Original Research Article

J. Funct. Mater. Biomol. 8(1) (2024) pp 779 – 782

Journal of Functional Materials and Biomolecules

Journal homepage: www.shcpub.edu.in

ISSN: 2456-9429

COMPARATIVE STUDY ON PHYTOCHEMICAL ANALYSIS OF METHANOLIC, ETHANOLIC AND AQUEOUS EXTRACT OF *LEUCAS ASPERA* LEAF

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Received on 7 April 2024, accepted on 25 April 2024,
Published online on June 2024

Abstract

The manuscript deals with the phytochemical screening of *Leucas Aspera* Leaf methanolic, ethanolic and aqueous extracts. The phytochemical analysis shows the presence of carbohydrates, alkaloids, phenols, flavonoids, saponins, steroids, tannins, terpenoid, quinines in methanolic extract. The phytochemical analysis shows the presence of carbohydrates, alkaloids, phenols, flavonoids, steroids, tannins, quinines in ethanolic extract. The phytochemical analysis shows the presence of carbohydrates, flavonoids, steroids, tannins and quinines in aqueous extract.

Keywords: *Leucas Aspera,* Methanolic extract, Ethanolic extract, Aqueous extract and Phytochemicals.

1 Introduction

Human beings have used plants as medicine for diverse health issues for thousands of years. In traditional medicine plants are widely used in different countries (mostly in India) and are a source of various potent and powerful drugs [1]. *Leucas aspera* (family: Lamiaceae) is an herb erecting to a height of 15–60 cm widely distributed throughout the plains of India. The taxonomic classification and anatomy of this plant were well documented and discussed by many researchers [2] [3]. The major phytoconstituents present in the plants are terpenoids, fatty acids, nicotine, ursolic acid, glucoside, beta-sitosterol, sterols, diterpene, and phenolic compounds [4]. Herbal plants are integral parts of traditional medicine worldwide, and most of the rural and urban population uses these plants in many of their regular needs even today. The current researchers are more focused on natural chemicals than synthetic chemicals due to their environmental, economic, and health benefits. Plants produce many chemical compounds for its biological activities including defensive mechanism against microbes, insects, and herbivorous animals and these chemicals are called phytochemicals. Herbal plants are a natural source of many important phytochemicals and widely used in pharmaceutical, food, and cosmetic industries. A wide variety of herbal plants are available in the Indian subcontinent, and they are the backbone of Indian traditional medicinal system Ayurveda and Siddha [5]. In India, the herbs have always been the prime type of medicine such as Ayurveda, Homeopathy, Siddha, and Unani. Medicinal plants are the native heritage with universal importance. Natural product extracts are very important source of new drugs. In the ancient medical system, various parts of plants, namely bark, roots, buds, leaves, fruits, and latex are used to cure various ailments. Herbs and medicines derived from plants have been extensively used in traditional cultures all over the world and are popular in modern medicine as alternatives to produce new prospective natural therapeutic
compounds for aggressive diseases [6]. Herbal medicines are natural and are favored over synthetic remedies. Medicinal plants are the sources of a large number of combinations of herbs and modern medicine. Indian people have an incredible passion for medicinal plants, and they use them for a lot of health-related applications. Approximately 25,000 plantbased formulations are available in the ethnic medical texts. Furthermore, modern medicine contains a minimum 25% of drugs produced from the plants and artificial drugs manufactured on original compounds isolated from the plants. India is one of the richest medicinal herbal granaries in the world that is of remarkable modern application, ensuring health security to millions of people [7] [8] [9]. *L. aspera* is a *Leucas* genus and the family *Lamiaceae*. The species are widely distributed and known with different common names based on the region where it grows and known commonly known as “Thumabi”. *L. aspera* is found in all parts of India mainly in the Himalayas. Conventionally, it used as an antipyretic and insecticide. Flowers are known to possess insecticide, stimulant,

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diaphoretic, emmenagogue, expectorant, and aperient. Leaves of *L. aspera* are also used in psoriasis, rheumatism, and different types of chronic skin eruptions. Bruised leaves are applied externally in snakebites [9] [10].

2 Experimental Selections

2.1.Collection of plant material

The leaf of *Leucas Aspera* were collected from dhamaleri muthur, a village in Tirupattur district, Tamil Nadu. The leaf is washed with water and dried carefully in the absence of sunlight to remove the water molecules present in the leaf. The dried leaves are made into fine powder using blender. Then the fine powders are stored properly in an airtight container for future purpose.

