

The Phytochemical and Pharmacological Screening of *Hyptis Suaveolens*

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World Journal of Biology Pharmacy and Health Sciences, 2023, 14(01), 239–246

Publication history: Received on 10 March 2023; revised on 21 April 2023; accepted on 24 April 2023

Article DOI: <https://doi.org/10.30574/wjbphs.2023.14.1.0190>

Abstract

The main aim of this article is to know the importance of traditional plant i.e *Hyptis Suaveolens*. It belong to family Lamiaceae, commonly called as Wialaitis tulsi and it grow on sub-tropic and semi- arid environment. It use broadly and belong to Subkingdom – Tracheobionta, Super kingdom – Spermatophyte , Division – Magnoliophyte, Class – Magnoliopsida, Subclass – Asteridae, Order – Lamiales. Hyptis is widespread in Australia its perennial, annual ,herb or sub-herb. The leaves of Hyptis is opposite and ovate about 2.5 to 10cm in length. The flower is dark purple in color and auxiliary with long stalk, hairy calyx and about 4mm long. The seeds are flat and mucilaginous fruit (nut let) are about 1.2-1.5mm long cure swellings, abscesses and hemorrhoids. In India the plant is considered to be stimulant, \carminative, soporifics and lactagogue. Commonly it is called as Horehound, Pignut, Wild spikenard, Gross Baume, Hyptis odder (French), Alfavaca-brava, Betônica-brava (Portuguese, Brazil), Chao, Hierba de las mules, hortela do campo (Spanish), Wilayati tulsi (Hindi), bhustrena, darp tulas, jungli tulas (Marathi), sirna tulasi (Telugu), bilati tulas .The phytoconstituent present in Hyptis is Alkaloid, Flavonoid, Terpenoid, Phenolic compound. It also shows the pharmacological effect like Anti-cancerous, Anti-microbial, Anti-oxidative, Anti-plasmodic, etc activity. The plant is aromatic.

Keywords: Terpenoid, Jangli tulsi; Morpho-taxonomy; Caryophyllene; Sabinene; Suaveolic acid

1. Introduction

Hyptis Suaveolens is a very common plant in India. The plant may be collected from road side and cultivation in waste area, riverbanks, coastal region. Indians used to call it "Chan/Wilayati tulsi". Tea made from the roots of H. Suaveolens is used to purify the blood, and it is also used as a remedy for the "diseases" of women. It has been used as a medicinal tea in many places^[1] The pharmacognostic property of plant is due to presence of different secondary metabolite. There are different active metabolite at different stage of plant life. From number of species existing plants on earth, only about 300 species are being used worldwide in the pharmaceutical, food, cosmetics and perfume. Plant foods contain constituents such as flavonoid, saponins, tannins, phenolics, terpenoid, Alkaloid, Glycosides, which have been assessed for their anti-oxidant, anti-mutagenic, antimicrobial, ant carcinogenic and other biological effects. Interestingly, natural product research guided by ethno-pharmacological knowledge provide novel chemical structure and mechanism of action. According to a report by Walker, the medicinal properties of plants could prevent the harmful effect from microorganism.

The accumulation of photochemical at the sites of infection of plants, several of which are insecticidal, anti-bacterial, antifungal, etc^[2]. The species is grow in sub-tropic and .semi-arid environments.

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1.1. Morpho-Taxonomy



Figure 1 *Hyptis Suaveolens*

1.2. Plant Taxonomy

- Subkingdom – Tracheobionta
- Super area – Spermatophyte
- Division – Magnoliophyte
- Class – Magnoliopsida
- Order – Lamiales

1.2.1. Leaves

The leaves are contrary and elliptical , about 2.5 to 10 cm long. Leaves are frequently glandular pigmented particularly on the periphery. Leaves are used as stimulant, carminative and as a parasitic cutaneous complaint [9]



Figure 2 Leaves

1.2.2. Flower

Flowers of *Hyptis Suaveolens* are supplementary with long stalk, hairy calyx. The size of flowers are approximately 4 mm long.

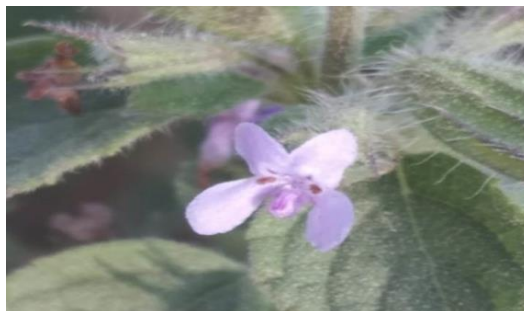


Figure 3 Flower

Flower The colour of flower is dark glandular and glandular. flowers are The corolla is two-lipped, mauve with dark glandular lines at the base of the broad two-lobed upper lip. flower has 4 stamens and it is pollinated by large number of pollinators leading to enormous seed production [5]

