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Antinflammatory Activity and Phytochemical Evaluation of *Annona Reticulata*

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Abstract: The present study was aimed to evaluate the anti-inflammatory properties of seed extracts of *Annona reticulata* in rats. The ethanol extract of *Annona reticulata* was extracted by using soxhlet extraction apparatus. The preliminary phytochemical studies revealed for the presence of alkaloids, phytosterols, fixed oil and fats, phenolic compounds and tannins, proteins and amino acids, flavannoids. The anti-inflammatory profile of this extracts was investigated on the basis of paw edema induced by carrageenan. The extract shows remarkable anti-inflammatory activity on compared with standard reference drug indomethacin. The ethanolic seed extract of *A.reticulata* (100mg/kg) significantly ($p< 0.001$) inhibits the inflammation of about 34.12% in paw edema induced by carrageenan and indomethacin (10mg/kg) inhibits about 35.13%. On the basis of these findings, it may be inferred that *A.reticulata* exerts anti-inflammatory activity at the second phase of carrageenan inflammation.

Key words: *Annona reticulata,* Seed extract, Phytochemical studies, anti-inflammatory activity, Carrageenan.

INTRODUCTION

Annona reticulata belongs to the family of *annonaceae* is native of West Indies naturalized in eastern and South India, A small tree, young branches tomentose the older glabrous, leaves membranous, 10-18 by 2.5-4cm oblong-lanceolate acuteon obtuse. Flowers 2-4, on lateral pedicles; pedicles about 12mm long elongating and becoming thick and woody in fruit.

The fruit is astringent, sweet, and useful in blood complaints it alleviates biliousness and thirst, and aggravates "Vata" and "Kapha" (Ayurveda). Unripe and dried fruits are used in diarrhea and dysentery. Leaves considered insecticide, anthelmentic and externally useful as suppurent.Leaves used against inflammation and tumor. Also used exhibited intropic positive chronotropic and spasmolytic activities. Root bark contains alkaloid, liriodenine and oxoushinsunine anonaine, michelalbine and reticuline.[1-5]. The availability of seeds is much and collection of plant material is easy. Based on the above facts the seeds of *Annona reticulata* was selected for the study. This study reports the effects of extract of *Annona reticulata* seeds against inflammation caused by carrageenan in wister albino rats.

MATERIALS AND METHODS

Preparation of Extract

The seeds of *Annona reticulata* were collected in Tiruchirappalli district where the plant is cultivated under natural condition and authenticated the same. The seeds of *Annona reticulata* were dried at shade at room temperature, pulverized by a mechanical grinder, sieved through 40 meshes. The powdered materials were extracted with ethanol using soxhlet extraction apparatus. The extract was concentrated under reduced pressure. The ethanol free semi-solid mass thus obtained was used for phytochemical studies and anti-inflammatory activities.

Animals

Albino rats (Wister Strain) of either sex weighing between 150-200gm B.W were used. They were individually housed under standard environmental conditions (25±3˚C and light dark cycles). Animals were used after one week of acclimatization in the departmental animal room. Animals were fed with rat feed and water ad libitum. The animals were divided into groups of three in six animals each and fasted for 12 hours before the experiment. The study is approved by IAEC.

Table I: Data Shows the Anti-inflammatory activity of seed extract of *Annona reticulata*

Groups	% Increase in Paw Volume (Mean ± S.E., n=6)							
	Post insult time of assay in minutes							
	0	60	120	180	240	360	480	% Inhibition of Paw Volume
Group 1 (Control)	65.5± 5.4	72.2± 6.4	84.9± 5.9	99.6± 8.9	109. 0± 7.3	108.6± 7.7	108.6± 6.9	NIL
Group 2 (Indom-ethacin 10mg/kg)	62.2± 3.9	66.6± 3.8	72.8± 3.4	70.5± 4.1	70.7± 2.8	71.5± 4.4	70.5± 5.6	35.13
Group 3 (***A.reti***-100mg/kg)	55.8± 3.5	63.6± 4.9	70.6± 5.4	71.6± 6.1	71.8± 4.4	71.6± 7.1	70.9± 6.8	34.12

All results expressed as Mean ± SEM from six observations P<0.001 Vs Control.

Phytochemical analysis

Ethanol seed extracts of *A. reticulata* were listed to determine the various phytochemical groups using standard methods [6, 7.] The anti-inflammatory properties of the plants may be attributed to the secondary metabolites present in it.

Anti-inflammatory activity[8]

The anti-inflammatory activity was studied by carrageenan induced hind paw edema method [9, 10, 11]. The dose of drugs administered to the different experimental groups, like control (Group 1) received 0.5ml of normal saline, standard (Group 2) received indomethacin (10mg/kg body weight) and test (Group 3) received seed extract of *A.reticulata* (100mg/kg body weight) by subcutaneously.5% w/v of acacia mucilage was used as a vehicle at a dose of 5ml/kg. The drugs were given, 1hour prior to the study. In all the groups, the inflammation was induced by single sub planter injection of 0.1ml of freshly prepared 1%w/v carrageenan solution in normal saline [9, 12] .Before injection of carrageenan,the average volume (Vo) of the left hind paw of each rat was calculated from three readings that did not deviate more than 3%. After injection of the carrageenan, readings (Vt) were obtained for each rat at the end of the zero minutes[13], 60min, 120min, 180min, 240min, 360min and 480min with the aid of a plethysmometer. The edema was expressed as an increase in the volume of paw, and the percentage of inhibition of inflammation [11, 14] for each rat and each group was calculated by new bould method [15.]

Statistical analysis

All values are presented as mean ± SEM. The percentage variation was evaluated for each group. Test of significance was statistically evaluated by student's t-test method[16,17].

RESULT AND DISCUSSION

The seeds of *A.reticulata* were selected to study the anti-inflammatory activity. The extraction process was carried with ethanol using soxhlet extraction apparatus after pulverizing and sieving through 40mesh. Then it was dried under reduced pressure. Its phytochemical evaluation reveals the presence of alkaloids, phytosterols, fixed oil and fat, phennolic compounds and tannins, proteins & amino acids, flavonoids. The effects of extract of *A.reticulata* on paw

edema induced by carrageenan are shown in the table-1. The seed extract showed (100mg/kg) significant inhibition of the edema. Edema which develops after the carrageenan administration is a biphasic event [1]. The initial phase is attributed to the realease of histamine and serotonin . The edema maintained between the first and the second phase is due to kinnin like substances[18]. The second phase is said to be promoted by the prostroglandin like substances. Carrageenan induces paw edema by inducing protein rich exudates containing a large number of neutrophils [19].It has been reported that the second phase of edema is sensitive to drugs like hydrocortisone, phenylbutazone and indomethacin [20].Indomethacin is a non-selective cyclooxygenase inhibitor [21]. Thus the investigated seed extract of *A.reticulata* exerts anti-inflammatory activity at the second phase of carrageenan inflammation. The result are significant ($p<0.001$) shown in table -I and are comparable to standard indomethacin. The above obtained evidence for the anti-inflammatory study verify objective of the present study.

CONCLUSION

In this study we concluded that the seed extract of *A.reticulata* is having good anti-inflammatory activity.

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