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Diuretic Activity of Methanolic Extract of *Albizia lebbeck*

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Short Communication

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ABSTRACT

The present study was investigated to establish the diuretic activity of methanolic extract of *albizia lebbeck in rats* using metabolic cages. The extract was administered to experimental rats orally at dose of 200 and 400mg/kg and Frusemide (20 mg/kg) was used as standard. The parameters evaluated for diuretic activity were urine volume, concentration of sodium, potassium and chloride ions. The rats treated with methanolic extract of *albizia lebbeck* revealed significant increase in the volume of urine, urinary concentration of Na^+, K^+ and Cl^- when compared to control group. Hence the plant has proved as diuretic.

INTRODUCTION

Man has been using herbs and plants products for combating diseases since times immemorial. Indian systems of medicine have a deep root in our culture heritage and cater to the Medicare of large sections of our population. These systems mainly use herbs. India unquestionably occupies the top position in the use of herbal drugs. It is one of the foremost countries exporting plant drugs and their derivatives. It also excels in home consumption. It is not at all surprising that herbal drugs are so prevalent in India given the great biodiversity and abundance of flora and the variety of geographical condition which allows the most exotic medicinal plants to be grown here [1]. *Albizzia lebbeck Benth*. (Leguminosae) is a deciduous tree with compound leaves, flat oblong fruits, round cream colored seeds, grow wild. The plant is found throughout India, Bangladesh, tropical and subtropical Asia and Africa [2]. Barks are used in toothache and diseases of the gum. Decoction of the leaves and barks are protective against bronchial asthma and other allergic disorders. Barks and seeds are astringent and are given in piles and diarrhea. Ethanolic extract of pods possesses antiprotozoal, hypoglycemic and anticancer properties. The methanolic extract of the pod was investigated for antifertility activity [3]. The plant extracts also evaluated in allergic rhinitis [4] and memory and learning of mice [5]. The present study thus attempts to evaluate the diuretic activity of leaf of *Albizzia lebbeck*.

MATERIALS AND METHODS

Plant Extraction and Phytochemical Screening

The dried and powdered leaves were subjected to preliminary phytochemical screening for qualitative detection of phytoconstituents. The dried and coarsely powdered leaves (250 g) were extracted successively with methanol extract in a soxhlet extractor by continuous hot percolation. Finally the crude extracts were analyzed for the presence of various phytoconstituents by following standard phytochemical tests [6] and the results were reported.

Animals

All the experiments were carried out using Wister rats 150-200 g. the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24 + 2°C and relative humidity of 30-70%. A 12:12 light: day cycle was followed. All animals were allowed free access to water and fed with standard commercial rat chaw pellets.

Acute Toxicity

The acute toxicity study was carried out as per OECD 425 Guidelines. Mortality in each group within 24 h was recorded. The animals were observed for a further 14 days for any signs for delayed toxicity. The methanolic extract of *albizia lebbeck* had good margin of safety and did not shown any lethal effects on the animals up to the doses of 2000mg/kg. Hence the LD50 of *albizia lebbeck* was considered as 2000mg/kg. Studies were carried out with 1/10 of the LD50 as effective dose 200mg/kg and double the effective dose 400mg/kg.

Diuretic Activity

The method of Lipschitz et al was employed for the evaluation of diuretic activity. The animals were divided into four groups (six in each) deprived of food and water for 18hrs prior to the experiment. On the day of experiment, the group I animals received normal saline (25ml/kg, p.o.). The group II animals received frusemide (20mg/kg, p.o.) the group III and IV animals received methanol extract of *albizia lebbeck* (200mg/kg, p.o. & 400mg/kg, p.o.) respectively. Immediately after the administration, the animals were kept in metabolic cages (two per cage) specially designed to separate urine and fecal matter and kept at room temperature. The total volume of urine was collected at the end of 24h. During this period no water and food was made available to the animals. The parameters accounted for ascertaining the diuretic activity are total volume of urine and urine concentrations of Na^+, K^+ and Cl^-. The $Na^+$and K^+were measured by flame photometry and Cl^-concentration was estimated by titration with silver nitrate solution using potassium chromate as indicator [7,8,9].

Statistical Analysis

Statistical evaluation was done by using one-way analysis of Variance (ANOVA) followed by Dunnett's test. P values <0.01 were Considered significant.

RESULTS

Phytochemical Screening

Preliminary phytochemical investigation of methanolic extract of *albizia lebbeck* showed the presence of alkaloid, carbohydrate, protein, tannins, flavonoids, and amino acids.

Diuretic Activity

The result of diuretic activity showed that the methanolic extract of *albizia lebbeck* at 200 and 400 mg/kg caused a dose dependent increase of urinary water and electrolytes concentration in normal rats. The results of extract and frusemide treated groups showed significant change in urine volume and electrolytes ($P < 0.01$) compared with control group.

Table 1: Diuretic Activity of Methanolic Extract of *Albizia lebbeck*

Group	Total urine (ml)	Total Na^+(meq/l)	Total K^+ (meq/l)	Total Cl^- (meq/l)
Group I	11.65±0.5	43±1.5	48±3.2	275±0.9
Group II	33.45±0.3*	132±1.7*	165±3.8*	1124±0.6*
Group III	22.51±0.5*	85±1.8*	98±2.8*	689±0.3*
Group IV	27.67±0.5*	115±2.5*	143±3.4*	985±0.3*

Significant (P <0.01) compared with treated groups Vs control.

DISCUSSIONS

As expected, frusemide produced a marked diuretic effect at a dose of 20 mg/kg as indicated by a significant increase in urine output. The drug frusemide mainly act on the luminal membrane of loop in kidney tubules and inhibit Na^+ K^+ Cl^- co-transporter thereby inhibiting the reabsorption of Na^+ K^+ Cl^- and also interfere with water reabsorption in proximal and distal convoluted tubules [10]. The

results of the present study show that significant increase in total urine volume in experimental rats, indicating that methanolic extract of *albizia lebbeck* might contain diuretic active components. Earlier studies confirmed that the plant having flavonoids like β sistosterol possess potent diuretic effect [11]. A probable reason is that the active ingredient in *albizia lebbeck* is responsible for its effect. There appears to be some correlation between in the urine volume and the electrolyte data in that the methanol extract not only increased urine volume but also enhanced electrolyte excretion to a higher level than control. This suggests that this extract has potent diuretic, like frusemide. Thus, the diuretic action of methanolic extract of *albizia lebbeck* may be by inhibition of Na^+ K^+ Cl^- co-transporter. Further studies like isolation and characterization of diuretic principle from the leaves of the plant is needed to confirm.

CONCLUSION

The Methanol extract were found to be active on the renal system in rodents. The data in the table allow the conclusion that the extracts revealed potent diuretic effect and the claim of the native practitioners that, the leaves possess diuretic effect, is justifiable.

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