1.2.3. Stem

The stems of the factory are four- angled, satiny, having long hairs like appearance and gland blotches

1.2.4. Seed

The seeds are flat and mucilaginous. Fruit (nutlet) aer about 1.2-1.5 mm long^[5]

Seed is defended in chine purr which help dispersed and it's slightly indented at end, seed are dimorphic. This dimorphic is reflected in seed size(wuff91973) and inverse relationship of seed size with light demand has been observed which confers good diapason for seed germination across range of germination temperature, so seed are able of growing across range 10- 40 degree Celsius but 25- 30degree Celsius optimum for its growth(felippe etal. 1983).^[5]



Figure 4 Seed

1.3. Traditional Use

Hyptis Sueveolens is used as anti-cancerous(Mudgalet.al1997) and tumorigenic(Peerzada 1997), mycotoxic exertion against fungus *Candida albicia*.^[5] *Hyptis* literature indicates that splint excerpts cure bumps, abscesses and hemorrhoids. In India the factory is considered to be goad, carminative, anodynes and lactogogue. Infusion is used in infections of the uterus; splint juice is taken in cases of bellyache and stomach pang.^[6] The shoot covers of the factory are comestible and also used for spicing purpose. The factory are strong sweet mint/ thyme- suchlike smell leads to the use of the factory as an insectifuge. As its English name backcountry tea implies, *H. suaveolens* serves in West Africa as an respectable cover in infusion for tea. It. is carminative, sudorific(causing or adding sweat), lactogenic, anticatarrh. and anti-parasitic. Crude splint excerpt is also used as a relief tocolic and bellyache. Leaves and outgrowths are considered to be antispasmodic and used in antirheumatic and Smothers of the dried leaves are also used to repel mosquitoes and control insectpests of stored grains^[7]

1.4. Common names

Horehound, Pignut, Wild spikenard, Gross Baume, *Hyptis à odeur*(French), *Alfavaca- brava*, *jangli tulsi*(Hindi), *bhustrena*, *darp tulas*, *jungli tulas*(Marathi), *sirna tulasi*(Telugu), *bilati tulas*(Bengali), *Ganga tulasi*(Oriya), *bhustrena*(Sanskrit)^[4]

1.5. Chemical Constituent

Hyptis Suaveolens chemically including alkaloids, tannins, saponins, phenol and flavonoid. The shops contained crude protein(9.19 to 17.94), crude fibre(4.88 to 9.04), ash(5.68 to 6.88), carbohydrate(66.24 to 75.87), crude lipid(3.48 to 4.90) and food energy(357.68 to 373.26 mg/ cal).^[8] *Hyptis Suaveolens* show presence of suaveolic acid, suaveolol, methyl suaveolate, beta- sitosterol, ursolic acid, and phenolic emulsion like rosamarinic acid, methyl rosamarinate that have potentially to substitute the traditional medicine as remedial agent against bacteria and viral pathogen. The major ingredients of the oil painting are Sabinene(25.0), α - terpinolene(13.64), β - caryophyllene(12.75), 1, 8- cineole(9.11), β - pinene(5.65), bicyclogermacrene(5.61) and limonene(5.40). The major ingredients of the oil painting are Sabinene(25.0), α - terpinolene(13.64), β - caryophyllene(12.75), 1, 8- cineole(9.11), β - pinene(5.65), bicyclogermacrene(5.61) and limonene(5.40). T

1.6. Photochemistry of *Hyptis suaveolens*

1.6.1. Terpenoid

The essential canvases are principally monoterpenoids or sesquiterpenoids and their oxygenated derivations. The monoterpenes are principally deduced from precursor of geranyl pyrophosphate while sesquiterpenes are deduced from farnesyl pyrophosphate and constitute one of the largest groups of secondary metabolites produced in shops under stress conditions. *H. suaveolens* having antifungal and broad spectral antibacterial exertion against both Gram-positive and Gram-negative bacteria.^[9] Ursolic acid (3-β hydroxy-urs-12-ene-28oic acid) is a natural pentacyclic triterpenoid (C₃₀H₄₈O₃) which is an important terpenoid reported in *H. suaveolens* and other members of family Lamiaceae.^[16] The natural ursolic acid that do in numerous factory species under family Lamiaceae need further logical substantiation to develop it into unborn medicine to treat habitual conditions like cancer, diabetes, and viral infections like AIDS COVID-19, etc.^[10,11]

