



## Research Article

### Anti-Inflammatory Activity of Different Fractions of *Leucas Cephalotes* Leaves Extract

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#### Abstract

*Leucas cephalotes* (Labiatae) is an annual herb found in Uttarakhand and throughout India as a weed in cultivated fields, wastelands and roadsides. In the present investigation the phytochemical screening of the crude methanolic extract of leaves was done by conventional methods and anti-inflammatory activity of crude, alkaloid, aqueous, hexane, petroleum ether and non alkaloid fractions of the leaves were investigated using carrageenan induced rat paw edema method. The results showed that alkaloidal fractions of the leaves causes significant reduction in inflammation i.e 80 % (100 mg/kg) followed by crude methanol extract i.e 61 % (100 mg/kg) and aqueous extract i.e 58 % (100 mg/kg) as compared to standard anti-inflammatory drug aspirin i.e 68.62% (25mg/kg). However, non alkaloidal, hexane and petroleum ether fractions did not show any anti-inflammatory activity irrespective of the time intervals. Thus crude methanolic extract and alkaloidal fractions of leaves of the plant can be fully explored for its anti-inflammatory potential.

**Keywords:** *Leucas cephalotes*, anti-inflammatory activity, phytochemical screening.

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## INTRODUCTION

*Leucas cephalotes* (Labiatae) is an annual herb found in Uttarakhand and throughout India as a weed in cultivated fields, wastelands and roadsides. The juice of the leaves is used as local application for psoriasis, chronic skin eruptions and chronic rheumatism<sup>1</sup>. Anti-inflammatory and analgesic potential of various extracts of *Leucas aspera* Spreng was studied<sup>2-4</sup>. This study, therefore, intends to investigate the analgesic and anti-inflammatory activities of the leaves of *Leucas cephalotes* by studying the effects of different solvent extracts of the plant leaves on carrageenan induced inflammation in experimental animal models, in order to confirm the medicinal properties of the plant.

## MATERIALS AND METHODS

### Plant material

The leaves of *Leucas cephalotes* were collected from the local gardens of Dehradun (U.K), India and were authenticated by the Taxonomist at Botanical Survey of India (BSI), Dehradun (U.K), India.

### Preparation of leaves extract

Extracts were prepared in order to study their anti-inflammatory activity. The leaves were dried under shade and were ground to form the smooth powder. Aqueous, methanolic, petroleum ether and hexane extracts of the powdered material were prepared by soaking 20g of the material in various solvents for 72 h and after every 24 h, the mixtures were stirred with a sterile glass rod. After the completion of 72 h time period, the extracts were filtered with Whatmann filter paper no. 1 in order to obtain the filtrate. The filtrates were kept in water bath to obtain the crude extract<sup>5</sup>. Phytochemical screening was performed and alkaloidal fractions were screened.

### Animals

Male albino rats (180–200 g) were used taking into account international principles and local regulations concerning the care and use of laboratory animals<sup>6</sup>. The animals had free access to a standard commercial diet and water *ad libitum* and were kept in rooms maintained at 22 ± 1°C with a 12-h light/dark cycle. The institutional animal ethical committee has approved the protocol of the study.

### Carrageenan-induced edema in rats

Eight groups of five animals each were used. Paw swelling was induced by sub-plantar injection of 0.1 ml 1% sterile carrageenan in saline into the right hind paw.

**Table1: Anti-inflammatory activity of different solvent extracts of leaves of *Leucas cephalotes* (at 100 mg/ kg of plant extract)**

Paw volume (ml)  $\pm$  SD

Experi-ment	Control	Aspirin (25mg/kg orally)	Methanol extract (100 mg/kg)	Aqueous extract (100mg/kg)	Alkaloidal fraction (100mg/kg)	Non alkaloidal fraction
1h after treatment	0.25 $\pm$ 0.003	0.21 $\pm$ 0.003	0.23 $\pm$ 0.003	0.28 $\pm$ 0.003	0.20 $\pm$ 0.003	0.34 $\pm$ 0.003
2h after treatment	0.25 $\pm$ 0.003	0.18 $\pm$ 0.003	0.20 $\pm$ 0.003	0.24 $\pm$ 0.003	0.15 $\pm$ 0.003	0.34 $\pm$ 0.003
3h after treatment	0.25 $\pm$ 0.003	0.15 $\pm$ 0.004	0.18 $\pm$ 0.004	0.18 $\pm$ 0.004	0.13 $\pm$ 0.004	0.34 $\pm$ 0.004
4h after treatment	0.25 $\pm$ 0.003	0.13 $\pm$ 0.004 68.62 % inhibition of paw edema	0.14 $\pm$ 0.002 61 % inhibition of paw edema	0.16 $\pm$ 0.002 58 % inhibition of paw edema	0.11 $\pm$ 0.002 80 % inhibition of paw edema	0.34 $\pm$ 0.002

