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Antiinflammatory Activity of The Fruits of *Semecarpus anacardium* Linn.

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Inflammation is a response of vascularized living tissue to the local injury. It is the body's defense mechanism, which is closely intertwined with the process of repair. It serves to destroy or dilute the injurious agents and also reconstitute the damaged tissue by regeneration. The severe side effects of steroidal and non-steroidal antiinflammatory drug evoked us to search for new antiinflammatory drugs from the indigenous source. The methanolic, ethanolic, chloroform, ethyl acetate and pet ether extracts of fruits of *Semecarpus anacardium* Linn were tested to study the antiinflammatory activity using the technique of carrageenan induced paw edema in albino rats. The extract showed significant antiinflammatory activity comparable to the reference standard aspirin.

Key Words: *Semecarpus anacardium* Linn., Antiinflammatory activity, Fruits.

INTRODUCTION

Inflammation is a normal protective response to tissue injury caused by physical trauma, noxious chemical or microbial agents. It is the body's response to inactivate or destroy the invading organisms, to remove irritant and set the stage for tissue repair. It is triggered by the release of chemical mediators from injured tissue and migrating cell[1,2].

Modern research in the field of antiinflammatory drugs is directed towards developing potent antiinflammatory compounds with improved tolerability and reduction in other major side effects. Drugs from plant origin are used in India for treatment of many diseases in traditional system of medicine[3].

The purpose of this study was to evaluate antiinflammatory potential of methanolic, ethanolic, chloroform, ethyl acetate and pet ether extract of fruits of *Semecarpus anacardium* Linn.

Semecarpus anacardium Linn commonly known as 'marking-nut' or bhallataka. It is used as home medicine for antiinflammatory, antiarthritic activity, in treatment of amoebic dysentry and in treating wounds. It also has anticancer, antiamoebic and immunomodulatory activity. It is popularly known as Ardha Vaidya (multipurpose medicine)[4,5].

EXPERIMENTAL

The fruits of *Semecarpus anacardium* (Family: Anacardiaceae), were collected from local market of Kalbadevi, Mumbai and samples were authentificated by Zandu Pharmaceuticals Pvt. Limited, Dadar, Mumbai.

Preparation of extract: The collected drugs were cleaned, air dried and powdered. The dried drugs were exhaustively extracted in the Soxhlet apparatus (18 h of extraction for each batch) using analytical grade solvent. All the extracts were concentrated *in vacuo* to a syrupy consistency.

Preliminary phytochemical investigation: Various chemical tests were performed on the extracts of fruits of *Semecarpus anacardium* to determine the presence of carbohydrates, amino acids, alkaloids, proteins, glycosides, flavonoids, phenolic compounds, fats, oils, steroids and volatile oil[6].

Animals: Healthy male and female Wistar albino rats with body weight 150-250 g were used for study. They were fed with standard chaw diet and water *ad libitum*. They were housed in polypropylene cage maintained under standard conditions (12 h light/12 h dark cycles, 25 ± 3 ºC, 35-60 % humidity).

The experimental protocol was subjected to the scrutiny of the Institutional Animal Ethics Committee and was cleared by the same before starting.

Acute toxicity study: Healthy adult albino rats of either sex were starved overnight and divided into 5 groups, each containing 6 animals. Animals were orally fed with an increasing dose of 5, 50, 300, 2000 mg/kg body weight of aqueous and non aqueous extract of *Semecarpus anacardium*. After oral administration the animals were observed for signs of toxicity, gross behavioural changes and mortality upto 14 d.

Evaluation of antiinflammatory activity: All the extracts were evaluated for their antiinflammatory activity by the carrageenan induced rat paw edema method. Healthy adult albino rats of either sex were divided into 12 groups of 6 animals each. First group received normal saline, second group received aspirin and remaining group received 150 mg/kg body weight of each extract.

Food was withdrawn overnight, but adequate supply of water was given to the rats before the experiment. The drugs were given orally with the help of an oral catheter. After 1 h a sub plantar injection of 0.1 mL of 1 % freshly prepared carrageenan was given to the left hind paw to all the animals. The paw volume was measured with help of plethysmometer immediately after injection. The paw volume was measured after 1, 2, 3 and eventually after 4 h. The average fourth hour paw volume of the extract treated rats was compared with the control group and the standard drug (aspirin) group[7-9].

Statistical analysis: The results were expressed as mean ± SEM and evaluated by Dunnett multiple comparison test. Values of $p < 0.001$ were considered statistically significant.

RESULTS AND DISCUSSION

The extracts of fruits of *Semecarpus anacardium* showed significant reduction in rat paw edema volume at a dose of 150 mg/kg body weight which is comparable to standard drug aspirin. The reduction in the paw volume of rat with the time shown in Fig. 1. Results are as shown in Table-1.

