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Review Article

FORMULATION AND EVOLUTION OF TULSI (HOLY BASIL)

Malipeddi Meghamala, Thammineni Naganji Reddy, Yadla Vani, Chennareddy Venkata Ramanareddy, Polaki Priyanka, C.Madhu

Gokul College of Pharmacy, Piridi, Bobbili, Vizianagaram, Affiliated to Jntu-Gurajada Vizianagaram.

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Abstract

The Tulasi leaf, also known as Holy Basil (*Ocimum sanctum*), is highly revered in traditional medicine systems like Ayurveda and holds significant religious importance in Hinduism. Its key aspects revolve around its potent medicinal properties, spiritual significance, and beneficial chemical components. Adaptogenic Helps the body adapt to stress (physical, metabolic, and psychological) by regulating cortisol levels, promoting a sense of calm, and reducing anxiety and depression. Antimicrobial Possesses broad-spectrum activity (antibacterial, antiviral, antifungal, antiprotozoal) making it useful for common colds, coughs, and various infections. Respiratory Health Acts as an expectorant (helps clear mucus) and is widely used for treating coughs, colds, bronchitis, and asthma. Anti-inflammatory & Antioxidant Rich in antioxidants (like eugenol and rosmarinic acid) that help fight free radicals and reduce inflammation. Metabolic Support Helps in normalizing blood sugar, blood pressure, and lipid (cholesterol) levels, offering support for conditions like diabetes and cardiovascular health. Detoxification Considered a blood purifier and a mild diuretic, aiding in the removal of toxins and supporting kidney health.

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*Corresponding Author

Malipeddi Meghamala

Assistant Professor

Department of Pharmacy Practice

Gokul College of Pharmacy, Piridi, Bobbili, Vizianagaram,

Affiliated to Jntu-Gurajada Vizianagaram.

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Introduction

Tulasi, or Holy Basil (*Ocimum sanctum*), is a sacred, aromatic herb deeply rooted in Indian culture and Ayurveda, revered for its spiritual significance and potent medicinal properties [1-14], acting as an adaptogen that helps the body fight stress, inflammation, and infections [15], with uses ranging from respiratory relief (asthma) and fever reduction to purification and spiritual protection in homes and temples [16].

Biological Source of Tulasi

Tulasi consists of the fresh or dried leaves and flowering tops of *Ocimum sanctum* Linn.

It belongs to the family Lamiaceae (Labiatae) [17].

Scientific Classification (for exams)

Kingdom: Plantae

Family: Lamiaceae

Genus: *Ocimum*

Species: *Ocimum sanctum* Linn. (also known as *Ocimum tenuiflorum*)

Chemical Constituent

Tulasi contains a rich array of bioactive compounds responsible for its therapeutic effects [18,19]

TABLE 1:

Compound	Category	Found In	Medicinal Properties
EUGENOL	Phenolic compound	Leaves, Essential Oil	Anti Oxidants, Anti Inflammation, Antiseptic

URSOL-IC ACID	Triterpenoid	Leaves	Antimicrobial, Anticancer, Anti Inflammation
ROSMARIN-IC ACID	Polyphenol	Leaves	Anti oxidents, Neuroprotective, Anti Allergic
LINALOOL	Terpene alcohol	Essential Oli	Anxilytic, Mild Sedative, Anti inflammatory
CARVA-CROL	Monoterpene	Essential Oli	Anti oxident, Anti Microbial
CARYOPHYLLENE	Sesquiterpene	Essential Oli	Anti Inflammatory, Analgesic
APIGENIN	Flavonoid	Leaves	Anti oxident, Anticancer, Anti Anxiety
LUTEOLIN	Flavonoid	Leaves	Anti inflammatory, Anti oxident
ORIEN-TIN	Flavonoid glycoside	Leaves	Antiaging, Antioxidant, Radioprotective
VITAMIN C	Vitamin	Leaves	Immune Support, Antioxidant
CALCIUM, IRON, ZINC	Mineral nutrients	Leaves	Bone Health, Blood formulation, Immune Function

Pharmacological Activities

Tulasi (Holy Basil) exhibits broad pharmacological activities, acting as an adaptogen, antioxidant, and anti-inflammatory agent, with traditional uses and scientific backing for antimicrobial, anticancer, cardioprotective, hepatoprotective, and immunomodulatory effects, helping the body combat stress, infections, metabolic issues (like high cholesterol/sugar), and protecting against toxins and radiation. Its active compounds, including eugenol and flavonoids, support respiratory, digestive, neurological, and metabolic health, making it a versatile herb in traditional medicine [20,22].

Key Pharmacological Activities

Antioxidant & Adaptogenic: Protects cells from oxidative damage and helps the body adapt to stress by balancing neuroendocrine & immune systems [23].

Anti-inflammatory & Analgesic: Reduces inflammation and pain, potentially through compounds like eugenol and ursolic acid [24].

Antimicrobial: Effective against bacteria, viruses, fungi, and protozoa, used for infections and as a natural preservative [25].

Cardioprotective: Helps lower cholesterol and triglycerides, supports heart health, and may prevent platelet aggregation [11].

Hepatoprotective: Protects the liver from damage caused by chemicals and toxins [13].

Anticancer: Shows potential in inhibiting cancer cell growth and protecting against carcinogens, though research is ongoing [26].

Respiratory Support: Treats cough, cold, asthma, and bronchitis, often with honey and ginger [8].

Metabolic & Endocrine: Helps manage blood sugar, cholesterol, supports thyroid function, and benefits fertility [12].

