Antiinflammatory and Analgesic Activity of Various Extracts of *Leucas aspera* Spreng (Labiatae)

A.R. SAUNDANE*, K.M. HIDAYAT ULLA AND N.D. SATYANARAYAN
Department of Chemistry,
Gulbarga University, Gulbarga - 585 106, Karnataka, India

Accepted 14 February 2000
Revised 12 December 1999
Received 26 July 1999

Four different crude extracts petroleum ether, chloroform, ethanol and water of *Leucas aspera* Spreng were investigated for antiinflammatory and analgesic activities in albino rats and mice, respectively at a dose of 400 mg/kg body weight, orally. Ethanol and distilled water extracts exhibited significant antiinflammatory activity, whereas significant analgesic effect was shown by petroleum ether and ethanol extract when compared with respective controls and were comparable with those of standard drugs, diclofenac sodium and analgin.

From ancient times, medical treatment in India has relied to a large extent on the use of plants. *Leucas aspera* Spreng (Labiatae) is an annual herb found throughout India as a weed in cultivated fields, waste lands and road sides. This plant has long been used as an antipyretic in South India, juice of the leaves is used as an external application for psoriasis, chronic skin eruptions and painful swellings, flowers are given with honey for coughs and colds in children in North Bengal[1].

Literature survey revealed that the ethanol extract of leaves of *Leucas aspera* has been found to possess antibacterial activity[2], whereas chloroform and petroleum ether extracts possesses fungistatic as well as fungicidal activities[3]. Even though, there are few reports on the isolation of chemical constituents from the various extracts of *Leucas aspera*[4-7], so far very little is known about its biological activities. Therefore, in the present study, we report the antiinflammatory and analgesic activities of various extracts of *Leucas aspera*.

Whole plant of *Leucas aspera* was collected from the fields in and around Gulbarga (Karnataka) during September 1998 and authenticated at the Herbarium, Department of Botany, Gulbarga University, Gulbarga. The whole plant including roots, stems, leaves and flowers were shade dried and chopped into small pieces.

*For Correspondence

The chopped plant material was subjected to soxhlet extraction separately and successively with petroleum ether (60-80°), chloroform, ethanol (95%) and distilled water. The extracts were concentrated to dryness in a flash evaporator under reduced pressure and controlled temperature (40-50°). All the extracts were kept in a desiccator and stored in a refrigerator for pharmacological studies. The test doses were prepared in Tween-80 (1%) suspension in distilled water of each extract to get the desired concentration of the extract.

Antiinflammatory activity was evaluated by formalin-induced rat hind paw oedema method[8]. Albino rats of either sex weighing between 150-200 g were divided into six groups of six animals each. The first group served as the control and received vehicle only (Tween-80, 1%), second group of animals were administered with standard drug diclofenac sodium 150 mg/kg body weight, orally. The animals of the third, fourth, fifth and sixth groups were treated with petroleum ether, chloroform, ethanol (95%) and distilled water extracts of *Leucas aspera* at a dose of 400 mg/kg body weight, orally. A mark was made on both the hind paws just below the tibio-tarsal junction so that every time the paw could be dipped in the mercury column of plethysmograph upto the mark to ensure constant paw volume. After 30 min of above treatment an inflammatory oedema was induced in the left hind paw by injection 0.1 ml of formalin (1%, w/v) in the planter

TABLE 1 : ANTIINFLAMMATORY ACTIVITY OF VARIOUS EXTRACTS OF *LEUCAS ASPERA*

Group	Dose (mg/kg)	Mean±S.E. 1h	Paw volume 4h
Control (Tween-80)	—	0.17±0.005	0.17±0.005
Standard Diclofenac sodium	150	0.20±0.025	0.05±0.011*
Petroleumether	400	0.15±0.022	0.15±0.034
Chloroform	400	0.16±0.014	0.11±0.027
Ethanol	400	0.16±0.016	0.08±0.010*
Distilled water	400	0.20±0.025	0.06±0.010*

*Indicates significant difference at $P<0.001$ when compared to control.

tissue of the paw of all the animals. The right paw served as a reference to non-inflammed paw for comparison. The initial paw volume was measured plethysmographycally within 30 sec of the injection. The relative increase in the paw volume was measured in control, standard and treated groups, 4 h after formalin injection. The per cent increase in paw volume over the initial reading was also calculated. This increase in paw volume in animals treated with standard drug and the four extracts of *Leucas aspera* were compared with the increase in paw volume of untreated control animals after 4 h. Thus, per cent inhibition of paw volume in treated animals was used for calculating the per cent inhibition of oedema of the control group using the formula, % inhibition = (1-Vt/Vc) 100, where Vt and Vc are the mean relative changes in the paw volume of the test and control, respectively. The results are summarised in the Table-1.