1.6.2. Flavonoid

Hyptis albida contain flavanoids with hydroxy-methoxy flavones derivations similar as 5-hydroxy-7-4 dimethoxy flavones, 5-hydroxy-7-4-trimethoxy flavones, ermanin, nevadensin, and gardenin while in nearly affiliated *Hyptis Suaveolens*, the flavonoid content ranges in between 10 and 13 similar as gallic acid, Ferulic acid, quercetin, chlorogenic acid, and rutin.^[12,13] flavonoids similar as hesperidins, apigenin, and aluteolin have anti-inflammatory and analgesic exertion.^[14] The flavonoids do in free state or as glycosides (O-glycosides or C-glycosides) with its different derivations like flavones, flavonol, flavanone, isoflavone, and chalcone anthocyanidins. flavonoid are help in glycosylated or esterified form and synthesized from outgrowth of amino acid phenylalanine and acetic acid through shikimic acid pathway.^[15] Flavonoids act as natural anti-inflammatory emulsion by acting as potent impediments for recap factor that modulate the expression of gene that effect are cytokines, chemokine and leukemia mislike rhinitis, and sclerosis.^[16]

1.6.3. Alkaloid

About 5500 alkaloids have been reported. Alkaloids have analgesic, antiplasmodic, and antibacterial parcels that's why they're used for medicinal purpose.^[17] The leaves of *H. suaveolens* are rich in alkaloids having medicinal counteraccusations.^[18,19] Its broad class of phytoconstituent.

1.6.4. Phenolic Compound

They contain benzene rings, with one or further hydroxyl substituent, and range from simple phenolic moles to largely polymerized composites^[20]. The chemical ingredients uprooted from shops, phenolic composites, can inhibit the immersion of amylase in the treatment of carbohydrate immersion, similar as diabetes.^[21] The factory phenolics do in both free and bounded form, the bounded phenolics constitute beta glycosides through stomach and small intestine, and it reaches the colon in unaltered form where they ply their chemical bioactivity. The phenolic composites are the potent antioxidants having the capability of scavenging free oxide revolutionaries. The number and position of hydroxyl group and nature of negotiation of sweet rings confer the magnitude of antioxidative eventuality to the phenolics.^[22,23] Depending upon the structure of aglycones, factory phenolics can be distributed as phenolic acid, flavonoids, polyphenolic amides, and other non-flavonoid polyphenols and their molecular mass ranges between 500 and 4000 Da.^[24] The phytoconstituent present in different part of *Hyptis Suaveolens* is mention in table (1)^[25]

Table 1 Phytochemical Profile of *Hyptis Suaveolens* [(+) present phytochemicals and (-) absent phytochemicals]

Sr.no	Test	Leaf	Stem	Root
1	Volatile oil	+	+	+
2	Starch	+	+	+
3	Protein	+	+	+
4	Tannin	+	+	+
5	Saponin	+	-	-
6	Fat	+	+	+
7	Alkaloid	+	+	+
8	Glycoside	+	+	+

1.7. Pharmacological Acitivity

1.7.1. Antimicrobial Acitivity

The flavonoids and phenolic composites present in the essential oil painting of *H. suaveolens* parade strong antibacterial exertion against pathogenic Gram-positive and Gram-negative bacteria similar as *Staphylococcus aureus*, *Salmonella typhi*, *Pseudomonas aeruginosa*, *Lactobacillus planetarium*, *Escherichia coli*, *Vibrio vulnificus*, *Enterococcus faecalis*, and *Streptococcus faecalis*^[26,27]. Essential oil painting from *H. suaveolens* shows strong antifungal exertion against *A.spergillus* spp. (*A. flavus*, *A. parasiticus*, *A.niger*, *A. ochraceus*, *A. fumigates*), *Saccharomyces cerevisiae*, *Mucor* sp., *Fusarium moniliforme*, etc. ^[28] *H. suaveolens* showed crack mending exertion by adding hydroxyproline content, collagen deposit, dry weight of granulation towel, and enhanced crack mending exertion by adding free revolutionary scavenging action and by adding the antioxidant enzymes in granuloma cells.^[29] The essential oil painting show less exertion toward Gram-negative bacteria (*P.aeruginosa* and *E.coli*,) than Gram-positive due to the protection by hydrophilic external membrane of the gram-negative bacteria which could support the passage of the lipophilic essential oil painting^[30].

1.7.2. Anti-cancer Acitivity

Cancer is a condition in which where cell in specific part of body grow unbridled. The essential oil painting of *H. suaveolens* containing terpenoids like sabinene, β caryophyllene, trans- caryophyllene, Spatulanol, β spathulenol, β -elemene, γ - elemene, Rimuene, α humulene, Eucalyptol, 1-8-cineole, etc. as principal ingredients show anti-cancer exertion on MCF- 7 cell line (cancer cell line of mortal bone). ^[31] Ursolic acid and related triterpenoids induces cell cycle arrest of cancerous cell lines by targeting carcinogenic enzyme through proteasome declination.^[22] therefore ursolic acid and its outgrowth can used as effective remedial agent against cancer. ^[32] In invitro anti cancer exertion of essential oil painting of *H.suaveolens* against MCF- 7 cell line (mortal bone cancer cell line) by MTT assay which measures the cell viability of *H.suaveolens* essential oil painting ^[33].