Fig. 1 *Leucas aspera* plant leaves

2.1.1 Taxonamical classification

Kingdom	**:**	Plantae plant
Sub kingdom	**:**	Tracheobionta, vascular plant
Superdivision	**:**	Spermatophyta, seed plant
Division	**:**	Angiosperma
Class	**:**	Dicotyledonae
Subclass	**:**	Gamopetalae
Series	**:**	Bicarpellatae
Order	**:**	Tubiflorae
Family	**:**	Labiatae
Genus	**:**	Leucas

2.2 Extraction of sample

About 5gm of the fine powder of the leaf of *Leucas Aspera* are taken in a thimble which is placed in an overnight extractor for the purpose of extraction of phytochemicals present in the leaf. The extraction is carried out using methanol, ethanol & aqueous. The extracts obtained are collected separately and the solvents are evaporated using vacuum distillation and dried. The dried samples are stored in an airtight container for further analysis. [11].

2.3 Qualitative Phytochemical Screening

The qualitative tests were carried out in leaf of *Leucas Aspera* by adopting standard procedure [12,13]. The methanolic, ethanolic and aqueous extracts were screened for the presence of phytochemicals.

1. Test for alkaloids

Mayer's test: small portion of solvent free extract was stirred with few drops of diluted HCl and filtered. The filtrate was then tested for following colour test. (a) 1.36 gm of mercuric chloride was dissolved in 60 ml distilled water. (b) 5gms of potassium iodide was dissolved in 20 ml of distilled water (a) and (b) was mixed and the volume adjusted to 100ml with distilled water. Appearance of cream colour precipitate with Mayer's reagents showed the presence of alkaloids.

2. Test for flavonoids

Shinoda's test: 5 ml of 20% sodium hydroxide was added to equal volume of the extract. A yellow solution indicates the presence of flavonoids.

3. Test for steroids

Liebermann Buchard test: A small amount of sample is treated with 2ml of acetic an-hydride followed by the addition of 3ml of H2SO4 Solution. Color changes from violet to

green or blue indicates the presence of steroids.

4. Test for terpenoids

Salkowski Test: To 1ml of extract add 0.5ml of chloroform followed by a few drops of concentrated sulphuric acid, formation of reddish-brown precipitate indicates the presence of terpenoids.

5. Test for Saponins

Froth test: 5ml of extract is diluted with 20ml of distilled water and agitated for 10 minutes. Foam is formed which indicates the presence of saponins.

6. Test for Carbohydrates

Fehling test: Two milliliters of each plant extract were hydrolyzed with dilute HCl, neutralized with alkali, and then heated with Fehling's solution A and B. The formation of a red precipitate was an indication for the presence of a reducing sugar.

7. Test for tannins and phenolic compounds

Lead Acetate test: 10% lead acetate solution, 0.5g of the extract was added and shaken to dissolved. A white precipitate observed indicate the presence of tannins and phenolic compounds.

8. Test for glycosides:

Keller-Killani test: To 2ml of extract, glacial acid, one drop 5% ferric chloride and concentrated sulphuric acid were added. Appearance of reddish-brown color at the junction of the two liquid layers indicates the presence of glycosides.

9. Test for Quinones

Sulfuric acid test: One drop of concentrated sulfuric acid was added to 5 ml of each extract dissolved in isopro-

pyl alcohol. Formation of red color indicates the presence of quinones.

10. Test for Phenols

The sample solution is treated with few drops of 10% ferric chloride. Formation of blue or green colour indicates the presence of phenols.

11. Test for saponins

To 2ml of distilled water was added with the sample solution and shakes well. Formation of foams indicates the presence of saponins.

3. Results and Discussion

3.1 Phytochemical analysis of *Leucas aspera*

Alkaloids, glycosides, carbohydrates, flavonoids, saponins, and phenols, was the aim of the study A methanolic, ethanolic, aqueous extract of the *Leucas aspera* stem was used to analyse its phytochemical components. Finding the numerous phytochemicals, such as steroids, terpenoids.