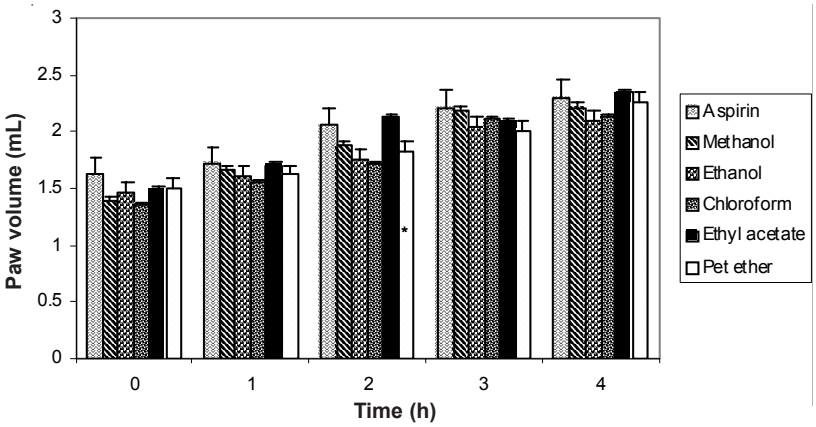

Fig. 1. Inhibition of carrageenan-induced hind paw edema at 0,1,2,3,4 h by standard aspirin and methanol, ethanol, chloroform, ethyl acetate, pet ether extract at dose 150mg/Kg body wt.*$p < 0.05$,**$p < 0.001$ as compared to control

TABLE-1
ANTIINFLAMMATORY ACTIVITY OF THE EXTRACTS OF FRUITS OF *Semecarpus anacardium* BY USING CARRAGEENAN INDUCED RAT PAW EDEMA METHOD (Dose of aspirin and all extracts is 150 mg/kg body weight)

Treatment	Mean difference in fourth hour paw volume ± SEM	% Inhibition at fourth hour
Normal Saline	1.230 ± 0.0450	-
Aspirin	0.673 ± 0.1560**	44.77
S. anacardium methanol extract	0.823 ± 0.0470**	33.33
S. anacardium ethanol extract	0.880 ± 0.0907*	31.71
S. anacardium chloroform extract	0.790 ± 0.0152**	35.77
S. anacardium ethyl acetate extract	0.850 ± 0.0305**	30.89
S. anacardium pet ether extract	0.790 ± 0.0871**	39.02

*$p < 0.05$, **$p < 0.001$ *vs.* Control (normal saline)

Indigenous drug system or Ayurveda can be source of variety of new drugs, which can provide relief from inflammation, but their claimed reputation has to be verified on a scientific basis. In some cases indigenous drugs may be the only answer because these drugs have minimum side effects and are easily available at low cost.

Semecarpus anacardium on preliminary phytochemical screening revealed variety of constituents like sugar, amino acid, alkaloids, saponins, tannins and some phenolic compounds. The activity might be attributed to these components[10,11]. Acute toxicity showed that aqueous and non-aqueous extract of aqueous and non-aqueous extract of *Semecarpus anacardium* was safe upto 2000 mg/kg body weight. The results revealed that the extracts of the fruits of *Semecarpus anacardium* showed statistically significant antiinflammatory activity at the dose level of 150 mg/kg body weight. The ethanol extract of *Semecarpus anacardium* showed moderate activity at the dose level of 150 mg/kg body weight in acute antiinflammatory model.

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REFERENCES

1. H. Mohan, Text Book of Pathology, Jaypee Brothers Medical Publication, edn. 5, pp. 133-158 (2005).
2. B.L. Bullock, Pathophysiology- Adoption and Alteration in Function, Little Brown & Company Publication, pp. 100-109 (1984).
3. K.M. Nadkarni, Indian Material Medica, Popular Prakashan, Bombay, Vol. 1, pp. 995-997 (1976).
4. K.M. Nadkarni, Indian Material Medica, Popular Prakashan, Bombay, Vol. 1, pp. 1118-1120 (1976).
5. Wealth of India-A Dictionary of Indian Raw Material and Industrial Products, National Institute of Science, CSIR, New Delhi Publication, Vol. 8, pp. 272-275 (1998).
6. K.R. Khandelwal, Practical Pharmacognosy, Nirali Prakashan, edn. 11, pp. 149-156 (2004).
7. H.G. Vogel and W.H. Vogel, Drug Discovery and Evaluation-Pharmacological Assay, Springer-Verlag Berlin Heidelberg, New York Publication, pp. 390-418 (1997).
8. A. Tawfeq, A. Mohamed, M.S. Al-Yahya, Al-Said and S. Rafatullah, *J. Biol. Sci.*, **7**, 1933 (2004).
9. A. Ahmadiani M. Jjavan, E. Barat and S. Semnanian, *J. Ethanopharmacol.*, **75**, 283 (2001).
10. D. Satynarayana, A.B. Joshi and K.S. Chandrashekher, *Indian Drug*, **41**, 405 (2004).
11. S.R. Chaudhari, M.J. Chavan and R.S. Gaud, *Indian J. Pharm. Sci.*, **66**, 454 (2004).

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