ANALGESIC, ANTIPYRETIC AND ANTI-INFLAMMATORY ACTIVITIES OF *ALBIZIA LEBBECK* BENTH. SEEDS

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Summary

Objective: In the present study an attempt was made to evaluated analgesic, antipyretic and anti-inflammatory activity of seed of the *Albizia lebbeck* Benth. **Methods**: Acute toxicity study was performed in mice after administration of the extract orally in graded doses. Analgesic, antipyretic and anti-inflammatory activity was carried out on yeast induced pyrexia in rats, tail immersion model and carrageenan-induced rat paw edema model respectively at 100, 150 and 200 mg/kg doses. **Results:** The preliminary phytochemical screening of the extract showed the presence of flavonoid, alkaloids, glycoside, carbohydrates, steroids, protein

and amino acid. The ethanolic extract produced significant antipyretic effect in a dose dependent manner and an appreciable antipyretic effect was noticed at 200 mg/kg dose. A dose dependent analgesic activity and anti-inflammatory activity was observed and significant effect was observed at 200 mg/kg dose. **Conclusion:** The present study demonstrates the potential Analgesic, antipyretic and anti-inflammatory effect of *Albizia lebbeck* Benth further supporting the claims by traditional medicine practitioners.

Keywords: *Albizia lebbeck* Benth, seed, analgesic, antipyretic, anti-inflammatory, tail immersion, yeast induced pyrexia in rats, carrageenan-induced rat paw edema.

Introduction

Albizia lebbeck Benth (belonging to family: Mimosaceae) having an unarmed deciduous which is about 12-21 m high, bark pale with glabrous young shoot. The root is used in hemicrania. The bark is bitter, cooling, alexiteric, anthelmintic, cures "vata", diseases of the blood, leucoderma, itching, skin disease, piles excessive perspiration, inflammation, bronchitis, good in rat bite. The bark is given in opthalmia. The flowers are good for asthma and for snakebite. All parts of the plant are recommended for the treatment of snake-bite [1]. It is reported to possess nootropic [2, 3], anxiolytic [4], anticonvulsant [4, 5], antifertility [6] and antidiarrhoeal [7]. Different phytochemicals have been Isolated from beans which include albigenin — a triterpene [8] and albigenic acid —a triterpenoid sapogenin [9]. Albizia hexoside– a bioactive saponin isolated from bark [10].

Material and Method

Plant material

The seeds of *Albizia lebbeck* were collected in the month of March and April from Sultanpur, Uttar Pradesh and were authenticated by

CSIR recognized institute, National Botanical Research Institute, (NBRI) Lucknow.

Animals

Wistar strain albino rats of either sex weighing 120 to 150 g and wistar strain albino mice 30-50g were fed on standard diet and water ad libitum. The animals were housed at room temperature (25 ± 1 °C), relative humidity 45-55% and 12:12 hrs light/dark cycle. The Protocol followed was approved by Institutional Animal Ethics Committee (IAEC) under CPCSEA committee was taken before animal experimentation.

Preparation of extract

The seeds were dried, crushed to moderately coarse power, and stored in airtight container. The dried powdered drug was macerated using ethanol. The solvent from the extract was eliminated under reduced pressure, and dried extract was collected.

Acute toxicity studies

Acute toxicity study was carried out as per the guidelines set by Organization for Economic Cooperation and Development (OECD). 1/10th of the LD-50 was taken as therapeutic dose [11].

Analgesic Activity

Analgesic activity was determined by tail immersion model. The tail immersion method was used to evaluate the central mechanism of analgesic activity. Here the painful reactions in animals were produced by thermal stimulus that is by dipping the tip of the tail in hot water [12]. Albino wistar mice (25-30 g) were divided in 4 groups. Group I control received vehicle, group II received standard drug aspirin 100mg/kg, group III, IV and V received ethanolic extract 100mg/kg, 150mg/kg and 200mg/kg respectively.

Antipyretic activity

Antipyretic activity was carried out by Brewer's yeast induced pyrexia model. Pyrexia was induced in rats by injecting 20% (w/v) aqueous suspension of Brewer's yeast intramuscularly. After 18 h,

the animals developed 0.5^0C or more rise in the rectal temperature. They were distributed into different groups of 6 each and ethanolic extract in the doses of 100, 150 and 200 mg/kg was administered orally. One group was administered with paracetamol (100 mg/kg) orally. Control group was given 0.5 ml normal saline. At different time intervals, rectal temperature was noted [13].

Anti-inflammatory activity

Antipyretic activity was carried out by Carrageenan induced paw edema model. 1% solution of carrageenan was prepared and 0.1 ml of this solution was injected into right hind paw of the rats. Group I control received vehicle, group II, III, and IV received ethanolic extract 100mg/kg, 150mg/kg and 200mg/kg respectively. The paw volume was measured just before and 1, 2, 3, 4, 5 h after administration of carrageenan by the volume displacement method, using a plethismometer [14].