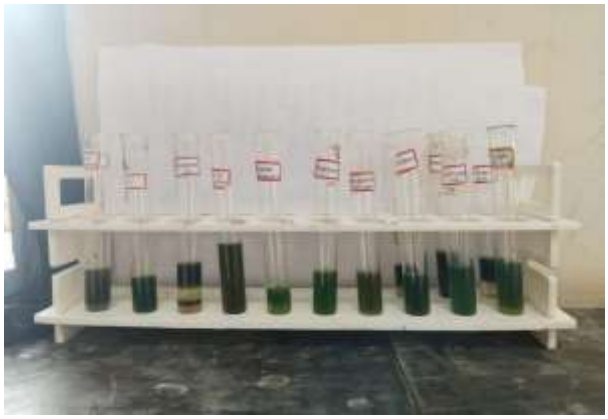

Fig. 2 Phytochemical analysis of methanolic extract of leucas aspera of leaf

The methanolic extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, alkaloids, phenols, flavonoids, saponins, steroids, tannins, terpenoid, quinines.

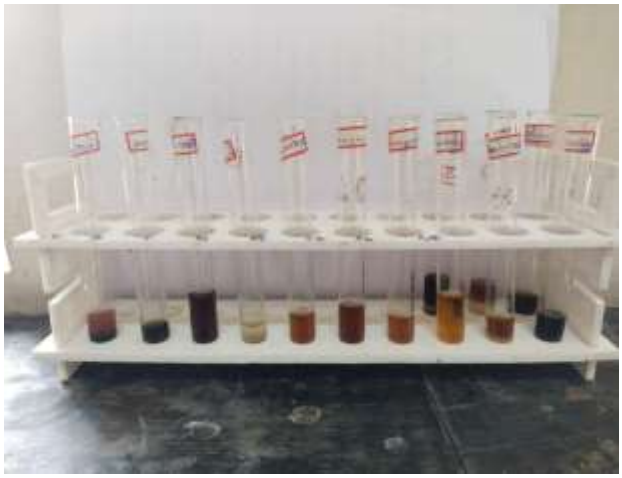

Fig. 3 Phytochemical analysis of ethanolic extract of leucas aspera leaf

The ethanolic extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, alkaloids, phenols, flavonoids, steroids, tannins, quinines.

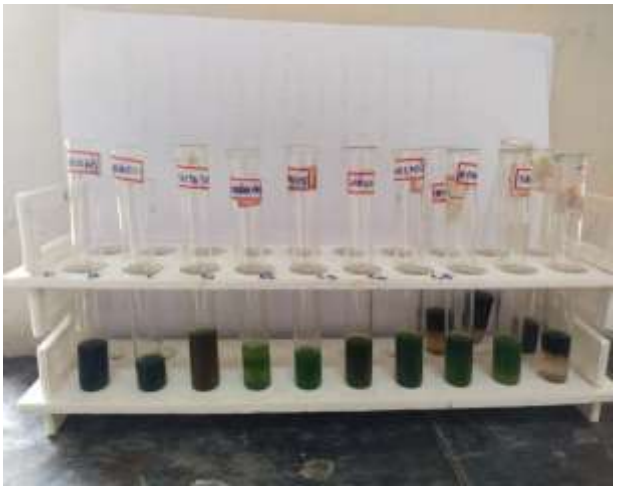

Fig. 4 Phytochemical analysis of aqueous extract of leucas aspera leaf

The aqueous extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, flavonoids, steroids, Tannins and quinines.

Table 1. Phytochemical analysis of methanolic, ethanolic, aqueous extract of *Leucas aspera* leaf

S. NO	PHYTCHEMICAL COMPOUNDS	METH-ANOL	ETHA-NOL	AQUE-OUS
1.	Carbohydrate	+	+	+
2.	Alkaloids	+	+	_
3.	Glycosides	_	_	_
4.	Phenols	+	+	_
5.	Flavonoids	+	+	+
6.	Saponins	+	_	_
7.	Steroids	+	+	+
8.	Tannins	+	+	+
9.	Terpenoids	+	_	_
10.	Quinones	+	+	+

Symbol (+) indicate positive and (-) indicate negative

4 Conclusions

The methanolic extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, alkaloids, phenols, flavonoids, saponins, steroids, tannins, terpenoid, quinones. The ethanolic extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, alkaloids, phe-

nols, flavonoids, steroids, tannins, quinones. The aqueous extract of *Leucas aspera* showed the presence of phytochemicals like carbohydrates, flavonoids, steroids, Tannins and quinines. Among the three extracts methanolic extract have more phytochemicals.

Acknowledgements

The authors would like to express their sincere thanks to the management, Sacred Heart College (Autonomous), Tirupattur for their constant support.

Conflict of Interest: Nil

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