



## Evaluation of anti-inflammatory activity of *Borassus flabellife* root ethanolic extract

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### ABSTRACT

Various medicinal plants are used in traditional system of medicine to treat various diseases and many of these plants have been evaluated for their different pharmacological activities. *Borassus Flabellife* is one among them. The present study was planned to investigate Antiinflammatory effect of *Borassus Flabellife* ethanolic extract of root. Acute inflammation was produced by injecting 0.1 ml Of 1% suspension of carrageenan into left hind paw of rats. The change in paw volume and percentage inhibition of edema were calculated on each hour till 5 hour. Sub-Acute Inflammation was produced by cotton wool granuloma method. The weight of wet and dry cotton was recorded on 8th day after implantation of cotton pallet. The results of this study indicate the significant antiinflammatory activity of *Borassus Flabellife* against carrageenan induced acute inflammation and cotton wool induced sub-acute inflammation.

**Key words :** Ethanolic Extract of *Borassus Flabellife* (BFE); Antiinflammatory; Carrageenan; Cotton Wool apoptosis.

## INTRODUCTION

Inflammation is considered as a primary physiologic defense mechanism that helps body to protect itself against infection, burn, toxic chemicals, allergens or other noxious stimuli, an uncontrolled and persistent inflammation may act as an etiologic factor for many of these chronic illnesses<sup>1</sup>. Although it is a defense mechanism, the complex events and mediators involved in the inflammatory reaction can easily be induced<sup>2</sup>. The side effects of the currently available anti-inflammatory drugs pose a major problem during their clinical uses<sup>3</sup>. Therefore, the development of newer and more potent anti-inflammatory drugs with lesser side effects is necessary. *Borassus Flabellifer* Linn. (palmyra palm in English), is widely distributed and cultivated in tropical Asian countries such as Thailand, Bangladesh, India, Burma, Sri Lanka, Malaysia, etc. Traditionally most of the plant parts are used therapeutically in the treatment of various diseases. The plant is reported to have steroidal saponins, borassosides, dioscin, steroidal glycosides (one of them are  $\beta$ -sitosterol 3-O-  $\beta$ -Dglucopyranoside) and three known steroids (one of them are  $\beta$ -sitosterol)<sup>4</sup>.

## MATERIALS AND METHODS

### PLANT:

Roots of *Borassus Flabellifer* were collected from the surrounding area of Jaipur, in the month of Sept, 2014 which was authenticated by from dept. of botany, University of Rajasthan.

The collected stem barks were washed, cut into small pieces and dried in the sun for about a week. After drying the plant materials were kept in an oven at 40°C to ensure complete drying. The dried plant parts were finally ground into coarse powder and preserved in an airtight container for future use. Air-dried powdered material of the drugs was extracted in Soxhlet apparatus using petroleum ether 60-80<sup>0</sup> followed by alcohol (70%).

### ANIMAL:

Swiss albino Rats weighing 150-200g were acclimatized at least under standard husbandry conditions. The animals were free access to standard rat pellet, with water supplied *ad libitum* under strict hygienic conditions. Animals were habituated to laboratory conditions for 48 hours prior to experimental protocol to minimize if any of non-specific stress. The approval of the Institutional Animal Ethical Committee (IAEC) of Mahatma Gandhi College of

Pharmaceutical Sciences, Jaipur was taken prior to the start of experiments.

### EFFECT OF *BORASSUS FLABELLIFER* EXTRACT ON CARRAGEENIN INDUCED RAT PAW EDEMA:

Twenty (20) overnight starved Wistar albino rats (either sex) of 150-200 g were divided into 4 groups of five animals in each group:

Group I Normal control

Group II Treated with standard Diclofenac sodium 15 mg/kg p.o.

Group III Treated with test extract- 200 mg/kg p.o.

Group IV Treated with test extract- 300 mg/kg p.o.

All the animals were injected with 0.1 ml. of freshly prepared carrageenan suspension, into subplantar region of left hind paw to induce inflammation.

The acute inflammation was produced according to the method of Winter *et al.* (1962)<sup>5</sup> in all the test animals. The animals were received vehicle/test drug and diclofenac sodium orally and sixty minute later all the animals were challenged by injecting of 0.1 ml of 1% freshly prepared carrageenan suspension into the sub plantar region of the left hind paw. The paw was marked with ink at the level of the lateral malleolus and immersed in mercury up to this mark. The paw volume was measured plethysmographically before injection, immediately after injection and again at 1, 2, 3, 4 and 5 hours after challenge with carrageenan. The change in paw volume (compared to day 0) was calculated on each consequent observation hour for each group<sup>6-9</sup>.