Neuroprotective: Enhances memory, sharpens senses, and protects nerves, used for fatigue and insomnia [5].

Radioprotective: Scavenges free radicals to reduce radiation damage [22].

Active Compounds

Essential Oils: Eugenol, Methylchavicol, cineole, linalool.

Flavonoids & Terpenoids: Ursolic acid, β -caryophyllene, tannins, alkaloids, glycosides

Medicinal Uses

1. Tulasi is used in the treatment of cough, cold, and bronchitis due to its expectorant action [8].
2. It possesses antimicrobial activity and helps in fighting bacterial, viral, and fungal infections [6].
3. Tulasi acts as an anti-inflammatory agent and is useful in reducing pain and swelling [9].
4. It is used as an antipyretic to reduce fever, especially in malaria and viral fevers [16].
5. Tulasi helps in boosting immunity by enhancing the body's defense mechanisms [23].
6. It is beneficial in respiratory disorders such as asthma and allergic conditions [8].
7. Tulasi is used in the management of diabetes mellitus as it helps in lowering blood glucose levels [12].
8. It acts as an antioxidant, protecting the body from oxidative stress [10].
9. Tulasi shows hepatoprotective activity, helping to protect the liver from toxins [13].
10. It is used in skin disorders like acne, eczema, and wounds due to its antiseptic properties [6].

Wide Variety of Dosage Forms

Tulasi (Holy Basil) is a highly versatile herb and is available in a wide variety of dosage forms, ranging from traditional Ayurvedic preparations to modern supplements. Here are the most common dosage formations of Tulasi Modern & Convenient Forms [19].

These are popular for ease of use and standardized dosing **Capsules / Tablets**

Description: Contain concentrated, standardized extracts (often of the leaves) or dried, powdered leaf (churna).

Use: Popular as a daily adaptogen for stress management and immune support.

Typical Dosage (Extract): Studies often use doses ranging from 300 mg to 500 mg of the standardized leaf extract, taken 1 to 2 times daily.

Essential Oil

Description: A potent, yellowish-green volatile oil distilled from the leaves and flowers.

Use: Primarily for topical application (diluted in a carrier oil for massage), aromatherapy (diffused), or as a component in steam inhalation for respiratory relief.

Important Note: Tulasi essential oil should generally not be ingested unless under the direct guidance of a qualified practitioner, as it is highly concentrated.

Liquid Extracts / Tinctures (Tulasi Ark):

Description: A concentrated liquid form often derived through distillation.

Use: Used in tiny, potent doses (e.g., 2 to 10 drops) mixed with water, often for respiratory issues or immunity.

Traditional & Herbal Forms

These forms are widely used in traditional home remedies and Ayurvedic practice:

Fresh Leaves (Raw)

Description: The simplest and most traditional form.

Use: Chewing 1 to 5 fresh, washed leaves daily, typically in the morning on an empty stomach, is considered a general wellness tonic and mind purifier (Manah Shodhana).

Tulasi Tea (Herbal Infusion)

Description: Dried or fresh leaves steeped in hot water.

Use: One of the most common and soothing forms for stress relief, colds, coughs, and digestive issues.

Typical Preparation: Steep 1 teaspoon of dried leaves (or 5-6 fresh leaves) in hot water for 5-10 minutes.

Powder (Churna)

Description: Dried and powdered Tulasi leaves.

Use: Can be mixed with warm water or honey. Often used for chronic respiratory issues and immune boosting.

Typical Dosage: 1 to 3 grams (about 1/4 to 1/2 teaspoon) mixed with warm water, often taken twice daily.

Juice (Swarasa)

Description: Freshly extracted juice from crushed leaves.

Use: Often mixed with honey to act as an expectorant for coughs and colds. Also used externally as drops for earaches.

Typical Dosage: 10 to 20 ml of fresh juice.

Topical Paste:

Description: Fresh leaves crushed into a paste.

Use: Applied externally to the skin for insect bites, mild irritations, ringworm, and chronic ulcers due to its antimicrobial and anti-inflammatory properties.

Conclusion

The Holistic Conclusion of Tulasi: Tulasi is best understood as a single entity that offers systemic, holistic benefits across spiritual, cultural, and medical domains.

The Adaptogenic King: The most significant pharmacological aspect is its role as a premier adaptogen. Tulasi is effective in helping the body and mind cope with a diverse

range of stressors-chemical, physical, metabolic, and psychological-by normalizing cortisol and other stress-related factors. This makes it an invaluable herb for promoting resilience, mental clarity, and balanced well-being in modern life.

A Multipurpose Medicinal Agent: Its rich composition of essential oils (like eugenol) and phytochemicals grants it a wide spectrum of clinically-supported activities.

Immune System: Strong antimicrobial, antiviral, and immunomodulatory properties make it a staple for preventing and treating common respiratory infections (coughs, colds).

Metabolic Health: Evidence suggests it can help regulate blood sugar, blood pressure, and cholesterol, supporting cardiovascular and metabolic health.

Anti-inflammatory: Its potent antioxidant and anti-inflammatory actions contribute to its use in treating chronic inflammatory conditions.

Cultural and Spiritual Cornerstone

Beyond its medicinal properties, Tulasi holds profound sacred significance in Hinduism, symbolizing purity, longevity, and spiritual protection. Its cultivation and worship in homes serve as a daily reminder of its purifying and sanctifying presence, reinforcing its use as an "Elixir of Life."

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Not Applicable

Author Contributions

All authors are contributed equally

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