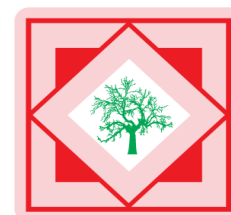




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Anti-inflammatory activity of *Artocarpus heterophyllus* bark

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ABSTRACT

Methanolic extract of bark of *Artocarpus heterophyllus* was evaluated for Anti-inflammatory activity on carrageenan induced models, in albino rats. The activity was found to be dose dependant. Overall results of this study suggest that the extract possesses significant anti-inflammatory activity.

Key Words *Artocarpus heterophyllus*, Methanolic extract, Anti-inflammatory activity, Carrageenan.

INTRODUCTION

Inflammation is a local response of living mammalian tissues to injury. It is a body defense reaction in order to eliminate or limit the spread of injurious agent. Anti-inflammatory are the drugs or medicines used to relieve swelling, pain and other symptoms of inflammation. These used to reduce the inflammatory response to infections agents, Trauma, Surgical procedures or in musculoskeletal muscle [1].

Artocarpus heterophyllus Lam, belonging to family- Moraceae, The jackfruit has played a significant role in Indian agriculture for centuries. Archeological findings in India have revealed that jackfruit is cultivated in India 3000 to 6000 years ago. Findings also indicate that Indian Emperor Ashoka the Great encouraged arbori-horticulture of various fruits including jackfruit. Varahamihira, the Indian astronomer, mathematician, and astrologer, wrote a chapter on the treatment of trees in his Brhat Samhita. His treatise includes a specific reference on grafting to be performed on trees such as jackfruit [2]. The bark is useful in fever, boils, wounds, skin diseases. The young fruits are acrid, astringent, carminative and tonic. The ripe fruits are sweet, cooling, laxative, and aphrodisiac and tonic the jackfruit is considered an invasive species in Brazil,

especially in the Tijuca Forest National Park in Rio de Janeiro. The seeds are dispersed by these animals, which allows the jackfruit to compete for space with native tree-species. Additionally, as the marmoset and coati also prey opportunistically on bird's eggs and nestlings, the supply of jackfruit as a ready source of food has allowed them to expand their populations, which has negatively impacted the local bird population. Between 2002 & 2007, 55662 jackfruit saplings are destroyed in the Tijuca Forest area in a deliberate culling effort by the park's management. Jackfruit has been cultivated since prehistoric times and has naturalized in many parts of the tropics, particularly in Southeast Asia, today it is an important crop of India, Burma, China, Sri Lanka, Malaysia, Indonesia, and Thailand. It is also grown in parts of Africa, Brazil, Suriname, the Caribbean, Florida, and Australia. It has been introduced to many Pacific islands since post-European contact and is of particular importance in Fiji, there is a large population of Indian descen [3]. A review of literature did not reveal any information on the anti-inflammatory studies. Hence in the present work anti-inflammatory activity of the bark extract of *Artocarpus heterophyllus* was studied.

MATERIALS AND METHODS

Plant material The bark of *Artocarpus heterophyllus* was collected from Gairatganj District Raisen (MP) in March and authenticated in Bhopal Institute of Technology & Science-Pharmacy Bhopal. A voucher specimen has been deposited in our laboratory for further reference.

Preparation of extract Collected bark were dried in shade and processed to a coarse powder. This powder was subjected to solvent extraction with methanol in a soxhlet apparatus. After exhaustive extraction, the methanolic extract was dried at low temperature under reduced pressure in a rotary evaporator to obtain greenish-black colored residue used for anti-inflammatory activity studies.

Anti-inflammatory activity Healthy Albino rats of either sex, weighing between 100-120 gm were selected for the studies. Rats were allowed to take standard lab feed, water and ad *libidum* in the animal house and were maintained in clean and hygienic conditions. For carrageenan induced rats hind paw edema model, rats were divided into 4 groups containing 6 animals per group. The experimental protocol has been approved by institutional animal ethical committee.

The control group was given a 1% sodiumcarboxymethylcellulose solution. Group II of animals received 5 mg/kg of diclofenac sodium, which was considered as standard. The experimental group III & IV were treated with 200 & 400 mg/kg of methanolic extract respectively dissolved in sodiumcarboxymethylcellulose solution. Doses were given orally with the help of an oral catheter. 0.1 ml of 1% solution of carrageenan was administered to the rats in to the planter surface of the right hind limb to induce paw edema. Paw volume was measured plethysmographically after 3 h of carrageenan injection and paw swelling in groups of treated were compared with control. Percentage inhibition of edema was calculated by using the following formula [4].

$$\% \text{ Inhibition} = \frac{V_c - V_t}{V_c} * 100$$

Where

V_t - mean increase in paw volume in rats treated with test compounds.

V_c - mean increase in paw volume in control group of rats.

Table 1. Anti-inflammatory Activity of *Artocarpus heterophyllus* bark Extracts against Carrageenan Induced Paw Edema in Rats

Group	Dose (mg/kg)	Mean paw volume(\pm S.D after 3 hrs)	% Inhibition of edema
Control	10 mg/kg	0.210 \pm 0.0095	—
Standard	5 mg/kg	0.060 \pm 0.0038	71.43%
Methanolic Extract	200mg/kg.	0.166 \pm 0.0078	20.95%
Methanolic Extract	400mg/kg.	0.108 \pm 0.0046	48.57%

(Mean \pm SD, n = 6)

P value < 0.05*

Statistical Analysis -Result were analysed by Student's t-test. The Minimum level of significance was fixed at P<0.05.

RESULT AND DISCUSSION

Anti-inflammatory activity of *Artocarpus heterophyllus* bark extracts against carrageenan induced paw edema is shown in Table 1. The methanolic extract at the dose level of 400 mg/kg body weight and diclofenac sodium at the dose of 5 mg/kg exhibit significant (P<0.05) anti-inflammatory activity whereas methanolic extract (200 mg/kg) did not show such significant activity when compared with carrageenan control.

CONCLUSION

Apart from modern medical therapy, the use of herbal drugs in the treatment of inflammatory diseases is a common practice in many countries of Asia including India and Bangladesh. A number of medicinal plants have been reported [5-7] to be effective against inflammatory, as they are used in traditional herbal practice. In Indian system of medicine certain herbs are claimed to provide relief of pain and inflammation. Carrageenan induced inflammation is a useful model to detect oral action [8] of anti-inflammatory agents. The development of edema [9] in the paw of the rats after the injection of carrageenan is due to release of histamine, serotonin and prostaglandin like substance. The significant activity of the methanolic extract and the standard drug observed in the present study may be due to the inhibition of mediators of inflammation such as histamine, serotonin and prostaglandin. The present study was undertaken to find out the scientific rationale factor responsible for anti-inflammatory activity.

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