

Morphological Identification of *Hyptis suaveolens* (L.) Poit. and Its Antimicrobial Activity

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Abstract

This paper is a study to examine the antimicrobial activity of *Hyptis suaveolens* (L.) Poit.. This plant is aromatic and wild growing plant. For doing this research, the plants were collected in flowering time from surrounding areas of Banmaw Township. According to the morphological characters presented in the vegetative and reproductive parts of the plants, this plant has been identified by using available literature. The fresh leaves were dried in shade and powdered. For their antimicrobial activity, the leaf powder was extracted by different solvents such as acetone, chloroform, ethyl acetate, ethanol, methanol, pet-ether and water. These extracts were tested against six different microorganisms by paper disc diffusion method. It was found that the ethyl acetate extract showed most significant antimicrobial activity on *E. coli*. It can be concluded that the present research may provide a basis for the isolation of constituents from leaves of *Hyptis suaveolens* for its potent activity on *E. coli*.

Keywords; Identification, Antimicrobial activity, *Hyptis suaveolens*

Introduction

Traditional medicine, making use of herbs in different preparations, is greatly relied upon especially by rural dwellers, for the treatment of various ailments. Nowadays, there is growing trend of people moving from synthetic drugs to herbal cure. The plant under investigation is *Hyptis suaveolens* (L.) Poit., belonging to the Family Lamiaceae. In developing countries, Lamiaceae have traditionally been used for their insecticidal and repellent properties against several insect species (Ngamo *et al.*, 2007). Most of them belong to the *Hyptis* genus that includes more than 400 species that grow in the tropical regions of the world, mainly in Africa and America and are highly aromatic plants.

Hyptis suaveolens is a medium aromatic shrub found in the tropics and subtropics, and distributed as the aggressive annual weedy species in the northern part of Thailand. The genus *Hyptis* is known to be used for traditional medicine as an anticancer (Mabberley, 1990), and antifertility agent in females (Oliver-Bever, 1986). 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 in Asia (Palmer, 1891).

The English therapeutic journalism shows that it is efficient against bacteria and fungi but there has not been much research yet on its viral effectiveness. *Hyptis suaveolens* is an important source of essential oils, alkaloids, flavonoids, phenols, saponins, terpenes, and sterols. For this reason and pursuant to the medicinal importance of the plant, this review is an effort to assemble all the information reported on its phyto-pharmacological activities, and information will lend a hand in generating attention towards the plant, and consequently, may be useful in emergence of new remedies which may be more effectual and have better curative properties. Therefore, the aim of this study is to determine the antimicrobial activity of the leaf extract of *Hyptis suaveolens* to correlate to its medicinal use.

Materials and Methods

Collection, Identification and Preparation

In this study, *Hyptis suaveolens* was collected during flowering period (December to March) from some areas of Banmaw Township. After the collection, all the vegetative and reproductive parts of the fresh specimens were studied, measured in detail and recorded. The relevant data for taxonomic description of the species were also recorded. Based on the resulting data, the plants were identified with the help of literatures (Backer; 1968, Burkill; 1935, Hooker; 1881, Dassanayake (1981) and Hu-Qi-ming (2009).). All the necessities were documented by photographs. Then, the leaves of this plant were thoroughly washed with water, dried in shade and crushed and powdered with a grinding machine. This powder was stored in the airtight container for further study.

Antimicrobial activity of *Hyptis suaveolens* (L.) Poit. leaves

Antimicrobial activity of different solvent extracts from *Hyptis suaveolens* leaves were tested on six microorganisms by paper disc diffusion method at Botany Department, University of Yangon.

Preparation of the crude extracts

About 5 g of the powdered leaves was extracted with 20 ml of each solvent (ethanol, methanol, pet-ether, chloroform, acetone, ethyl acetate and water) respectively. The powder sample with respectively solvents was placed in water bath for 6 hours. The crude extracts were then filtered. After filtration, the extracts were dried on water bath to obtained concentrated substances.

Test organisms

The test organisms used in this study were *Aspergillus flavous*, *Bacillus subtilis*, *Candida albican*, *Escherichia coli*, *Pseudomonas fluorescens* and *Xanthomonas oryzae*.

