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Review Article

Leucas aspera And Its Economic Importance: A Review

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ABSTRACT

Herbal remedies and fragrant plants have played a pivotal role in traditional medicine systems for centuries. These plants are treasured for their natural compounds known as phytochemicals or secondary metabolites, which offer a range of benefits including affordability, effectiveness and minimal side effects in contrast to their artificial equivalents. Production of these plant- derived drugs varies across various organelles, tissues, and cells that make up the plant. Leucas aspera, family of Lamiaceae which is frequently referred to as Thumbai, used as an anti-arthritic agent, the leaves possess insecticidal action. The flowers are used as a stimulant. The plant extract was given with honey for the relieve of stomach pain. Saponins, oleic acid, palmitic acid, glucosides and tannins are extracted from various parts of the Leucas aspera. This extract possesses many biological activities such as antivenom, thrombolysis, antiulcer, anticancer, antimalarial and antidiabetic activity. The leaf paste was combined with arrowroot and applied on the damaged areas to treat injuries. The flowers are used as an asperients to relieve constipation and expectorant to treat cough. The floral arrangements are mixed along using honey as a remedy cough. Therefore, Leucas aspera is a source of medicinally bioactive compounds and exhibit wide variety of physiological effects.

INTRODUCTION

Plant secondary metabolites serve as invaluable sources of food additives and medications, flavours additionally various industrial compounds (Zhao et al., 2005). However, the current practice of isolating these phytochemicals from naturally grown plants has led to the overexploitation of wild plant populations, endangering several species with the risk of extinction over time. Leucas aspera Spreng, a member of the Labiatae family (Lamiaceae), commonly referred to as Thumbai and White dead

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nettle in English, holds significant importance in Indian traditional medicine systems. It is generally grown in India and Philippines. Leucas aspera typically thrives as a weed, emerging in field borders and waste areas during the rainy season (Chauhan,1999). However, its growth diminishes in the summer, leading to limited availability throughout the year. Plants which belong to this family are widely used as a traditional healer for curing diseases, in which the genus Leucas have an immense potential for discovery of new drug molecules (Chouhan and Singh 2011).

DISTRIBUTION

Leucas aspera is a medicinal herb in which it is distributed in India and Philippines and in the plains of Java, Africa and Tropical Asia (Prajapati et al., 2010). It is an annual herb which is commonly found in cultivated fields, roadway edges, sandy areas, and it grow as a competitive weed (Mominul Islam et al., 2014).

BIOACTIVE COMPOUNDS

Flavonoids and lignans are isolated from the plant contain prostaglandin, induces contractions and have an antioxidant activity (Sadhu et al.,2003). Alkaloids, tannins, flavonoids, phenolic acids and stilbenes found in these plants have more biological effects including antioxidant activity (Hartwell et al.,1982).

Leucas aspera also contains compounds such as Benzene acetaldehyde, Caryophyllene, Tetradecanoic acid, A- Caryophyllene (Humulene), Delthyl phthalate, Thymine, Glycerin, 1-(3 methyl butyryl) etc., (Anandan et al., 2012).

PHARMACOLOGICAL APPLICATIONS OF Leucas aspera

Leucas aspera is considered to be an important medicinal plant which possesses various pharmacological activities like Antivenom, anti-inflammatory, Hepatoprotective and Anticancer features etc. The bioactive compounds extracted from all sections of the plant, like flowers, the leaves and the stem are responsible for this activity.

1. ANTIFUNGAL ACTIVITY

Chloroform and petroleum ether extracts play an important role for the antifungal activity which act against fungi Trichophyton (Vijay kumar et al.,2016). Leucas aspera methanolic preparations have a greater antifungal property in opposition to Candida tropicalis, Penicillium spp., Epidermophyton floccosum, Microsporum gypsum (Babu et al.,2016). The extracts made of methanol from the Leucas aspera flowers, the alkaloidal residue has higher range of antifungal properties in opposition to many fungal species such as Aspergillus niger, Candida albicans (Mangathayaru et al.,2005).

2. ANTIOXIDANT ACTIVITY

Alcoholic extract from the Leucas aspera roots have a significant impact on the antioxidant property. The entire plant ethanolic extract had IC50 value of 99.58±22µg/ml when compared with the ascorbic acid which is in the range of 1.25±0.95µg/ml by using DDPH assay (Rahman et al.,2013). While compared to in vitro callus extract, the wild leaf extract has a better anti-oxidant property. The methanol-based extract of the root shown higher concentration of IC50 value of 6.552µg/ml for antioxidant activity (Chew et al., 2012). In 2010, Shashidharamurthy and colleagues, injected the triterpenoid extracted by using methanol at a dose of 75 mg per mouse, which results in the decrease in venom-induced antioxidant status and also the lipid peroxidase activity in different organs (Venkatesan et al., 2014).

