetone and ethanolic, have also been shown to exhibit potent anti-inflammatory and antidiabetic properties[54]. The Ocimum basilicum aqueous extract's hypoglycemic action in vitro was studied, and it was concluded that the aqueous extract of basil, through its antioxidant properties and potential to inhibit α-glucosidase and α-amylase, provided advantageous effects in the control of diabetes [55]. The phytochemicals present in the ethanol and hexane extracts of Ocimum basilicum have shown that they play an important role in the prevention of various helminth infections, inflammation, and oxidative stress-related diseases[56]. The plant Ocimum basilicum L. contains gycosides, alkaloids, triterpenes, flavonoids, coumarin, and essential oils. The chemical composition of the stem essential oils of Ocimum basilicum L. and Ocimum tenuiflorum L. is similar. One of the main compounds that Ocimum produces is methyl eugenol, which could potentially contribute to its antioxidant properties[57]. The mucilage of Ocimum basilicum L. seeds was obtained. The mucilage possesses various characteristics, including stability, swelling index, toxicity, and lipid adsorption from various sources, making it suitable for making developing a weight control product[58]. Thai basil, scientifically referred to as Ocimum basilicum L., is a widely recognized herb. According to this research, it has been demonstrated that Ocimum basilicum grown in Malaysia is rich in eucalyptol,estragole, (E)-β-ocimene, α-trans-bergamotene,α-caryophyllene[59]. The main phytochemical in Ocimum basilicum is rosmarinic acid[60].Effects of plants and their constituents on some respiratory disorders, including bronchitis and lung cancer[61]. Ocimum basilicum may be clinically useful in stroke prevention[62].

***Ocimum gratissimum* L. :**

Ocimum gratissimum is a synonym of Ocimum viride and Ocimum viridiflorum. It is known by the name of Holy Basil, and its Marathi name is Rama Tulasi. This species, growing widely, is also known as Raan tulsi or Van tulsi. Ocimum gratissimum is an aromatic, perennial herb, stem erect, round-quadrangular, much branched; leaves are opposite; ovate; racemes terminal. Flowers are pale green. This species has a very strong aroma. Leaf decoction is used for skin diseases. Also, this leaf is applied to non-healing wounds.

| Scientific Classification | |
|---|---|
| Kingdom | Plantae |
| Division | Magnoliophyta |
| Class | Magnoliopsida |
| Order | Lamiales |
| Family | Lamiaceae |
| Genus | Ocimum |
| Species | gratissimum |

**Vernucular name**
English : Lemon basil
Marathi : Rama tulsi
Hindi : Ban tulsi
Sanskrit : Ajeka

**Ethnomedicinal properties of Ocimum gratissimum:** In India, the whole plant has been used to treat sunstroke, induce sweating headaches and flu, reduce fever, and have anti-inflammatory effects. The herb Ocimum gratissimum is used for diarrhea and gastrointestinal infections[63].

**Phytochemical and pharmacological studies of Ocimum gratissimum**: Ocimum species have the potential to serve as valuable sources of medicinal drugs. Ocimum gratissimum contains phytochemicals such as amino acids, tannins, volatile oils, flavonoids, phenolic compounds, steroids, alkaloids, triterpenoids, etc.

The whole plant is completely crushed or transformed into a paste, which acts as a poison for fish. The investigation could focus on the particular toxins present and their impact on fish[64]. New and innovative chemotherapeutics

found in plants are responsible for controlling the chemotherapy used to treat certain cancers. Based on their knowledge of ethnomedicine, this encourages researchers to look for novel anticancer compounds in plants as potential therapeutics. Thus, O. gratissimum aqueous leaf extract was evaluated as a novel anticancer agent in this work using the MTT assay[65].The quantitative analysis of microbial biotransformation needs to be studied in detail to determine the feasibility of Ocimum gratissimum volatile oil as an ideal substrate for industrial vanillin production. Vanillin has huge industrial applications in pharmaceuticals and perfumes[66].The study was to determine the preliminary phytochemistry and antibacterial effectiveness of Ocimum gratissimum leaf extract on moxifloxacin-resistant Escherichia coli isolated from clinical and environmental samples using microbiological and agar disc diffusion techniques. A decoction of Ocimum gratissimum is used in Congo to treat gonorrhea and mental illness[67].Tribals in Nigeria use leaf extract to treat diarrhea, while cold infusions of the leaves are used to relieve stomach pain and hemorrhoids. The antimicrobial efficacy of various leaf extracts derived from Ocimum gratissimum was tested against Staphylococcus aureus, Salmonella typhimurium, Escherichia coli, and Salmonella typhi, which are pathogenic bacteria responsible for causing diarrhea[68].

**4. Conclusion:**

This literature review emphasizes the significance of certain plants within the Ocimum genus, which are part of the mint family. It discusses the cultural and health benefits, traditional uses, and ethnomedicinal importance of these Ocimum species. The review also provides a brief overview of phytochemical and pharmacological activities, including antibacterial, anti-inflammatory, antiviral, antistress, and antifungal properties. Conducting phytochemical and pharmacological research in the field of medicine can pave the way for new opportunities in phytomedicine. The analysis conducted in this study confirms the presence of biologically active compounds such as phenols, flavonoids, saponins, tannins, and alkaloids with antioxidant activity in all three Ocimum species. Therefore, it can be concluded that phytochemical constituents serve as abundant sources of antioxidants, which play a significant role in pharmacology. This endeavour aims to present comprehensive information on various aspects of these plants.

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