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Review Article

Review on Medicinal Plant *Hyptis suaveolens*

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Abstract

Hyptis suaveolens (Fam: Lamiaceae) is an important medicinal plant with several medicinal uses in both folklore and traditional systems of medicine. Various extracts of the plant have been reported to possess anti-diabetic activity, anti-ulcer activity, analgesic activity, anti-bacterial and anti-fungal activity, and also used for treating constipation, cough, and gonorrhea reported by different authors. Yet many other activities lack scientific evidence. The literature review reveals that a wide range of phytoconstituents have been isolated from the plant and they possess an array of pharmacological activities. An exhaustive and up-to-date survey of literature on botanical and ethnobotanical profiles, and earlier phytochemical and pharmacological works done on the *Hyptis suaveolens*.

Keywords: *Hyptis suaveolens*; Phytochemical; Analgesic; Anti-inflammatory; Wound Healing Activity; Antioxidant Activity and Antimicrobial Activity

Introduction to Family Lamiaceae

The Lamiaceae or Labiatae (the mint or deadnettle family) are a family of flowering plants. The family has a cosmopolitan distribution. The enlarged Lamiaceae contains about 236 genera and has been stated to contain 6,900 to 7,200 species but the World Checklist lists 7,534. The largest genera are *Salvia* (900), *Scutellaria* (360), *Stachys* (300), *Plectranthus* (300), *Hyptis* (300), *Teucrium* (250), *Vitex* (250), *Thymus* (220), *Nepeta* (200). *Clerodentrum* was a genus of over 400 species, but by 2010, it had been narrowed to about 150.

The plants are aromatic in all parts and include many widely used culinary herbs, such as basil, mint, rosemary, sage, savory, marjoram, oregano, hyssop, thyme, lavender, and perilla. Some are shrubs, trees such as teak, or rarely vines. Many members of the family are widely cultivated, owing not only to their aromatic qualities but also their ease of cultivation: these plants are among the easiest plants to propagate by stem cuttings. Besides those grown for their edible leaves, some are grown for decorative foliage such as coleus. Others are grown for food purposes, but seeds are utilized instead of leaves such as with chia.

The leaves emerge oppositely, each pair at right angles to the previous one (called decussate) or whorled. The stems are frequently square in cross-section, but this is not found in all members of the family and is sometimes found in other plant families. The flowers are bilaterally symmetrical with 5 united petals, and 5 united sepals. They are usually bisexual and verticillastrate (a flower cluster that looks like a whorl of flowers but consists of two crowded clusters.). The Lamiaceae is divided into 7 subfamilies with 10 genera.

Introduction to the Genus *Hyptis*:

Hyptis is a genus of flowering plants in Lamiaceae. These plants commonly known as bushmint are widespread in the tropics and

warmer temperate regions of America[2]. There are 300 to 400 species which may be a perennial, small herbs to large shrubs.

Other species of *Hyptis*:

- *Hyptis alata* - clustered bushmint, musky mint.
- *Hyptis Americana* - American bushmint.
- *Hyptis argutifolia*
- *Hyptis atrorubens* - marubio oscuro
- *Hyptis brevipes*
- *Hyptis crenata* - Brazilian mint.
- *Hyptis capitata* - false ironwort, wild hops.
- *Hyptis diversifolia*
- *Hyptis emoryi* - desert lavender.
- *Hyptis escobilla* - Bayamon.
- *Hyptis florida*
- *Hyptis goyazensis*
- *Hyptis hirsute*
- *Hyptis hygrobia*
- *Hyptis lantanifolia* - island bushmint.
- *Hyptis lappacea*
- *Hyptis lorantziana*
- *Hyptis martiusii*
- *Hyptis mutabilis* - tropical bushmint.
- *Hyptis pectinata* - comb bushmint.
- *Hyptis plantanifolia*
- *Hyptis pseudoglauca*
- *Hyptis recurvata*
- *Hyptis spicigera* - marubio.
- *Hyptis suaveolens* - pignut is also known as chan.
- *Hyptis velutina*

General botanical description of *Hyptis suaveolens* plant

Systematic position:

- Kingdom: Plantae
- Unranked: Angiosperms
- Unranked: Eudicots
- Unraked: Asterids
- Order: Lamiales
- Family: Lamiaceae
- Genus: *Hyptis*
- Species: *H. suaveolens*
- Botanical name: *Hyptis suaveolens* DC.

Common Name: Horehound, Wild spikenard, Grosbaume, Pignut, Chan.