Tail flick method[8] was followed for the evaluation of analgesic activity. Albino mice of either sex weighing between 25-30 g were randomly distributed in six groups consisting of five animals in each group. The first group served as a control group and animals were administered with vehicle (Tween-80, 1%), orally. The second group of rats were administered with standard drug analgin at a dose of 50 mg/kg body weight, orally. The animals of the third, fourth, fifth and sixth group were treated with petroleum ether, chloroform, ethanol and distilled water extracts, respectively at a dose of 400 mg/kg body weight, orally. The reaction time was noted at 15, 30, 45 and 60 min of time intervals after the drug administration. Per cent protection against tail flicking was calculated using the following formula, % protection = (1-Wt/Wc) 100, where Wt and Wc are the mean values of the tail flicking in the test and control groups, respectively. The results are recorded in Table-2. The data were analysed by student's 't' test and the level of significance was set at $P<0.001$.

In formalin-induced hind paw oedema test, statistically it was found that there was no reduction in the oedema in all the groups with test drug after 1 h, but at the end of 4 h, ethanol (95%) and distilled water extracts significantly reduced the paw volume, which is comparable to diclofenac sodium. While petroleum ether and chloroform extract did not show any significant antiinflammatory activity.

The results of analgesic activity of crude extract of *Leucas aspera* revealed that petroleum ether and ethanol (95%) extracts exhibited significant analgesic activity as compared to control group. Ethanol (95%) extract showed highly significant activity which is comparable to that of the analgin, whereas chloroform and distilled water extracts did not show any significant analgesic activity.

Thus, it can be concluded that, on preliminary screening of crude extracts of *Leucas aspera*, ethanol and distilled water extracts exhibited significant antiinflammatory activity, whereas only ethanol (95%) extract produced long term analgesia in the experimental animals. Pain,

TABLE 2 : ANALGESIC ACTIVITY OF VARIOUS EXTRACTS OF *LEUCAS ASPERA*

Group	Dose (mg/kg)	Mean time (In sec)±S.E. 15 Min	30 Min	45 Min	60 Min
Control (Tween-80)	—	3.8±0.20	3.8±0.20	3.6±0.24	3.4±0.24
Standard (Analgin)	50	5.4±0.50*	6.2±0.37*	8.0±0.31*	9.0±0.44*
Petroleum Ether	400	5.6±0.81	5.8±1.06	7.4±0.92	6.6±0.24*
Chloroform	400	4.0±0.31	6.6±0.92	8.4±0.67*	5.2±0.58
Ethanol	400	5.6±0.67	6.8±0.37*	6.2±0.37*	7.8±0.86*
Distilled Water	400	5.2±0.48	5.8±0.97	7.2±0.58*	6.0±1.14

*Indicates significant difference at P<0.001 when compared to control.

swelling and fever have been treated with *Leucas aspera* in the traditional system of medicine[1]. Thus, our results supports the analgesic and antiinflammatory activity of *Leucas aspera* as claimed in the Ayurvedic Literature.

REFERENCES

1. Kirtikar, K.R. and Basu, B.D., In; Indian Medicinal Plants, Vol III, Lalit Mohan Basu, Deharadun, India, 1991, 2019.
2. Shirazi, A.M.J., **Indian J. Pharm.**, 1947, 9, 116.
3. Thakur, D.K., Mishra, S.K. and Chowdhari, P.C., **Indian J. Animal Health.**, 1987, 26, 31.
4. Badami, R.C. and Patil, K.B., **J. Oil Tech. Assoc. India.**, 1975, 7, 82.
5. Pradhan, B.P., Chakraborthy, D.K. and Subba, G.C., **Phytochemistry.**, 1991, 29, 1693.
6. Mishra, T.N., Singh, R.S., Pandey, H.S. and Singh, S., **Phytochemistry.**, 1991, 31, 1809.
7. Mishra, T.N., Singh, R.S., Prasad, C. and Singh, S., **Phytochemistry.**, 1992, 32, 199.
8. Kulkarni, S.K., In; Hand book of experimental Pharmacology, 1st Edn, Vallabh Prakashan, Delhi, 1987, 63.