Antimicrobial screening

Isolated bacterial strains grown on nutrient agar were inoculated into 50 ml conical flasks containing 10 ml of sterile growth medium. Then, they were incubated at 30°C for 72 hours on a reciprocal shaker at 200 rpm. 0.3 ml of test organisms was added to assay medium, then poured into plates. After solidification, paper discs impregnated with different solvent extracts were applied on the test plates and these plates were incubated for 24-36 hours at 30°C. After incubation for 24-36 hours, the inhibition zone which appeared around the paper discs indicated the presence of bioactive compounds which inhibit the growth of test organisms. Then, the zones of inhibition diameter including 6 mm paper disc were measured with the aid of a transparent ruler.

Results

Morphological characters

Scientific Name : *Hyptis suaveolens* (L.) Poit.
Commons Name : Wild spikenard, bush tea
Myanmar Name : Taw pinsein
Family : Lamiaceae

Flowering and fruiting Period: September to November

It is an erect and strappingly aromatic annual herb reproducing by seeds. The stem is woody hairy and bears glandular dots. It is a strong-scented herb, which grows up to 2 m in height, with quadrate hairy stems and ovate to obovate leaves (3-5 cm long and 2-4cm wide). The leaves are simple, opposite and decussate. The margins of the leaves are serrate, both surfaces are densely hairy and dotted with small glands. The petioles are up to 3 cm long. The flowers grow in small cymes along branch ends

with reduced leaves. The calyx is campanulate shaped and ends with 5 teeth nearly equal, 5 mm long in flower and 10 mm long in fruit and is ribbed. The corolla is blue in colour. The four stamens are inserted in the top quarter of the corolla tube where they are included. The ovary is divided into four lobes with a filiform style ending in a short bilobed stigma. Nutlets (a small nutlike 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, and vehicles. (as shown in figure 1)