3. ANTIMICROBIAL ACTIVITY

The ethanolic extract of Leucas aspera contains active components which act against bacterial strains. Extracts of Leucas aspera was tested for its ability to inhibit the expansion of Staphylococcus aureus, Salmonella sp, Escherichia coli, Listeria sp. The plant extract has shown maximum

inhibition on E. coli(16mm) among tested bacterial species followed by Listeria(11mm), S. aureus(8mm), Salmonella sp. (7mm). The root of the plant has shown antibacterial activity against many bacterial species such as the Escherichia coli, Shigella flexneri, Staphylococcus aureus (Chew et al.,2012). The root has more antibacterial activity against bacteria when compared to leaves and flowers. The stem of Leucas aspera also have antibacterial activity against Salmonella choleraesuis, Shigella flexneri, Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus (Lan et al.,2012). The leaves have bactericidal action against microorganisms classified as Gram positive and Gram negative such as Escherichia coli, Pseudomonas aeruginosa, Shigella flexneri (Chew and colleagues., 2012). The leaf extract in methanol has high antibacterial activity when compared to petroleum ether and ethanolic extract of leaves. The blossoms showed antimicrobial efficacy against many bacterial species such as the Salmonella choleraesuis, Pseudomonas aeruginosa and Escherichia coli (Chew and colleagues.,2012). The flower juice has higher range of antibacterial action against certain kinds of bacteria, including Bacillus subtilis, Escherichia coli and Klebsiella pneumoniae (Lan et al.,2012).

4. ANTI-INFLAMMATORY ACTIVITY

The whole plant cause degranulation of mast cells and found to have anti-inflammatory activities (Reddy et al.,1986). Based on the different extracts such as methanol, ethanol and aqueous extracts, the anti-inflammatory activity varies (Sundane et al., 2000).

5. LARVICIDAL ACTIVITY

The seeds, flowers and leaves of Leucas aspera have larvicidal activity in opposition to larvae of the Species of mosquitoes including Anopheles subpictus, Grassi, and Culex tritaeniorhyncus Giles (Kamaraj et al., 2009). Both pupicidal and larvicidal activity of Leucas aspera from the whole plant have been exhibited. The larvicidal activity have shown from the leaf extract against the mosquito species such as Aedes aegypti L. with Culex quinquefasciatus (Bagavan and collegues.,2010).

6. ANTIMALARIAL ACTIVITY

A Chloroquine-sensitive strain of Plasmodium falciparum is susceptible to the antiplasmodial action of leaves (Bagavan et al., 2010). Higher levels of antimalarial activity against Plasmodium falciparum are exhibited by the floral ethyl acetate extract.

7. ANTIHELMINTHIC ACTIVITY

The unrefined water-based leaf extract of Leucas aspera has shown the Anthelminthic effect by causing death of a worm at all concentration. Large variations in the worms' response to paralysis are caused by extracts at varying doses (e.g., 5, 25, 50, and 100 mg/ml). Different degree of helminthiasis is due to the level of tannins preset in compounds of plant extract. Tannins are the secondary metabolites and polyphenolic compounds in which it shows the property of antihelminthic activity.

8. ANTI-DIABETIC ACTIVITY

The ethanolic leaf extract have the capability to reduce the level of blood glucose (Tukaram and collegues.,2011). Leaves and stem methanolic extracts have high concentration of antihyperglycemic activity (Mannan et al.,2010).

9. ESSENTIAL OIL

The plant's essential oil that was extracted from Leucas aspera consists of large quantity of antimicrobial activity in opposition to Staphylococcus aureus and Candida albicans. The bacteriostatic activity present in the essential oil acts against the species of Escherichia coli, Proteus vulgaris and Shigella flexneri (Rao et al., 1971).

OTHER APPLICATIONS

Leucas aspera serves as a substitute for various ailments. According to Singh et al. (2002), Tiwari and Yadav (2003), Mahishi et al., (2005), Revathi and Parimelazhagan (2010), jaundice, anorexia,

cough, dyspepsia, and asthma, conjunctivitis, diabetes, otalgia, skin disorders, scabies, toothache and wound healing. It is widely utilized for its nutritional value and is consumed as a source of food in rural areas. The plant consists of high protein content (21.3%) (Chen and colleagues, 1979; Prakash and colleagues, 1988) as well substantial levels of the whole carotenoids and Beta-carotene (Rajyalakshmi & colleagues, 2001). It is also employed as an analgesic agent. Leucas aspera is a stimulant, expectorant, aperient, diaphoretic, antipyretic, and anti-rheumatic drug. Its leaves are known to exhibit insecticidal activity (Ganesan et al.,2007). Leaves of Leucas aspera are used for the treatment of psoriasis and skin eruptions. For snake bites, the bruised leaves are applied externally.

CONCLUSION

Traditional method of treating many diseases through plant extracts plays an important role across the world. The pharmacological value of Leucas aspera consists of many valuable compounds which can be used to treat to many diseases. The phytochemicals like flavonoids, lignans, glucoside, sterols and terpenes exhibit large quantity of therapeutic values. The plant extracts of Leucas aspera have antivenom, anti-inflammatory and antidiabetic activity. The compounds present in the Leucas aspera can be used as an ingredient in the antioxidant formulations in pharmaceutical fields. The methanol extract from the roots of Leucas aspera could be developed as a pharmaceutical product. Aqueous extract of Leucas aspera have a good anti-arthritic activity. The plant is applied in many fields such as cosmetics, food industries and nutraceutical products.

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