1.7.3. Anti-inflammatory Action

Anti seditious Acitivity *Hyptis suaveolea* shows implicit topical anti-inflammatory effect further than indomethacin. ^[34] The pentacyclic triterpenoid ursolic acid produces profound and effective anti-inflammatory goods. ^[35] The anti-seditious effect of *H. suaveolens* by scavenging free revolutionaries analogous to standard anti-inflammatory medicine Ibuprofen was reported by several authors^[36,37].

1.7.4. Anti-diabetic Acitivity

Anti diabetic medicine aer use to lower the abnormally high glucose (sugar) position in the blood. Ursolic acid a pentacyclic triterpenoid act as strong hypoglycemic agent enhances vesicular insulin transportation, stashing, and induces the uptake of insulin by the glucose transporter protein (GLUT4) located on tube membrane by cranking intracellular accumulation of calcium^[38].

1.7.5. Antioxidant Acitivity

Hyptis Suaveolens, a repository of different polyphenolics and flavonoid composites having effective antioxidant property due to strong radical scavenging capability as determined by several logical styles including ABTS (2 ' azino-bis-(3- ethylbenzothiazoline- 6- sulfonic acid) and DPPH (2- diphenyl- 1- picrylhydrazyl). ^[39] The antioxidative eventuality of natural polyphenolics composites with variable hydroxyl group is due to their capability to scavenge different ROS species by suppressing their conformation by modulating the enzyme exertion involved in their product ^[40]. The poly- phenols parade their antioxidant action by hydrogen- snippet transfer (chapeau) and singlet- electron transfer (SET) medium. In the former, the phenolic functional group transfer its hydrogen snippet to free revolutionaries while in ultimate the transfer of single electron results in conformation of radical cation. ^[41] Polyphenols like flavonoids may have the capability to reply with non-polar composites in the membrane lipid precluding the lipid oxidation and therefore cover the membrane structure and function from oxidation ^[42].

1.7.6. Anti plasmodic Acitivity

Hyptis Suaveolens generally used in traditional drugs for malarial drug and increased interest. ^[43] It inhibits growth of both chloroquine sensitive and chloroquine- resistant strains of *Plasmodium falciparum* under in vitro conditions. diterpenoid 13 α - epi- dioxiabiet- 8(14)- en-18-ol set up from petroleum ether excerpt of *H. suaveolens* leaves also shows antiplasmodial exertion ^[44,45].

1.7.7. Larvicidal action

Larvicidal exertion of this factory is due to composites like nascence- pinene, beta- pinene, sabinene, terpinolene, beta-caryophyllene, and 4- terpineol. prize of *H. suaveolens* shows larvicidal exertion against unheroic fever mosquito *Aedes aegypti* (L), *Aedes albopictus* naiads . Mosquito- borne conditions similar as dengue fever, unheroic fever, malaria, filariasis, viral encephalitis affects large mortal population. [46] *H. suaveolens* EO had insecticidal exertion against *A. albopictus* naiads and mortality was lozenge dependent. In our exploration, the essential oil painting(EO) uprooted from fresh leaves of *Hyptis Suaveolens*(Lamiaceae), and its main ingredients were estimated for larvicidal and repellent exertion against the Asian barracuda mosquito, *Aedes albopictus* Skuse(Dipteral Culicidae), presently the most invasive mosquito worldwide[47] .

2. Conclusion

The above review articles give a broad idea about the pharmacological activity as well as presence of phytoconstituent. It is easily available plant. The plant *Hyptis Suaveolens* was use traditionally. It show therapeutic effect like anti-microbial, anti-inflammatory, anti-plasmodic ,etc pharmacological effect due to presence of phytoconstituent like alkaloid, phenolic compound, terpenoid and, flavonoid. It also show repellent action for mosquito. The presence of different constituent in different part of plant is shown in table 1. The leaf extract of *Hyptis Suaveolens* shows the anti acne activities. The extraction take place by using soxhlet assembly and ethanol. The above extraction are useful to make antidiabetic as well as different cosmetic product like anti acne cream, some syrup. There were very few side effect of *Hyptis* product. It is a annual herb that distributed all over world. *Hyptis Suaveolens* has been shown to contain vital nutrients proteins, carbohydrates, fats, fibre and the phytochemicals alkaloids, tannins, saponins, flavonoids, and terpenoids which are responsible for its remedial use.

Compliance with ethical standards

Acknowledgments

The author would like to express sincere gratitude to the management of Late Bhagirathi Yashwantrao Pathrikar College of Pharmacy for their continuous support and encouragement in this work.

Disclosure of conflict of interest

Authors declare that there is no conflict of interest.

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