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**Research Article**

# COMPARATIVE IMMUNOMODULATOR ACTIVITY OF LEAVES AND BARK OF *ALBIZIA LEBBECK* (LINN.) BENTH.

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**ABSTRACT**

Adaptability is probably the most distinct characteristics of life which may be defined as sum of all non specific response of the body to any demands made upon it; fundamentally it was a physiological response; primary object of which was to maintain life & to re-establish the normal state. Immunomodulator activity of ethanolic and aqueous extracts of leaves and bark of *Albizia lebbeck* Benth. were investigated in Swiss albino mice by using swim endurance test and acetic acid induced writhing test model. The ethanolic and aqueous extracts of leaves and bark of *Albizia lebbeck* were administered to the experimental animals among which the ethanolic extract of *Albizia lebbeck* leaves have shown to be exhibit strong immunomodulator effect by increasing the swimming or survival time ($P<0.001$) and also decreased the writhing produced by glacial acetic acid ($P<.001$). The maximum increase in swimming or survival time was noted in mice receiving test and standard drugs which were significantly more than the control group animals. Test and standard drugs offered maximum protection against acetic acid induced writhes by reducing frequency of writhes per minute.

**Keywords:** *Albizia lebbeck*, Immunomodulator, Swim endurance.

## INTRODUCTION

Immunomodulatory agents are used to either suppress or stimulate the immune responsiveness of an organism against the invading antigens. Several plant products have been reported for immunomodulatory activity and many formulations of these plant products are available to enhance the immune system. Plants are the essential and integral part in complementary and alternative medicine. Plants have the ability of the formation of secondary metabolites like proteins, flavonoids, alkaloids, steroids and phenolic substances which are in turn used to restore health and heal many diseases[1-2]. The plant *Albizia lebbeck* Benth. (Mimosaceae) (Common name: Shirish) is reported to possess anti-asthmatic, antiseptic, antitubercular, antiepileptic, immunomodulator, anti-dysenteric, anti-inflammatory, antifertility and antidiarrhoeal properties. The main constituents of *Albizia lebbeck* are alkaloids, flavonoids, tannins, β-sitosterol, proteins and saponins. Traditionally *Albizia lebbeck* bark has been used as an immunomodulator

but no data is available regarding said activity in the leaves[3-10]. The aim of the present study is to scientifically compare the immunomodulator activity of leaves with that of bark, which has not been carried out yet.

**EXPERIMENTAL METHOD**

*Preparation of Plant Extracts*: The crude drug was washed, dried and powdered moderately coarse and sieved through sieve no. 60 and then subjected to successive solvent extraction with ethanol and water and filtered. The extracts obtained were concentrated under reduced pressure using Rota evaporator (Buchi, USA).

more than 3000mg/kg b.w. for the ethanol and the aqueous extracts of leaves and bark[11].

***Swimming endurance test:*** Swimming endurance test was carried out on a 21st days according to method described by standard monograph. Precaution was taken that mice should not be at rest at any particular place and should swim continuously. End point of the test is considered to be the point of exhaustion, when the animal remains floating passively in water in an upright position, making only small movements to maintain the head just above the water level[12].

**Table 1 Effect of *Albizia lebbeck* Benth. on Swimming Endurance and Writhing Response Test in Swiss Albino Mice**

| Treatment groups (oral) | Dose ( on the basis of body weight) by oral route | Mean Swimming time (in min.) | Frequency of writhes (per min.) | Onset of writhes (in min) |
|---|---|---|---|---|
| Control (Normal Saline) | 2 ml | 280.60±1.39 | 9.33±1.21 | 8.5±0.28 |
| Standard (AP-3000) | 30 mg/kg | 355.50±1.4** | 3.16±1.19** | 13.25±0.34** |
| Ethanolic extract (Leaves) | 500 mg/kg | 314.25±0.98* | 4.86±1.18* | 10.38±0.53** |
| Aqueous extract (Leaves) | 500 mg/kg | 287.32±0.87* | 6.66±1.32 | 9.23±0.85 |
| Ethanolic extract (Bark) | 500 mg/kg | 286.32±1.13* | 6.25±1.18 | 9.62±0.15* |
| Aqueous extract (Bark) | 500 mg/kg | 284.35±1.16 | 7.25±0.97 | 8.98±0.44 |

Values are mean ±SEM (n=6), P* <0.05, P*<0.01, P**<0.001 (Newman-Keuls test)
Acetic acid: 6% glacial acetic acid, 0.1 ml

***Animals:*** Adult male Swiss albino mice weighing 20 ± 5 g, six animals per group were used for the study. The animals were housed under standard laboratory conditions in polypropylene cages. Ambient temperature of 25±4°C, 55±2% relative humidity and 12h dark and light cycle was maintained. They were supplied with food and water *ad libitum*. The study was conducted in accordance with the protocol approved by the Institutional Animal Ethics Committee (CPCSEA). All groups of animals were treated with normal saline water, standard and test drugs (Table 1) for 21 days. Acute toxicity of all the extracts was determined by $LD_{50}$ values by staircase method which was

***Writhing test:*** At the end of 21st day, all the animals were administered with 0.1 ml of glacial acetic acid by intraperitoneal route. Onset of writhes and number of writhes were observed in all the groups[13].

**RESULTS AND DISCUSSION**

On the basis of swimming endurance test, the effect of ethanolic and aqueous extract of *Albizia lebbeck* Benth. leaves and bark respectively were compared. It was concluded that the ethanolic extract of leaves were having higher values with respect to bark extract in increasing swimming or survival time , hence leaves were found to exert more immunomodulatory effect. Test and standard drugs offered maximum protection against acetic acid induced

 

writhes by reducing frequency of writhes per minute. Similarly onset of writhes was found to be delayed significantly at level of ($P<0.001$) in test and standard drug treated animals.

***CONCLUSION*:** Both the test and standard drug treated mice group exhibited an increase in endurance time and also in chemical induced stress i.e. acetic acid induced writhes; test drugs were found to be significantly effective as frequency of writhes was decreased. A detailed investigation may be carried out to ascertain its exact mechanism of immunomodulating action.

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