

**COMPARATIVE STUDY OF ANTHELMINTIC ACTIVITY OF AQUEOUS AND
ETHANOLIC EXTRACTS OF *ALBIZIA LEBBECK* LINN**

Bhavana Madupoju^{*1}, Bhukya Nagaraju², Dr. Madireddy Mamata³ and R. Thirumuragan⁴

¹Assistant Professor, Department of Pharmaceutics, KL College of Pharmacy, KL Deemed to be a University, Guntur, Andhra Pradesh, India.

²Assistant Professor, Department of Pharmaceutics, Vijaya College of Pharmacy, Munaganoor, Hyderabad, Telangana, India.

³Associate Professor & HOD, Department of Pharmaceutical Analysis, Trinity College of Pharmaceutical Sciences, Bandarikunta, Peddapalli, Telangana (St), India, 505172.

⁴Principal, Niveditha College of Pharmacy, Chintamani, Chickballapur District, Karnataka, 563125.



***Corresponding Author: Bhavana Madupoju**

Assistant Professor, Department of Pharmaceutics, KL College of Pharmacy, KL Deemed to be a University, Guntur, Andhra Pradesh, India **Email ID:**

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ABSTRACT

Albizia lebbek, commonly known as Indian Siris, is a versatile and esteemed medicinal plant with a rich history of traditional uses as anthelmintic bronchitis, asthma, eczema and allergic rhinitis etc. The present study is an attempt to explore the anthelmintic activity of aqueous and ethanolic extract of bark of plant *Albizia lebbek* in a comparative study. The various doses of aqueous and ethanolic extracts were evaluated for their anthelmintic activities on adult Indian earthworms, *Pheretima postuma*. Both the solvent extracts were able to show anthelmintic activity at 10 mg/ml concentration. The activities are well comparable with the standard drugs, Piperazine citrate and Albendazole. All the doses of aqueous and ethanolic extract of *Albizia lebbek* showed better anthelmintic activity than the standard drugs. When the dose of the extract is increased, a gradual increase in anthelmintic activity was observed. Aqueous extract showed better anthelmintic activity in comparison to the ethanolic extract of *Albizia lebbek*. The data were verified as statistically significant by using one way ANOVA at 5 % level of significance ($p < 0.05$).

KEYWORDS: *Albizia lebbek*, Anthelmintic, *Pheretima postuma*, Standard drugs.

INTRODUCTION

Plants have a great relationship with human life, and most of them of economic importance, so it got the attention of scientists and researchers, the species *A. lebbek* belongs to the Legume family; sub family Mimosoidae. And grow in a wide range of climates, covering an annual rainfall range of 600 - 2500 mm, characterized by having rapid growth, the ability to fix nitrogen and improve soil structure.^[1] *A. lebbek* is a moderate to a large deciduous tree that reaches 18–30 m in height with 50 cm to 1 m in diameter. Leaves are found to be bipinnate having a length of 7.5–15 cm with 2-4 pairs of pinnae (50-100 mm long) and each pinna with 6–18 leaflets (up to 50 mm long). Lamina is pale green when young and gray-green at maturity, The trees remain leafless for a period of 1 to 5 months, depending on locality and the length of the dry season. Inflorescence an axillary cluster of 15-40 pedicellate flowers. Peduncle approximately 100 mm, pedicel 1.5-5 mm, corolla inconspicuous, free filaments many, 15-30 mm. The entire inflorescence is fluffy, 60 mm in

diameter, and yellow-green with a distinctive pleasant fragrance.^[2] The fruit is a pod, 15–30 cm in length and 2.5-5.0 cm in width, containing six to twelve seeds. The seeds are pale brown, ellipsoid-oblong, compressed, measuring 7 to 11 mm long and 6 to 9 mm broad, with a smooth hard seed coat. Seed weights average 7,000 to 11,000 per kilogram.^[3] The bark is 1.2 cm thick, variable in color from pale to dark brownish gray, with many short, irregular cracks, often with silvery patches on the branches, exfoliating in irregular thick woody scales. The inner bark is pink. The sapwood is white, large, and distinguishable from the heartwood, which is dark brown with lighter and darker streaks. The heartwood is coarse-grained, hard, elastic, strong, and durable. The species has been reported to contain a variety of phytochemicals, including protein, lipids, fiber, nitrogen-free extract, ash content, moisture, etc. it can be used as a good, cheap, and potential source for the supplement.^[4] The literature survey reveals that various parts of *Albizia lebbek* have been used as a folklore medicine for curing various ailments. There are no reports on systematic and