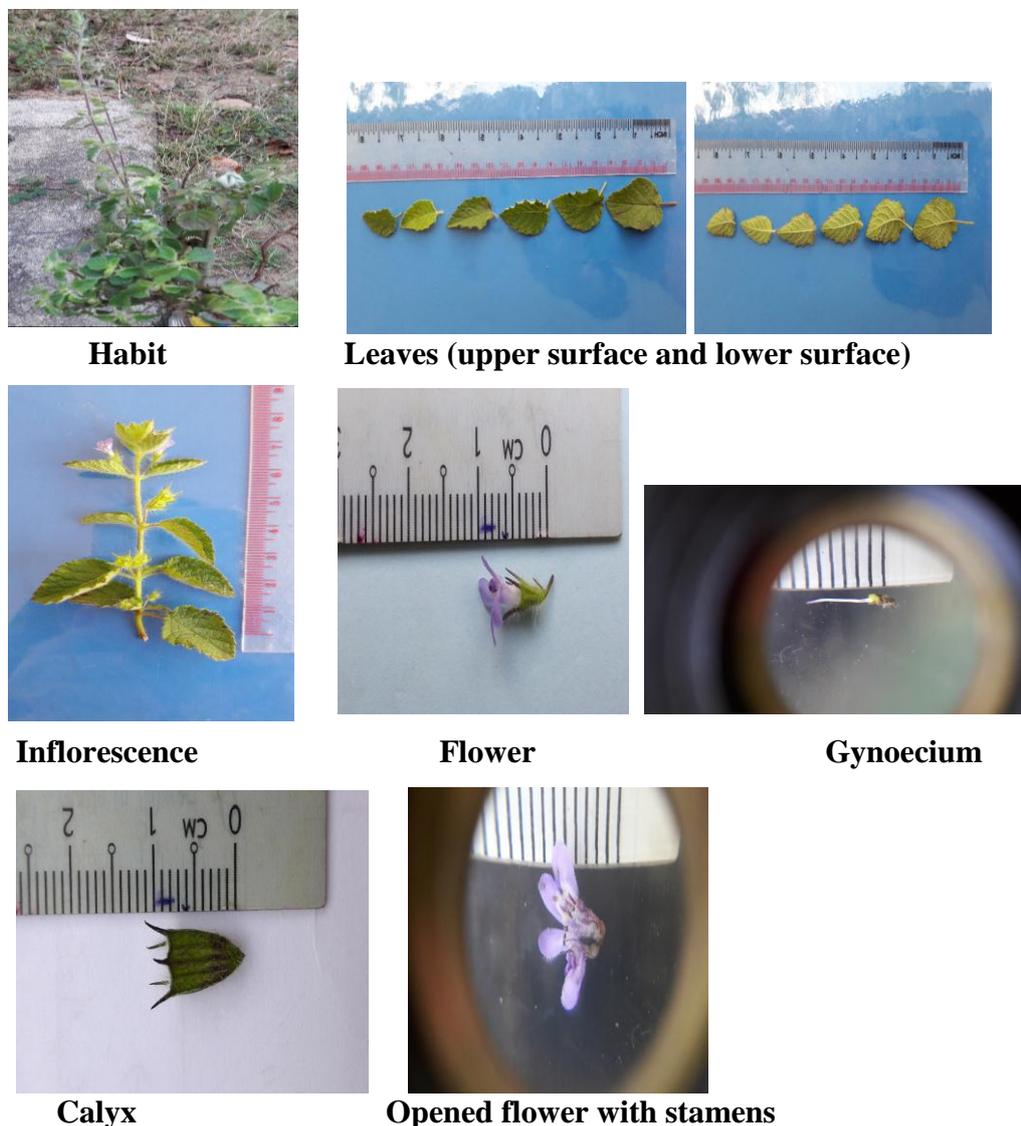


Figure 1. Morphological characters of *Hyptis suaveolens* (L.) Poit.

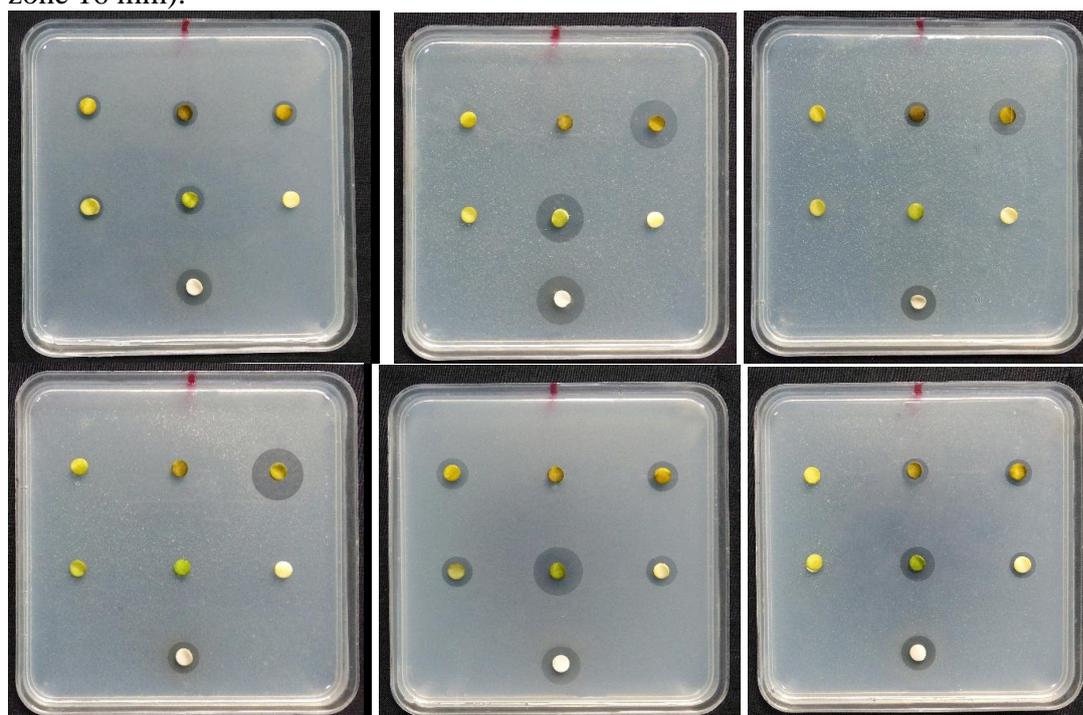
Antimicrobial activity

Screening of antimicrobial activity of leaves of *Hyptis suaveolens* (L.) Poit. was carried out by using different solvents namely pet-ether, chloroform, methanol, acetone, ethyl acetate, ethanol and water. The diameter of inhibition zones that appeared were given in Table 1 and figure 2.

