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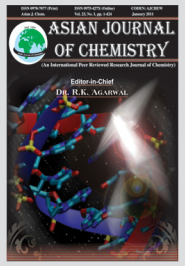

NOTE

Antiinflammatory activity of *Inula cuspidata* Leaf Extract

SOMESH THAPLIYAL[1,*], KAPIL KUMAR GOEL[2] and NIDHI GOEL[3]

[1]Department of Pharmaceutical Sciences, Hemwati Nandan Bahuguna Garhwal University, Srinagar-246 174, India
[2]Department of Pharmaceutical Sciences, Gurukul Kangri University, Haridwar-249 404, India
[3]Dev Bhoomi Institute of Pharmacy and Research, Dehradun-248 001, India

*Corresponding author: E-mail: shastrisomth@yahoo.co.in

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Inula cuspidata leaf powder was extracted with petroleum ether, chloroform, acetone, methanol and water using soxhlet apparatus. All the extracts were screened for the antiinflammatory activity by measuring the reduction in carrageenan induced hind paw edema. The potency of each extract was compared with each other and standard drug diclofenac sodium (5 mg/kg) for antiinflammatory activity. The maximum antiinflammatory activity was observed in water extract followed by petroleum ether, acetone extract, methanolic extract and chloroform extract.

Key Words: *Inula cuspidata*, Antiinflammatory activity.

Inula cuspidata is also known as Jhuri. It belongs to the family Asteraceae. *Inula cappa*, *Inula eupatorioides*, *Inula racemosa* are the major known species of this genus. *Inula cuspidata* is a small or medium sized deciduous or sub deciduous shrub of India found in the western Himalaya from Kashmir to Uttarakhand[1]. The aerial parts of *Inula cuspidata* are used for the treatment of respiratory[2], gastrointestinal, urinary disorder[3,4]. The essential oil of leaves possesses good antifungal activity against plant and human pathogenic fungi[5]. The biological screening of the plant extract showed anti-cancer activity. Isoquercitin, β-sitosterol and its β-D-glucoside, incaspitolides, geranyl linalool and squalene have been isolated from the aerial parts of the plants[4].

Collection of the plant: Clean and healthy leaves were collected from ascending region of Sahastradhara, Dehradun and authenticated by Dr. H.C. Pandey, Scientist of Botanical Survey of India, Dehradun.

Preparation of extract: The fresh leaves were dried at room temperature (25-30 ºC) for 15 days and powdered. Powder (150 g) thus obtained was extracted with various solvent like petroleum ether, chloroform, acetone, methanol and water using soxhlet apparatus[6,7]. The crude extracts obtained from petro-leum ether (7.0064 g, 4.67 %), chloroform (3.2263 g, 2.15 %), acetone (3.8314 g, 2.55 %), methanol (7.1015 g, 4.73 %) and water (40.3176 g, 26.87 %). The extracts were concentrated under reduced pressure, tested for various photochemical constituents and screened for their antiinflammatory activity.

Procurement of animals: Albino rats of Wistar strain (150-200 g) either sex were procured from central animal house of the institute. They were housed in standard polypropylene cages and kept under controlled room temperature (24 ± 2 ºC relative humidity 60-70 ºC) in a 12 h light and dark cycle. The rats were given a standard laboratory diet and water *ad libitum*. Food was withdrawn 12 h before and during the experimental protocols.

Antiinflammatory activity: The leaf extract of *Inula cuspidata* was evaluated for its antiinflammatory activity by carrageenan induced rat paw oedema method. The animals were divided into 7 groups, each comprising of 5 animals. Group I served as control and received normal saline solution (10 mL/kg P.O.). The group II served as standard and received diclofenac sodium (5 mg/1 mL/kg). III, IV, V, VI and VII received test drug in the dose of 100 mg/10 mL/kg. The drugs were given orally with the help of antiinflammatory oral cather. After 1 h an injection of 0.1 mL of 1 % solution of carrageenan was administered in the right hind paw of each rat. The paw volume was measured by plethysmograph (UGO, Basile, Italy) at 0 and 3 h after the carrageenan injection.The differences between the two readings were taken as the volume of edema and the percentage of antiinflammatory activity was calculated[8,9].

Values are expressed in ± SEM: n = 6 in each group. **p < 0.01 significant with respect to the control group.

Statistical analysis: All data were expressed as mean ± SEM. The results were analyzed by one -way analysis of variance (ANOVA), followed by Dennett's test. Differences between means were considered to be significant at $p < 0.01$.

The results of the animal experiment are shown in Table-1. In the acute inflammation model, the leaf extract of *Inula cuspidata* at different solvent at a dose of 100 mg/10 mL/kg p.o. showed significant reduction in the oedema volume which is comparable to the standard drug diclofenac sodium.

TABLE-1
ANTIINFLAMMATORY ACTIVITY OF DIFFERENT EXTRACTS OF *Inula cuspidate*

Treatment with	Dose (mg/kg)	Mean paw volume (mL) ± SEM 3 h	Inhibition (%) after 3 h
Control	10	0.206 ± 0.07889	–
Diclofenac sodium	5	0.064 ± 0.01854**	68.93
Petroleum ether	100	0.074 ± 0.01356**	64.07
Chloroform	100	0.090 ± 0.01095**	56.31
Acetone	100	0.080 ± 0.05692**	61.16
Methanol	100	0.084 ± 0.0101**	59.22
Water	100	0.072 ± 0.02561**	65.05

Carrageenan induced hind paw oedema is the standard experimental model of acute inflammation. Carrageenan is the phlogistic agent of choice for testing antiinflammatory drug as it is not known to be antigenic and is devoid of apparent systemic effect. Moreover the experimental models exhibit a high degree of reproducibility. Carrageenan induced oedema is a biphasic response. The first phase in mediated through the release of histamine, Serotonin and Kinin, whereas second phase is related to the release of prostaglandin and slow reacting substances which peak at 3 h.

The significant antiinflammatory effect of leaf extract of *Inula cuspidata* to be similar to that of diclofenac sodium, which could be related to its histaminic, Kinin and prostaglandin inhibitory activity. The present study concluded that the leaf extract of *Inula Cuspidata* selected for antiinflammatory activity has shown appreciable results which support the claim of local people and much work in this direction has to be done to confirm its utility in higher models.

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REFERENCES

1. P. Chauhan and V.K. Saxena, *Indian J. Pharm. Sci.*, **47**, 160 (1985).
2. R. Sahai, S.K. Agarwal and R.P. Rastogi, *Indian Drugs*, **42**, 100 (1981).
3. B. Ferdinand, P. Singh and J. Jakupovic, *Phytochemistry*, **21**, 157 (1982).
4. C.K. Kokate, Practical Pharmcognosy, Vallabh Prakashan, Delhi, edn. 6, p. 107 (2001).
5. D.S. Reeves, R. Wise, J.M. Andrews and L.O. White, Clinical Antimicrobial Assay, Oxford University, New York, pp. 24-25 (1999).
6. M.C. Marjorie, *Clin. Micro. Rev*., **12**, 563 (1999).
7. R.P. Rastogi and B.N. Mehrotra, Compendium of Indian Medicinal Plants, CDRI, Lucknow and PID, Delhi, Vol. 3, pp. 360-361 (1998).
8. A.E. Osmaston, A Forest Flora for Kumaon, Periodical Expert Agency, Delhi, pp. 301-302 (1978).
9. I.F. Satsyperova, S. Bobokhodzhaeva, A.G. Kotov, Beskaravainyi, A. Zinchenko, P. Khvorost and N.F. Komissarenko, *Rastitelmye Resursy*, **28**, 61 (1992).