scientific study of anthelmintic activity of bark extracts. In the present study, we report the anthelmintic activity of aqueous and ethanolic extracts of the bark of *Albizia lebbek* and their comparative study.

MATERIALS AND METHODS

Plant collection and authentication

The plant material *Albizia lebbek* bark were collected from talakona region of Tirupathi and was authenticated by Dr. K. Madhava Chetty, Assistant Professor, Department of Botany, S.V. University, Tirupati, and Andhra Pradesh, A voucher specimen was kept in department for further use.

Preparation of extracts

The bark was soaked in distilled water, shaken for 4 to 5 hours and filtered. The filtrate was gently heated in heating mantle at 45°C to get a concentrated viscous solution. The viscous solution thus obtained was passed through muslin cloth. The coagulated mass was dried in hot air oven at 40-50°C for 2 to 3 hours. The dried product was grinded, powdered and passed through sieve (Sieve no 80) and the obtained aqueous extract powder was stored in an air tight container. The ethanolic extract was obtained by treating the above aqueous mucilage with 95% ethanol in the ratio 1:1 with continuous stirring. The coagulated mucilage which formed as a white mass floating on ethanol was transferred to an evaporating disc and treated successively with ethanol. The coagulated mass was dried in hot air oven at 40-50°C for 2 to 3 hours. The dried product was grinded, powdered and passed through sieve (Sieve no 80) and the obtained ethanolic extract powder was stored in an air tight container.

Biological activity

Healthy adult Indian earthworms, *Pheretima postuma*, due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings^[5-7], were used in the present study. All earthworms were of approximately equal size. They were collected from local place, washed and kept in water.

Drugs

The ethanolic extract of *Albizia lebbek* was tested in various doses in each group. Normal saline water was used as control. Piperazine citrate and Albendazole were used as the standard drugs for comparative study with aqueous and ethanolic extracts.

Experimental method

The method of *Nargund*^[8] was followed for the

screening of anthelmintic activity. Anthelmintic activity was evaluated on adult Indian earthworm, *Pheretima postuma*. Earthworms were divided into fifteen groups (5 each). The first group (I) served as normal control which received saline water only. The second (II) and third (III) groups received the standard drugs is Piperazine citrate and Albendazole at a dose level of 10 mg/ml. Groups (IV) to (IX) received doses of aqueous extracts of 10mg/ml, 15 mg/ml, 20 mg/ml, 25 mg/ml, 30mg/ml and 35 mg/ml respectively. Groups (X) to (XV) received doses of ethanolic extracts of 10 mg/ml, 15 mg/ml, 20 mg/ml, 25 mg/ml, 30 mg/ml and 35 mg/ml respectively.

Observations were made for the time taken to cause paralysis and death of individual worms for two hours. Paralysis was said to occur when the worms do not revive even in normal saline water. Death was concluded when the worms lost their motility followed with fading away of their body colors.

Statistical analysis

The data on biological studies were reported as mean \pm Standard deviation ($n = 5$). For determining the statistical significance, standard error mean and analysis of variance (ANOVA) at 5 % level significance was employed. $P < 0.05$ were considered significant.^[9]

