

## PHARMOLOGICAL ACTIVITY OF *LEUCAS ASPERA* (L.) EXTRACT - AREVIEW

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### ABSTRACT

*Leucas aspera* is a medicinal plant that has been traditionally used in various parts of the world for its therapeutic properties. This review provides an overview of the scientific literature on the phytochemical and pharmacological aspects of *L. aspera*. The plant has been reported to contain various secondary metabolites such as alkaloids, flavonoids, terpenoids, and phenolic compounds, which are responsible for its diverse pharmacological activities[1]. These activities include anti-inflammatory, antioxidant, antimicrobial, antidiabetic, anticancer, and hepatoprotective effects, among others. However, further studies are needed to fully understand the mechanisms of action of the plant's compounds and their potential use in modern medicine. Overall, the findings suggest that *L. aspera* has great potential as a source of natural medicines for the treatment of various diseases.

**Keywords:** *Leucas aspera*, anti-inflammatory, antioxidant and hepatoprotective effects.

### Introduction

The emergence of drug-resistant bacteria and the limitations of existing antibiotics have prompted researchers to explore alternative sources of antimicrobial agents. **Table 1** represents the Scientific Classification of *Leucas aspera*. Medicinal plants have been known for their therapeutic properties and have been used to treat various ailments since ancient times. *Leucas aspera*, also known as Thumbai (in Tamil), is a widely distributed plant in tropical and subtropical regions of the world[4].

**Table 1:** Scientific Classification of *Leucas aspera*

Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Asterids
Order:	Lamiales
Family:	Lamiaceae
Genus:	Leucas
Species:	<i>L. aspera</i>

It has been traditionally used in many parts of the world for its medicinal properties, including its antimicrobial activity [2]. **Figure 1** represents clear picture of *Leucas aspera* leaves and flowers.



**Figure 1:** *Leucas aspera* a clear representation of leaves and flowers

The aim of this review is to list out the available literature on antimicrobial activity of *Leucas aspera* and its potential use as a natural alternative to synthetic antibiotics. The review will provide an overview of the plant's phytochemistry, traditional uses, and its potential as an antimicrobial agent against a wide range of pathogenic microorganisms. It will also discuss the mechanisms of action of the plant active compounds and the possible ways to optimize its antimicrobial activity. This will be a valuable resource for researchers and clinicians interested in natural products and their potential use in the treatment of infectious diseases. It will also provide insights into the potential of *Leucas aspera* as a new source of antimicrobial agents to address the growing threat of drug-resistant [3].

**Methodology Extract preparation:** The plant's root, flower, leaf, and stem were processed through a grinder to create a powder. The 100 g of plant material was then individually steeped in 500 mL of 80% v/v methanol in a beaker for 4 days at room temperature [(26-28) °C]. Cheesecloth and Whatman filter paper were used for the filtration process to remove the dry plant pieces. A rotary evaporator was then used to further concentrate the filtrate. Each extract was put into a glass Petri dish. In order to create a solution with 2.0 mg/mL of extract, the dried plant extracts were then

redissolved in 80% (v/v) methanol. This solution was then utilised for assays [5].

**Antimicrobial activities:** Anti-fungal activity According to reports, *L. aspera* extracts in petroleum ether and chloroform effectively combat the fungi *Trichophyton* and *Microsporum gypsum*. The value for the lowest inhibitory concentration was 5 mg/MI[1].

**Antioxidant property:** Antioxidant property of *L. aspera* was reported by many researchers. The ethanolextract of *L. aspera* showed very potent antioxidant activity. Better antioxidant activity was observed in the petroleum ether extract of *L. aspera* leaf, and the order of the activity is petroleum ether > ethanol > isopropyl alcohol > ethyl acetate > chloroform. They also suggested ethanol or isopropanol (polar solvent selection) and petroleum ether (non-polar solvent selection) for better extraction of phytochemicals and phytoconstituents. Moreover, better antioxidant activity was observed in wild leaf extracts when compared to in vitro callus extract[6].

**Analgesic and Anti-inflammatory Properties:** *Leucas aspera* has been shown to possess analgesic and anti-inflammatory properties. The plant has been used to treat pain and inflammation associated with rheumatism, arthritis, and other musculoskeletal disorders. The analgesic effect of *Leucas aspera* may be due to the presence of bioactive compounds such as ursolic acid, betulinic acid, and oleanolic acid. The anti-inflammatory effect of the plant may be attributed to its ability to inhibit the release of pro-inflammatory cytokines such as interleukin-1 $\beta$  (IL-1 $\beta$ ), interleukin-6 (IL-6), and tumor necrosisfactor-alpha (TNF- $\alpha$ )[3].

**Antimicrobial Properties:** *Leucas aspera* has been shown to possess antimicrobial properties. The plant has been used to treat bacterial and fungal infections. The antimicrobial effect of the plant may be due to the presence of bioactive compounds such as lupeol, betulinic acid, and ursolic acid [7].

**Antipyretic Properties:** *Leucas aspera* has been shown to possess antipyretic properties. The plant has been used to treat fever and other febrile conditions. The antipyretic effect of the plant may be due to its ability to inhibit the production of prostaglandins, which are involved in the regulation of body temperature [2].

