

Study of Antimicrobial, Synergistic, and Mosquito repellent activities of *Hyptis suaveolens*

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Abstract— *Hyptis suaveolens* is a medium aromatic shrub found in uncultivated areas and road sides. It has variety of uses and has potential in inhibiting many pathogens. It contains Sabinene, α -terpinolene, 1,8-cineole, β -caryophyllene. It is considered as analgesic, decongestant, emmenagogue, antipyretic, stimulates blood circulation. In the present study we studied the antimicrobial activity of leaf extracts of *Hyptis suaveolens* against *Pseudomonas aeruginosa*, *Streptococcus aureus* and cell phone bacteria. We tested synergistic activity of *Hyptis suaveolens* with *Kaempferia galanga* and *L. amaranthus* and its comparison. We tested mosquito repellent activity of essential oil of *Hyptis suaveolens*. We found that antimicrobial activity of *Hyptis* is greater when it is applied alone than when tested as a combination. It also inhibited the growth of cell phone bacteria. We confirmed mosquito repellent activity in *H. suaveolens*.

Keywords— *Hyptis suaveolens*, antimicrobial, synergistic, mosquito repellent, *Kaempferia galanga*, *L. amaranthus*

Introduction

Hyptis suaveolens (L.) Poit is a traditional pubescent annual herb found throughout India and many other countries. On the basis of literature references, this plant was selected for the screening of wound healing property [1]. The plant, *Hyptis suaveolens* (L.) Poit commonly known as *Wilayati tulsi* belongs to the family Lamiaceae and used as an important medicinal plant. The plant has been considered as an obnoxious weed, distributed throughout the tropics and subtropics. Almost all parts of this plant were being used in traditional medicine to treat various diseases [2]. The leaves of *H. suaveolens* have been utilized as a stimulant, carminative, sudorific, galactagogue and as a cure for parasitic cutaneous diseases [3]. Crude leaf extract is also used as a relief to stomachache. Leaves and twigs are considered to be antispasmodic and used in antirheumatic and antisporific baths [4], an anti-inflammatory, antifertility agents [5], and also

applied as an antiseptic in burns, wounds, and various skin complaints. The decoction of the roots was found highly valued as appetizer and was reported to contain urosolic acid, a natural HIV-integrase inhibitor [6]. Fumes of the dried leaves are also used to repel mosquitoes and control insect pests of stored grains. Traditionally, the plant extracts were used to cure swellings, also as memory aid [7].

Witayapanet al [8] found antibacterial activity of *H. suaveolens*. Vineth singh et al found mosquito repellent activity of *H. suaveolens* [9]. The synergistic activity of *Hyptis suaveolens* with *Kaempferia galanga* and *L. amaranthus* and its comparison was rare work. The aim of this work was to test antimicrobial activity of leaf extracts of *Hyptis suaveolens* in *Pseudomonas aeruginosa*, *Streptococcus aureus* and cell phone bacteria. Testing of synergistic activity of *Hyptis suaveolens* with *Kaempferia galanga* and *L. amaranthus* and its comparison, also testing of mosquito repellent activity of essential oil of *Hyptis suaveolens*.

MATERIAL AND METHODS

Preparation of oil from leaf

The leaves of *Hyptis suaveolens* were collected and washed. The cleaned leaves were weighed 200g filled in the steamer so that it was not in direct contact with water. It was like Soxhlet apparatus. It was then heated so that vapour generated were then passed through condenser. The condensed vapour in the form of oily solution was then collected in the round bottom flask. It was then transferred to brown bottle or a tightly closed bottle.

Preparation of leaf extract

Leaves were collected and washed repeatedly. It was dried in hot air oven and powdered using pestle and mortar. Using methanol a thick liquid solution was prepared. Extract was then squeezed out using cheese cloth. It was then transferred to a boiling tube and heated to 40-50°C until a greenish sticky substance was obtained. Then it was stored in refrigerator.

Medium Preparation

Nutrient agar medium was prepared for disk diffusion technique with the following compositions, Peptone- 1g, Beef extract- 0.6g, Agar- 4g, Distilled water- 200ml, pH adjusted to neutral (6.8) at 25 °C. The medium was autoclaved at 121°C for 20 mins.

Disk diffusion method

The agar plates were labeled correctly. After solidification of the medium, streaking was then carried out using the appropriate microorganism. Filter disks of diameter about 5mm were then placed on the petriplates in the area where streaking was done. Prepared extracts were then placed above the filter disks. Then it was kept for incubation in BOD for about 24 hours at room temperature. Repeat the procedure with all the six extracts prepared. The zone of inhibition was observed and the effects of each extracts were compared. The cellphones were swabbed throughout using cotton and streaked in the solidified medium and repeat the same procedure for the zone of inhibition.

Results

After 72 hours, the culture with extract of *H.suaveolens* exhibited more inhibition. *L.amaranthus* also exhibited inhibition almost similar to *H.suaveolens*. The amount of inhibition was greater in the petriplate containing combined extracts of *H.suaveolens* and *K.galanga*, as shown in Table 1 and Figure 1.

Extract	Diameter of inhibition zone(mm)
<i>H.suaveolens</i>	19
<i>L.amaranthus</i>	10
<i>k.galanga</i>	17
<i>H.suaveolens</i> - <i>L.amaranthus</i>	7
<i>H.suaveolens</i> - <i>k.galanga</i>	10
<i>k.galanga</i> - <i>L.amaranthus</i>	6

Figure 2 showed that the mosquito larvae got destroyed due to the effect of essential oil extracted from *Hyptis suaveolens*.

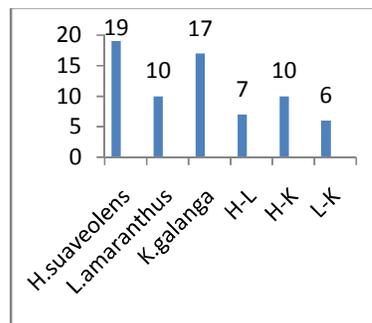


FIGURE 1

Figure 1



Figure 2

Discussion

Due to the presence of essential oil in *Hyptis suaveolens* it exhibits different properties. From the studies conducted we confirmed mosquito repellent activity in *H.suaveolens*. Arivoli, S. et al [10] found the mosquito repellent activity of hyptis oil against *Aedes aegypti*. Chanda et al [11] found the mosquito repellent activity. It has got synergistic activity but it was found that antimicrobial activity of *Hyptis* is greater when it is applied alone than when tested as a combination. It also inhibited the growth of cell phone bacteria, but it requires an intensive study which takes more time to present a better result in case of cell phone bacteria. *H.suaveolens* has got potential in eliminating different pathogens that we come across our daily life. So a more detailed study may lead to the development of different products that can help in treatment of various diseases. It may also serve as a natural product and hence may overcome the problems of side effects caused due to the use of chemicals.

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