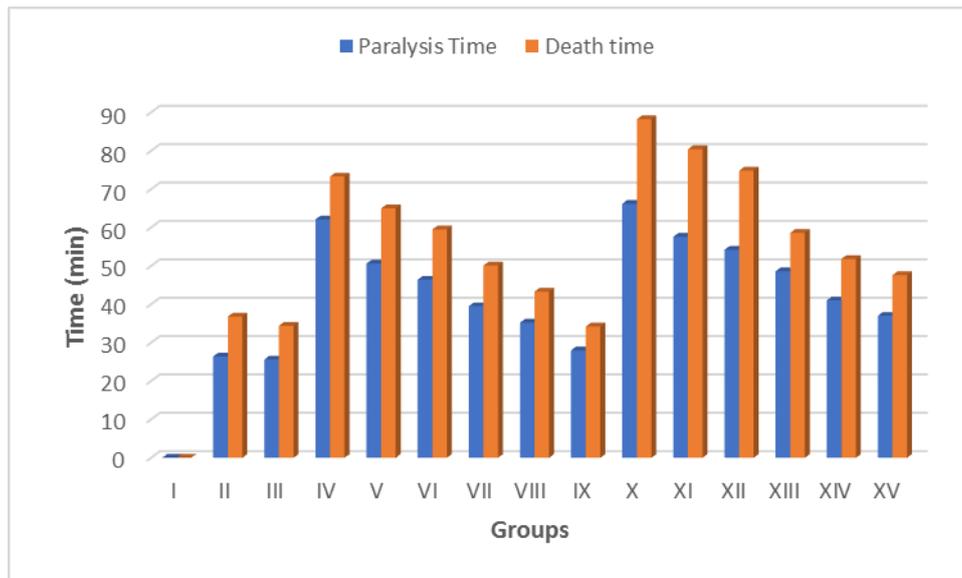
RESULTS AND DISCUSSION

The extracts of *Albizia lebbek* produced a significant anthelmintic activity in dose dependent manner as shown in Table 1. The anthelmintic activity of both aqueous and ethanolic extract was comparable with that of standard drugs. The normal saline water was used as a control. The activity shown by aqueous and ethanolic extracts is of considerable importance and has justified its use in controlling the disease causes by worms as reported by the tribal people. By employing one-way ANOVA, all data were found to be statistically significant at 5 % level of significant ($p < 0.05$). The extent of activity shown by the crude extracts was found to be comparable with both standard drugs Piperazine citrate and Albendazole which justifies its activity as shown in Fig 1. It could be concluded and confirmed that the aqueous and ethanolic extract of bark of plant *Albizia lebbek* is having anthelmintic activity. Aqueous extract showed better anthelmintic activity in comparison to the ethanolic extract of *Albizia lebbek*. Further studies are required to identify the actual chemical constituents that are present in the crude extracts of this plant which are responsible for anthelmintic activity.

Table 1: Anthelmintic activity of aqueous and ethanolic extracts of *Albizia lebbek*.

Groups	Groups	Dose (mg/ml)	Time taken for paralysis (min) (X \pm S.D.)	Time taken for death (min) (X \pm S.D.)
I	Control (Normal saline water)	-	-	-
II	Standard – 1 (Piperazine citrate)	10	26.4 \pm 0.45	36.8 \pm 0.52
III	Standard – 2 (Albendazole)	10	25.6 \pm 0.31	34.4 \pm 0.82
IV	Aqueous extract	10	62.1 \pm 0.83	73.3 \pm 0.83

V	Aqueous extract	15	50.6 ±0.62	65.0 ±0.69
VI	Aqueous extract	20	46.4 ±0.57	59.5 ±0.65
VII	Aqueous extract	25	39.5 ±1.08	50.1 ±1.10
VIII	Aqueous extract	30	35.2 ±0.69	43.3 ±0.69
IX	Aqueous extract	35	28.0 ±0.92	34.2 ±0.92
X	Ethanolic extract	10	66.2 ±0.63	88.2 ±0.63
XI	Ethanolic extract	15	57.6 ±0.52	80.4 ±0.89
XII	Ethanolic extract	20	54.2 ±0.67	74.8 ±0.75
XIII	Ethanolic extract	25	48.6 ±1.10	58.6 ±1.09
XIV	Ethanolic extract	30	41.0 ±0.63	51.8 ±0.66
XV	Ethanolic extract	35	37.0 ±0.89	47.6 ±0.82



Each value is represented as mean \pm standard deviation ($n = 5$). Standard error mean < 0.294 . Data are found to be significant by testing through one way ANOVA at 5 % level of significance ($p < 0.05$).

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