Other names

- French: *Hyptis* a odeur
- Portugese, Brazil: Betonica brava
- Spanish: Hortelado campo
- Hindi: Wilaiti tulasi
- Marathi: Jungle tulas
- Telugu: Sirna tulasi
- Bengali: Bilati tulas
- Oriya: Ganga tulasi
- Sanskrit: Bhustrena

Phytogeography and ecology

Most of the species are native to tropical America [1-3] and extend from the Southern United States through the Caribbean region and Central America, south to Argentina. But few of the species have neutralized in the warmer parts of the world.

Hyptis is neutralized in India. It is now established in the Deccan peninsula, North East India, Vindhyan Highland, Andaman, and Nicobar Islands [4,5]. *Hyptis* is of common occurrence along the sides of rail tracks, roadsides, foothills of open forests, forest clearings, and heavily infested wasteland particularly arid and rocky substrates. It is a ruderal weed and is capable of heavy infestations displacing native flora and is said to be a potent invader of Vindyhan Highlands [6,7].

Morphology

It is an erect annual herb, a sparingly aromatic annual herb reproducing by seeds. The stem is woody hairy and bears glandular dots. *Hyptis* is a strong-scented herb, which grows up to 2ms in height, with quadrate hairy stems and ovate to obviate leaves (3-5 cm long and 2-4 wide). The margins of the leaves are serrulate and

the lower surface is densely hairy. The petioles are up to 3cm long. The flowers grow in small cymes along branch ends with reduced leaves. The calyx is 5 mm long in flowers and 10 mm long in fruit and is ribbed; the corolla is blue. Nutlets (small nuts like fruit or seed) are about 1.2-1.5 mm long and slightly notched at the end. Seeds are dispersed through the movement of water. animals, vehicles. It is a wide range of pollinators and hence seed production is enormous. The seed can remain dormant for many years and the plant can sprout vigorously from rootstocks following rains. Morphologically it resembles with *Ocimum* species.

Figure 1

Uses

Traditional uses

- It has both medical as well as insecticidal properties.
- Leaf extracts cure swellings, abscesses, and hemorrhoids.
- Used as stimulant, carminative, sudorific, lactogogoue.
- Infusion is used in infections of the uterus, leaf juice is taken in case of colic and stomach ache.
- The shoot tops of the plant are edible and also used for flavoring purposes. Leaves are used in mint-flavored beverages.
- Roots are chewed with beetle nuts as stomachic and its decoction is used as an appetizer while some parts of the plants are used for headache
- Antifertility agents, used in the treatment of dysuria dry seeds are soaked overnight in a glass of water and taken in the morning on the empty stomach with a little amount of sugar.
- The very strong aromatic odor leads to the use of the plant as an insecticide.
- The plant has been reported to possess antifertility, antispasmodic, and anti-inflammatory activities.

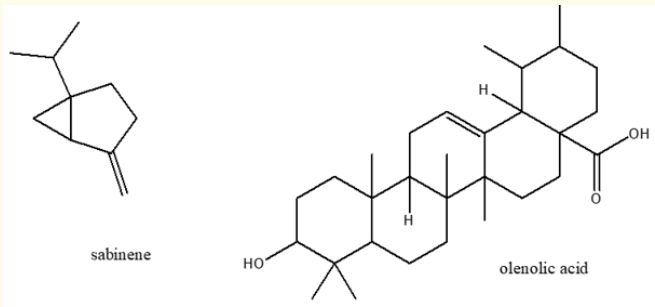
Ethnobotanical uses

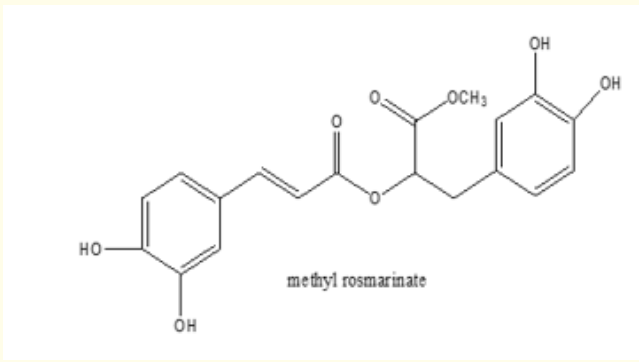
Tumor, Malaria, Headache, Cancer, Expectorant, Fever, Stomach ache, Cold, Yellow fever, Rheumatism, Analagesic, Spasm, Antispasmodic, Constipation, Urethritis, Liver stimulant, Antisudorfic, Depurative, Aperitifs, Despepsia, Mennorhagia, Bechic (relieving cough), Epistaxis, Nausea, Bilious, Pacifier, Palsy, Carminative, Flu, Poison (veterinary), Repellant (insect), Lactogogue, Cattarah.