### STATISTICAL ANALYSIS:

The values were expressed as mean  $\pm$  SEM from 5 animals. The results were subjected to statistical analysis by using one- way ANOVA followed by Tukey- Kramer test to calculate the significance difference if any among the groups.  $P < 0.05$  was considered as significant.

## RESULTS

After injection of carrageenan a progressive increase in paw volume was observed in the control group and found to be maximum at hour 4. After 4 h decrease in paw volume was observed. In hour 1 there was a significant reduction in paw volume was observed in group II ( $P < 0.001$ ) and group IV ( $P < 0.01$ ) animals, when compared to the control group. Animals of group III did not reveal significant reduction in paw volume, compared to the control group animals. In 2nd hour the animals of group II and group IV were showed significant ( $P < 0.001$ ) reduction in paw volume when compared to control group. The animals of group III did not showed reduction in paw volume compared to control group. In hour 3 a significant ( $P < 0.001$ ) reduction in paw volume of group II and group IV were observed when compared to the control group. The animals of group III did not show significant reduction in paw volume.

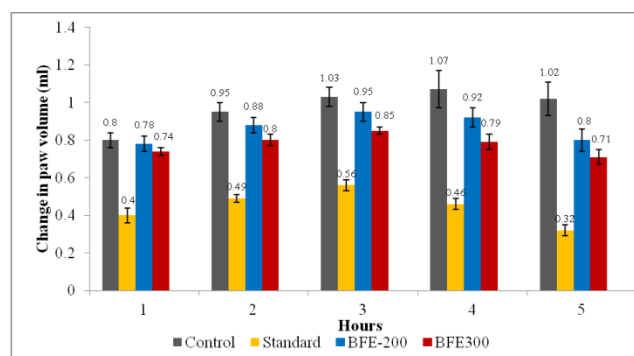
In 4th hour a significant reduction in paw volume of group II ( $P < 0.001$ ), group III ( $P < 0.01$ ) and group IV ( $P < 0.001$ ) were observed when compared to the control group. The animals of group II and group IV showed significant ( $P < 0.001$ ) reduction in paw volume when compared to control group in 5th hour. Animals treated with diclofenac sodium at dose of 15 mg/kg showed significant inhibition of biphasic response of acute inflammation produced by carrageenan. Animals treated with 300 mg/kg body weight showed significant inhibition of both phases of inflammation produced by carrageenan. But animals treated with 200 mg/kg b.w. suppressed only the second phase of carrageenan induced inflammation.

**Table 1. Effect of BFE on carrageenan induced acute inflammation in rats**

Groups	Treat ment	Mean change in paw volume (ml) $\pm$ SD				
		1h	2h	3h	4h	5h
I	Contr ol	0.80 $\pm$ 0.04	0.95 $\pm$ 0.05	1.03 $\pm$ 0.05	1.07 $\pm$ 0.10	1.02 $\pm$ 0.09
II	Diclofenac sodium (15 mg/kg)	0.40 $\pm$ 0.04***	0.49 $\pm$ 0.02***	0.56 $\pm$ 0.03***	0.46 $\pm$ 0.03***	0.32 $\pm$ 0.03***
III	BFE-200 mg/kg	0.78 $\pm$ 0.04	0.88 $\pm$ 0.04	0.95 $\pm$ 0.05	0.92 $\pm$ 0.05	0.80 $\pm$ 0.06
IV	BFE-300 mg/kg	0.74 $\pm$ 0.02**	0.80 $\pm$ 0.03***	0.85 $\pm$ 0.02***	0.79 $\pm$ 0.04***	0.71 $\pm$ 0.04***

Values are mean $\pm$ SD of six animals

\*\*\* $P < 0.001$ ; \*\* $P < 0.01$  when compared to control group.



**Figure 1. Effect of BFE on Carrageenan induced acute inflammation in rats**

## DISCUSSION

It is clearly evident from the study that *Borassus Flabellifer* ethanolic extract of root exhibit significant anti-inflammatory effect in albino rats. Results of two doses are also comparable with standard drug. All the above results support the uses of pant as anti-inflammatory. The carrageenan-induced paw edema in rats is believed to be biphasic<sup>10</sup>. The first phase is due to the release of histamine

or serotonin, and the second phase is caused by the release of bradykinin, protease, prostaglandin, and lysosome<sup>11</sup>. Therefore, it can be assumed that the inhibitory effect of the extract of *Borassus Flabellifer* on carrageenan-induced inflammation could be due to the inhibition of the enzyme cyclooxygenase, leading to the inhibition of prostaglandin synthesis.

The present study on extract of *Borassus Flabellifer* has demonstrated that this plant has significant anti-inflammatory properties, so it can be used in the treatment of various types of pains and inflammation.

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