

PHYTOCHEMICAL ANALYSIS OF *LEUCAS ASPERA*

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Abstract: Medicinal plants are the treasure house of potential drugs. They possess anti inflammatory, anti helminthic, anti pyretic, analgesic and anti cancer properties. *Leucas aspera* is one among them. It is commonly used as anti pyretic and insecticide since ancient times. The aim of the present study is to evaluate phytochemical analysis of the leaves of *Leucas aspera* in different solvents like methanol, ethanol, chloroform, petroleum ether and aqueous by both qualitative and quantitative analysis. The qualitative analysis shows the presence of alkaloids, steroids, flavonoids, terpenoids, saponins, carbohydrates, proteins and amino acids. The quantification of alkaloids, flavonoids and phenols were estimated. The results suggested that the plant *Leucas aspera* possess significant medically active compounds which can be used as the source for the production of new drugs in the field of medicine.

Key words- *Leucas aspera*, Medicinal plant, Leaves, Phytochemical screening

I. INTRODUCTION

Medicinal plants contain numerous biologically active compounds which are helpful in the treatment of various diseases and improving the life (Samy, *et. al.*, 2008). According to World Health Organization, approximately 80% of the population currently uses herbal medicine (Karthishwaran and Mirunalini, 2010). The prime reason is that the other systems of medicine have number of side effects. Plant based system of medicine does not possess serious problems. Plant medicines are used worldwide in the traditional treatment for many diseases (Vyas, *et. al.*, 2011). Plants contain natural phytoconstituents (Amrit pal singh, 2005). Medicinal plants are possessed to have various properties like antioxidant, anti inflammatory, anti cancer, anti diabetic, anti helminthic etc. One such traditionally used plant is *Leucas aspera*.

Leucas aspera is a perennial herb found commonly in tropical regions (Ai Lan Chew, *et. al.*, 2012). It is an herbaceous aromatic weed belonging to the family Lamiaceae and is known as “Thumbai” in Tamil and “Dronapushpi” in Sanskrit (Rai, *et. al.*, 2005). It is used as medicinal plant since ancient times. The whole plant is used to cure many human ailments. The leaves are used chronic rheumatism, psoriasis and other chronic skin eruptions (Rai, *et. al.*, 2005). Bruised leaves are used to treat snake bites. (Shirazi, 1947). The leaves are also used as insecticides and mosquito repellent in rural areas (Reddy *et al.*, 1993). The leaves are used to treat coughs, cold, and painful swelling (Kripa *et al.*, 2011).

The present study aims with the identification of the phytoconstituents of leaves of *Leucas aspera* in different solvents like methanol, ethanol, petroleum ether, chloroform and aqueous by qualitative and quantitative phytochemical screening.

II. MATERIALS AND METHODS

2.1 Collection of plant sample

The leaves were collected from Thiruverumbur, Tiruchirapalli, Tamilnadu, India.

2.2 Preparation of the extract

The leaves of *Leucas aspera* were washed thoroughly in tap water to remove dust particles. The leaves were then dried in shade at room temperature and coarsely powdered by a mechanical grinder. The dried powdered sample was soaked in methanol for 3 to 5 days. After 5 days, the extract was filtered using No.1 Whatman filter paper and stored in air tight container for further analysis.

2.3.1 Qualitative analysis of phytochemicals

Preliminary phytochemical screening was carried out by the method described by (Kokate, *et. al.*, 1986 and Harbourne, *et. al.*, 1980).

2.3.2 Test for alkaloids (Mayer's test)

To the 1ml of extract, 1 ml of Mayer's reagent (Potassium iodide solution) was added. Formation of whitish yellow or cream coloured precipitate indicates the presence of alkaloids.

2.3.3 Test for steroids (Liebermann Burchard test)

To the 1ml of extract, 2ml of acetic anhydride and 2ml of concentrated sulphuric acid were added. Formation of violet to blue or green colour indicates the presence of steroids.

2.3.4 Test for terpenoids (Salkowski test)

To the 1 ml of extract, 2ml of chloroform and few drops of sulphuric acid were added. Formation of reddish brown ring indicates the presence of terpenoids.

2.3.5 Test for flavonoids (Alkaline reagent test)

To the 1 ml of extract, few drops of dilute ammonium solution and few drops of concentrated hydrochloric acid were added. A yellow colouration indicates the presence of flavonoids.

2.3.6 Test for saponins (Froth test)

To the 1 ml of extract, 5 ml of distilled water was added and shaken vigorously. Formation of froth indicates the presence of saponins.

2.3.7 Test for phenols (Lead Acetate test)

To the 1ml of extract, 1 ml of lead acetate solution was added. Formation of precipitate indicates the presence of phenols.

2.3.8 Test for tannins (Lead acetate test)

To the 1ml of extract, 1ml of lead acetate was added. A formation of white precipitate indicates the presence of tannins.

2.3.9 Test for tannins (Ferric chloride test)

To the 1ml of extract, 1ml of ferric chloride solution was added. Formation of blue, black or brownish green colour indicates the presence of tannins.

2.3.10 Test for cardiac glycosides (Keller killiani test)

To the 1ml of extract, add 5ml of distilled water and evaporate it to dryness. Then to the Sample add 2ml of glacial acetic acid containing trace amount of ferric chloride solution. Then add 1ml of concentrated sulphuric acid to the sides of the tube. Formation of brown ring underlayed with blue colour indicates presence of cardiac glycosides

2.3.11 Test for aminoacids (Ninhydrin test)

To the 1ml of sample, add 3 to 4 drops of Ninhydrin solution was added and boiled in water bath for 10 minutes. Formation of purple or blue colour indicates the presence of amino acids.