Statistical Analysis

Results are expressed as the mean ± S.E. One way Anova was used to analyze the significance of the results. 'p' values were considered statistically significant.

Results and Discussion

The preliminary phytochemical studies of the seeds of *Albizia lebbeck* showed the presence of flavonoid, carbohydrates, glycosides and alkaloids as the major phyto-constituents. For analgesic activity, tail immersion method was done, the ethanolic extract at the dose of 200mg/kg exhibited significant analgesic activity, when compared with the standard and the lower dose of the extract i.e. 100mg/kg. This particular method selected has various advantages; limited tissue damage is one of them. The results obtained from both standard aspirin (100mg/kg) and the *Albizia lebbeck* seeds extract (100mg/kg, 150mg/kg and 200mg/kg) treated groups were compared with the control (Table 1). In the screening of the antipyretic activity, ethanolic extract at the dose of 200mg/kg were exhibited significant activity. The yeast induced pyrexia is called pathogenic

fever, which is due to the production of prostaglandins (PGE2). The results obtained from both standard paracetamol (100mg/kg) and the *Albizia lebbeck* seeds extract (100mg/kg, 150mg/kg and 200mg/kg) treated groups were compared with the control (Table 2). In the anti-inflammatory studies, the value obtained showed a significant reduction in the growth of edema in the hind paw of the rats. The values at 100, 150 and 200 mg/kg were similar meaning that the activity is dosage dependent (Table 3).

Table 1. Effect *Albizia lebbeck* seeds extract on tail immersion method for analgesic activity

Treatment	Reaction time in hrs				
	0 hr	1 hr	2 hr	3 hr	4 hr
Control (normal saline)	3.27±0.22	3.45±0.36	3.56±0.56	3.20±0.18	3.17±0.36
Asprin (100 mg/kg)	4.47±0.22	4.69±0.20	6.27±0.42	6.15±0.27	5.97±0.32
Ethanolic extract of *A. lebbeck* (100 mg/kg)	4.87±0.12	4.91±0.42	4.67±0.29	5.27±0.02	5.07±0.39
Ethanolic extract of *A. lebbeck* (150 mg/kg)	4.67±0.032	3.97±0.28	4.57±0.12	4.86±0.46	5.07±0.36
Ethanolic extract of *A. lebbeck* (200 mg/kg)	4.81±0.19	4.27±0.35	5.47±0.21	5.68±0.25	6.17±0.34

Each value represents mean ±SEM of 6 rats.

Table 2. Effect *Albizia lebbeck* seeds extract on yeast-induced pyrexia model in rats for antipyretic activity

Treatment	Reaction temperature (^{o}C) before and after treatment				
	0 hr	1 hr	2 hr	3 hr	4 hr
Control (normal saline)	35.87±0.12	35.85±0.16	35.76±0.06	35.84±0.18	35.82±0.06
Paracetamol (100 mg/kg)	38.17±0.22	37.69±0.20	37.47±0.42	37.45±0.27	36.37±0.32
Ethanolic extract of *A. lebbeck* (100 mg/kg)	38.07±0.12	37.81±0.42	37.57±0.29	37.27±0.02	36.47±0.39
Ethanolic extract of *A. lebbeck* (150 mg/kg)	38.17±0.032	37.67±0.28	37.57±0.12	37.26±0.46	36.37±0.36
Ethanolic extract of *A. lebbeck* (200 mg/kg)	38.01±0.19	37.77±0.35	37.67±0.21	37.18±0.25	36.27±0.34

Each value represents mean ±SEM of 6 rats.

Table 3. Effect *Albizia lebbeck* seeds extract on carrageenan induced rat paw edema in rats for anti-inflammatory activity

Treatment	% increase in paw volumes (ml×100)(% inhibition)				
	0 hr	1 hr	2 hr	3 hr	4 hr
Control (normal saline)	70.7±.12	92.85±.46	105.26±.36	109.84±0.18	115.82±0.06
Ethanolic extract of *A. lebbeck* (100 mg/kg)	58.01±0.19	70.77±0.35	71.67±0.21	77.18±0.25	86.27±0.34
Ethanolic extract of *A. lebbeck* (150 mg/kg)	50.17±0.032	64.67±0.28	67.57±0.12	69.26±0.46	72.37±0.36
Ethanolic extract of *A. lebbeck* (200 mg/kg)	48.01±0.19	52.77±0.35	57.67±0.21	63.18±0.25	71.27±0.34

Each value represents mean ±SEM of 6 rats.

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