$\pm$  SD, Standard deviation

The different solvent extracts, alkaloidal and non alkaloidal fractions of *L. cephalotes* at dose of 100 mg/kg were administered orally 60 minutes before carrageenan injection. Aspirin (25 mg/kg) was used as reference drug. Control group received the vehicle only (10 ml/kg). The inflammation was quantified by measuring the volume displaced by the paw, using a plethysmometer at time 0, 1, 2, 3, and 4 h after carrageenan injection. The difference between the left and the right paw volumes (indicating the degree of inflammation) was determined and the percent inhibition of edema was calculated in comparison to the control animals.

### Statistical analysis

The results were expressed as mean  $\pm$  S.D. Statistical significance was determined by analysis of variance and subsequently followed by Turkey's tests. P values less than 0.05 were considered as indicative of significance. The analysis was performed using INSTAT statistical software.

## RESULTS AND DISCUSSION

### Carrageenan-induced edema in rats

The anti-inflammatory effects of the solvent extracts of *L. cephalotes* on carrageenan-induced edema in rat's hind paws are presented in Table 1. The anti-inflammatory activity of different fractions and extracts were found to have effect in dose-dependent manner. There was a gradual increase in edema paw volume of rats in the control group. However, in the test groups, methanol extract and alkaloidal fractions (100 mg/kg) showed a significant reduction in the edema paw volume followed by the aqueous extracts. There was no reduction in inflammation found in case of rats treated with petroleum ether, hexane extracts and non alkaloidal fraction. The results showed that alkaloidal fractions of the leaves causes significant reduction in inflammation i.e 80 % (100 mg/kg) followed by crude methanol extract i.e 61 % (100 mg/kg), aqueous extract i.e 58 % (100 mg/kg) compared to standard anti-inflammatory drug aspirin i.e 68.62% (25 mg/kg).

The values of reduction in paw volume,  $0.11 \pm 0.002$ ,  $0.14 \pm 0.002$ ,  $0.16 \pm 0.002$  and  $0.13 \pm 0.004$  were found significantly of alkaloidal fraction, methanol extract, aqueous extract and aspirin, respectively at 4 h after carrageenan administration. The present study provides evidence that the alkaloidal fraction and methanol extract of *Leucas cephalotes* acts as potent anti-inflammatory agent in rats in acute inflammation model. Carrageenan induced inflammation is most commonly used as an experimental model for evaluating the anti-inflammatory potency of compounds or natural products<sup>7</sup>. Our results are in accordance with the study<sup>4</sup> which described alkaloidal fraction and methanol extracts of leaves (100 mg/kg) of *Leucas aspera* Spreng as potent anti-inflammatory agent in carrageenan induced inflammation in wistar rats. Further studies are needed to isolate and identify some active compounds which might be responsible for anti-inflammatory activity.

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## REFERENCES

1. Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol III, Dehradun: Lalit Mohan Basu; 1991, pp: 2019.
2. Saundane AR, Hidayat Ull KM, Satyanarayan ND (2000). Anti-inflammatory activity and analgesic activity of various extracts of *Leucas aspera* Spreng. Ind J Pharm Sci. 262:144-146.
3. Srinivas K, Rao MEB, Rao SS (2000). Anti-inflammatory activity of *Heliotropium indicum* Linn. and *Leucas aspera* Spreng in albino rats. Indian J Pharmacol.32:37-38.
4. Goudgaon NM, Basavaraj NR, Vijayalaxmi A (2003). Anti-inflammatory activity of different fractions of *Leucas aspera* Spreng Indian Journal of Pharmacology. 35: 397-398.
5. Alade, PI and Irobi ON (1993). Antimicrobial activities of crude leaf extracts of *Acalypha wilkensisiana*. Journal of Ethnopharmacology.39:171-174.
6. Olfert ED, Cross BM, McWilliam AA. Canadian Council of Animal Care guide to the care and use of experimental animals. 2<sup>nd</sup> edition, Vol.1, 1993.
7. Winter CA, Risley EA and Nuss GW, 1962. Carrageenan-induced edema in hind paws of the rat as an assay for anti-inflammatory drugs. Proc. Soc. Exp. Biol. Med. 111: 544-52.