Table 1 Inhibition zone exhibited by different extracts of leaves of *Hyptis suaveolens* (L.) Poit. against six microorganisms

No.	Extract	Microorganisms					
		<i>A. flavous</i>	<i>B. subtilis</i>	<i>C. albican</i>	<i>E. coli</i>	<i>P. fluorescens</i>	<i>X. oryzae</i>
1.	Acetone	8 mm	-	-	-	8 mm	-
2.	Chloroform	8 mm	-	8 mm	-	-	8 mm
3.	Ethyl acetate	8 mm	14 mm	14 mm	16 mm	8 mm	8 mm
4.	Ethanol	8 mm	-	-	-	8 mm	-
5.	Methanol	10 mm	14 mm	-	-	14 mm	12 mm
6.	Pet-ether	-	-	-	-	8 mm	8 mm
7.	water	12 mm	14 mm	12 mm	10 mm	12 mm	12 mm

In this experiment, pet-ether and chloroform extracts exhibit least activity (8mm) on *P. fluorescens* and *X. oryzae*, *A. flavous* and *C. albican* respectively. Acetone and ethanol extracts showed similar zone of inhibition (8mm) against *A. flavous* and *P. fluorescens*. Methanol extract showed varied in the zone of inhibition from 10-14 mm against *A. flavous*, *B. subtilis*, *P. fluorescens* and *X. oryzae*. Ethyl acetate and water extracts showed antimicrobial activity on all tested organisms. Especially, ethyl acetate extract showed the highest activity against *E. coli* (inhibition zone 16 mm).



1 = Acetone extract 2 = Chloroform extract 3 = Ethyl acetate extract
 4 = Ethanol extract 5 = Methanol extract 6 = Pet-ether extract 7 = watery extract

Figure 3. Antimicrobial test of different solvent extracts from leaves of *Hyptis suaveolens* (L.) Poit.

Discussion and Conclusion

Research on *Hyptis suaveolens* (L.) Poit was made from two aspects such as morphological study and antimicrobial study. The specimens were collected from Banmaw Township, Kachin State. It is an erect herb and commonly found in road sides. It belongs to the family Lamiaceae. Its Myanmar name is Taw pinsein. Because of this plant possess strongly aroma, it may have medicinal values.

Crude drugs are usually obtained from wild sources and are mostly collected by illiterate and unskilled people unaware of their botanical information, authentication and standardization parameters. This usually affects the safety of the final product. For safe and efficacious herbal medicine production, appropriate control of starting material is extremely crucial (Kumar, 2014). *Hyptis suaveolens* (L.) Poit. is a plant with potentially limitless uses and is of importance to properly establish a partial monograph for its correct identification. The morphological characters of *Hyptis suaveolens* (L.) Poit. mentioned in result were in accordance with those described by Backer (1968), Burkill (1935), Hooker (1881), Dassanayake (1981) and Hu-Qi-ming (2009).

In the antimicrobial activity, the leaves of *Hyptis suaveolens* (L.) Poit. were extracted with different solvents. The leaf extracts were used to carry out antimicrobial screening on *Aspergillus flavous*, *Bacillus subtilis*, *Candida albican*, *Escherichia coli*, *Pseudomonas fluorescens* and *Xanthomonas oryzae*. The result showed that ethyl acetate and water extract were effective against all of the test organisms. The highest activity (zone of inhibition in diameter is about 16 mm) was demonstrated by the ethyl acetate extract against *Escherichia coli*. Madigan (2005) stated that *Escherichia coli* causes urinary tract infection, cholera, diarrhea and vomiting. Therefore, it is recommended that the different components detected in leaves of this plant should be isolated and tested against the susceptible microorganism (*Escherichia coli*) in order to reach at the most potent structure. Further in-depth research has to be carried out to use the phytochemicals in pharmaceutical industry as a substitute for medicine. This review delivers a widespread assessment of indigenous medical uses, phytochemical components and an insight on its pharmacological expansions for its use as a therapeutic plant.

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