**Respiratory Ailments:** *Leucas aspera* has been used to treat respiratory ailments such as asthma, bronchitis, and cough. The plant has been shown to possess bronchodilatory and

expectorant properties, which may be attributed to its ability to relax the smooth muscles of the bronchioles and promote the expulsion of mucus from the respiratory tract [8].

**Digestive Disorders:** *Leucas aspera* has been used to treat digestive disorders such as indigestion, diarrhea, and dysentery. The plant has been shown to possess gastroprotective and antidiarrheal properties. The gastroprotective effect of the plant may be due to its ability to reduce gastric acid secretion and increase mucin secretion, which protects the gastric mucosa from damage. The antidiarrheal effect of the plant may be attributed to its ability to inhibit intestinal motility and reduce the secretion of fluids and electrolytes into the gut [3].

**Skin Diseases:** *Leucas aspera* has been used to treat various skin diseases such as eczema, psoriasis, and dermatitis. The plant has been shown to possess anti-inflammatory and antioxidant properties, which may help to reduce skin inflammation and oxidative stress [9]. Table 2 represents the pharmacological importance of *Leucas Aspera* and Table 3 depicts antimicrobial activity of *Leucas Aspera*.

**Table 2:** Pharmacological importance of *Leucas Aspera*

S.no	Tissue	Compound/Extract	Activity
1	Aerial parts	Hydroalcoholic extract	Arthritis, anti-arthritic activity"
2	Leaf	Hydroalcoholic extract	Hepatoprotective activity
3	Aerial parts	Methanol extract	Ulcer protective effect"
4	Aerial part	Ethyl acetate fraction	Anticancer activity "
5	Aerial part	A-amylase inhibitor	Diabetes
6	Leaves	Aqueous suspension	Anabolic effect
7	Roots	Methanol and petroleum ether extracts	Analgesic activity
8	Roots	Hydro-ethanol and aqueous extract	Chemoprotective effects
9	Roots	Nano-particles of <i>L. aspera</i>	Anticancer activity
10	Roots	Ethanol extract	Antiepileptic activity"
11	Whole plant	Ethanol extract	Cytotoxic activity
12	Whole plant	Aqueous and alcoholic extracts	Antiinflammatory action
13	Shoot system including stem, leaves and flower	Ethanol extract	Antiinflammatory action
14	Whole plant	Aqueous extract	Hepatoprotective
15	Leaf	Methanol Extract	Cytotoxic Activities"
16	Leaf	Ethanol extract	Antidiabetic activity
17	Leaf	Ethanol extract	Antidiabetic activity"
18	Whole plant	Methanol Extract	Antihyperglycemic activity"
19	Whole plants	Ethanol extract	Cytotoxic effect"
20	Root	Ethanol extract	Cytotoxic effect and antinociceptive activity"

21	Root	Ethanol extract	Central nervous system depressant activity
22	Leaf	Triterpenoid from methanol extract	Antivenom activity
23	Leaf	Methanol leaf extract	Antivenom activity"
24	Aerial parts	Ethanol extract	Antipsoriatic activity"
25	Aerial parts	Diterpenes	Activity Inhibiting Prostaglandin-Induced Contractions
26	Whole plants	Ethanol extract	Anti-inflammatory activity"
27	Whole plants	Methanolic extract	Anti-mutagenic activity"
28	Whole plants	Ethanol extract	Anthelmintic activity

**Table 3: Antimicrobial activity of *Leucas Asper***

S. No	Extract	Species found to respond Antimicrobial Activity
1	Ethanol extract	<i>Bacillus subtilis</i> , <i>Bacillus megaterium</i> , <i>Staphylococcus aureus</i> , <i>Salmonella typhi</i> , <i>Salmonella Paratyphi</i> , <i>Shigella dysenteriae</i> , <i>Vibrio cholera</i> , <i>Pseudomonas aeruginosa</i> , <i>Escherichia coli</i> , <i>Klebsilla sps</i> & <i>S.aureus</i>
2	Methanol extract	<i>Candida tropicalis</i> , <i>Candida albicans</i> , <i>Trichophyton mentagrophytes</i> , <i>Microsporium gypsum</i> , <i>Microsporium nanum</i> , <i>Aspergillus flavus</i> , <i>Epidermophyton floccosum</i> , <i>Penicillium sp.</i> <i>Bacillus cereus</i> , <i>B. megaterium</i> , <i>B. subtilis</i> , <i>P. aeruginosa</i> , <i>S. paratyphi</i> , <i>S. typhi</i> , <i>Shigella dysenteriae</i> , <i>Shigella sonnei</i> , <i>S. aureus</i> & <i>Klebsiella vulgaris</i> .
3	Choloroform extract	<i>V. cholerae</i> & <i>S. typhi</i>
4	Aqueous extract	<i>S. aureus</i> , <i>E. coli</i> and <i>P. aeruginosa</i> , <i>Salmonella mgulani</i> , <i>Salmonella bovis</i> & <i>Salmonella worthington</i>
5	Volatile oil	<i>P. aeruginosa</i> , <i>Haemophilus influenza</i> & <i>Candida albicans</i>

### Conclusion

The literature review suggests that *Leucas aspera* is a valuable source of natural compounds with a wide range of medicinal properties. The plant has been shown to possess analgesic, anti-inflammatory, antimicrobial, antipyretic, respiratory, digestive, and skin-related properties. Further research is needed to fully elucidate the mechanisms of action of the bioactive compounds.

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