2.3.12 Test for proteins (Biuret test)

To the 1ml of extract, 1ml of 40% sodium hydroxide solution and 2 drops of 1% copper sulphate solution were added. Formation of violet colour indicates the presence of proteins.

2.3.13 Test for carbohydrates (Barfoed test)

To the 2ml of extract, 1ml of Barfoed's reagent was added and boiled in water bath for few minutes. Formation of reddish brown precipitate indicates the presence of carbohydrates.

2.3.14 Test for reducing sugars (Fehling's test)

To the 1ml of extract, equal quantities of Fehling solution A and B were added and heated. Formation of brick red precipitate indicates the presence of reducing sugars.

2.4 Quantitative estimation of phytochemicals

2.4.1 Alkaloid determination

5 gm of sample was added to 200 ml of 10% acetic acid in ethanol in a beaker. The beaker was tightly covered and allowed to stand for 4 hours. This was filtered and the extract was concentrated on a water bath to one quarter of the original volume. The entire solution was precipitated by the drop wise addition of concentrated ammonium hydroxide solution. The precipitate was collected and washed with dilute ammonium hydroxide and filtered. The residue is alkaloid, which was dried and weighed (Harbourne, *et. al.*, 1980).

2.4.2 Flavonoid determination

10 gm of sample was added to 100 ml of 80% aqueous methanol in a beaker. The whole solution was filtered through Whatman filter paper No.42 (125mm). The filtrate was then evaporated to dryness and weighed (Harbourne, *et. al.*, 1980).

2.4.3 Determination of total phenols

Few grams of sample were boiled with 50 ml of ether for the extraction of phenols for 15 minutes. To the 5ml of extract, 10 ml of distilled water, 2ml of ammonium hydroxide solution and 5ml of concentrated amyl alcohol were added. The samples were left for 30 minutes. This was measured at 505 nm (Harbourne, *et. al.*, 1980).

III. RESULTS AND DISCUSSION

The qualitative phytochemical analysis of the leaves of *Leucas aspera*.is summarized in the Table 1. The quantification of important phytochemicals of the leaves of *Leucas aspera*.is summarized in Table 2. The methanolic extract of leaves shows the presence of high number of phytochemicals when compared with other solvents like ethanol, petroleum ether, chloroform and aqueous. It shows the presence of alkaloids, steroids, terpenoids, flavonoids, phenol, carbohydrates, saponins, and reducing sugars. Phytochemicals such as saponins, terpenoids, and alkaloids have hypoglycemic activities (Cherian and Augusti, 1995). The leaves show the presence of terpenoids and they play a major role in the treatment of intestinal disorders like diarrhoea and dysentery (Akinpelu and Onakoya, 2006). The leaves show positive result for phenols which can be act as antioxidants (Rumaisa, *et. al.*, 2013). The leaves also have flavanoids which can act as antioxidants. Phytochemicals have highest therapeutic efficiency in pharmaceutical field (Thilagavathi, *et. al.*, 2015). It helps to undertake further studies on isolation and identification of specific phytochemicals for pharmacological studies.

Table 1. Results of qualitative analysis of the leaves of *Leucas aspera*.

| TESTS | METHANOL | ETHANOL | PETROLEUM ETHER | CHLOROFORM | AQUEOUS |
|--------------------|----------|---------|-----------------|------------|---------|
| ALKALOID | + | + | - | - | + |
| STERIODS | + | + | + | + | + |
| FLAVONOIDS | + | - | + | - | + |
| TERPENOIDS | + | - | - | - | + |
| SAPONINS | + | + | + | + | + |
| PHENOLS | - | + | - | - | - |
| TANNINS | - | - | - | - | - |
| CARDIAC GLYCOSIDES | + | + | - | - | - |
| AMINOACIDS | - | - | - | - | - |
| PROTEINS | - | - | - | - | - |

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|------------------------|---|---|---|---|---|
| CARBOHYDRATES | + | + | - | + | + |
| REDUCING SUGARS | + | - | - | - | - |

Table 2. Results of quantitative analysis of the leaves of *Leucas aspera*.

| TESTS | METHANOL | ETHANOL | PETROLEUM ETHER | CHLOROFORM | AQUEOUS |
|------------------|-------------|-------------|-----------------|-------------|-------------|
| ALKALOID | 9.48 ± 1.18 | 7.59 ± 0.20 | 1.25 ± 1.67 | 0.52 ± 0.30 | 8.35 ± 1.03 |
| FLAVONOID | 8.43 ± 0.12 | 1.01 ± 1.54 | 7.85 ± 0.14 | 1.09 ± 0.12 | 8.15 ± 1.18 |
| PHENOLS | 2.33 ± 0.25 | 12.25 ± 1.3 | 2.09 ± 1.92 | 1.09 ± 0.12 | 1.72 ± 0.32 |

CONCLUSION

The qualitative and quantitative analysis shows that the leaves of *Leucas aspera* contain significant bioactive components such as alkaloids, steroids, terpenoids, phenols, tannins, proteins, flavonoids and saponins. The methanolic extracts are rich in phytoconstituents when compared with other extracts. Thus, the study reveals the presence of various phytoconstituents of the leaves of *Leucas aspera*. Further studies are being undertaken to isolate its phytoconstituents and to identify its medicinal properties in the field of medicine.

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