Past phytochemical and pharmacological work done on *Hyptis suaveolens*

Phytochemical work

Hyptis suaveolens is an important source of essential oil, steroids, terpenes, alkaloids, flavonoids, phenols, and saponins. The essential oil contains cineole, sabinene, terpineol, menthol, azulenic sesquiterpenes. Leaves and flowers contain campesterol and fucosterol. Seeds contain anti-A antiheamagglutinin. Roots contain oleanolic acid, a-peltoboykinolic acid. Two diterpenes suaveolol, suaveoloic acid, methyl suaveolate, and two phenolic compounds rosamarinic acid, and methyl rosamarinate, along with some other important constituents also isolated from this plant.





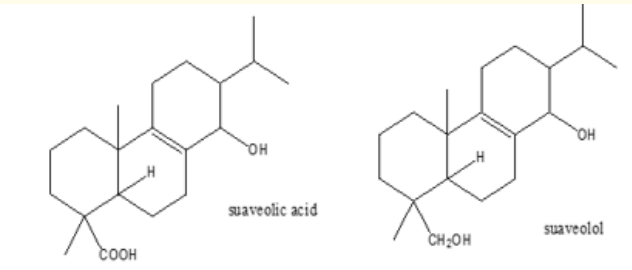


Figure 2

Pharmacological work

Hyptis suaveolens has the following activities:

- Analgesic, anti-inflammatory, wound healing activity,
- Antioxidant activity and Antimicrobial activity,
- Antiplasmodial activity,
- Antiulcer activity, gastroprotective activity,
- Antifertility activity and Antidiabetic activity,
- Immunomodulatory activity.

Hyptis suaveolens contains a wide variety of flavonoids and polyphenolic compounds and some plants species of the Lamiaceae family also contain vitamin C, vitamin E, quercetin, isorhammetin, kaempferol [8-10] having the effective antioxidant property that is due to strong free radical scavenging activity.

Anti-cancer activity

Ursolic acid and related triterpenoids are present in *Hyptis suaveolens.* The apoptosis as induced by ursolic acid involves a caspase-dependent pathway of death of carcinoma cells it can target several signaling molecules involved in cellular transformation, cell proliferation, angiogenesis, and metastasis that results in cancer [11-15].

Antimicrobial activity

Hyptis suaveolens is active against pathogenic Gram-positive and Gram-negative bacteria such as *Staphylococcus aureus, Salmonella typhi,Pseudomonas aeruginosa,Vibrio vulnificus Lactobacillus plantarum, Escherichia coli* due to the presence of phenolics and flavonoids present in the essential oil of *Hyptis suaveolens* [16].

Hyptis suaveolens shows strong antifungal activity against *Aspergillus* spp [17].

Anti-diabetic activity

Insulin deficiency in diabetic patients causes several abnormalities like accumulation of lipids. The methanolic extract obtained from leaves of *Hyptis suaveolens* exhibits anti-hyperglycemic activity in streptozotocin-induced diabetic rats. It also improves the insulin signaling in adipose tissue by enhancing the activity of beta cell function in streptozotocin-induced diabetic mice [18].

Anti-malarial and Anti-fertility activity

Petroleum ether extract of *Hyptis suaveolens* leaves contains a diterpenoid 13 alpha -epi-dioxiabiet-8(14) en -18-ol used in the treatment of malaria and anti-fertility activity [19].

Wound healing activity

Hyptis suaveolens showed wound healing activity by increasing hydroxyproline content, collagen deposition, and dry weight of granulation tissue, and enhanced wound healing activity by increasing free radical scavenging action and by increasing the enzymes of antioxidant in granuloma cells [20].

Anti-inflammatory activity

The anti-inflammatory activity of *Hyptis suaveolens* was reported by many authors due to the presence of two diterpenes suaveolol, methyl suaveolate, and triterpenoid ursolic acid [21,24].

Antiviral activity

Hyptis suaveolens contains pentacyclic triterpenoids shown better inhibition activity against the chikenguniya virus. The root extract contains ursolic acid which acts as cytotoxic and virucidal effect on HIV integrase, which prevents replication of AIDS virus. Many Lamiaceae family members were reported their pharmacological activity on respiratory tract viral infection, cold and fever [21,25-31].

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