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Research Article

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PRELIMINARY PHYTOCHEMICAL SCREENING ON BARK & PODS OF *Albizzia lebbeck* Linn

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ABSTRACT

In the current research work phytochemical screening of *Albizzia lebbeck* bark and pods were performed. The bark and pods were collected from the station road Sipri bazaar Jhansi. The bark and pods were shade dried and powdered. The powdered bark and pods were defatted with Petroleum Ether in Soxhlet apparatus and then extracted with absolute ethanol for 24 hours separately in Soxhlet apparatus**.** The percentage yield of bark was calculated as 8.38% w/w and the percentage yield of pods was 9.7% w/w. The results of preliminary phytochemical screening of the ethanolic extract of *Albizzia lebbeck (L)* bark revealed the presence of alkaloids, glycosides, steroids, flavanoids, saponins, tannins, carbohydrates & reducing sugar. The results of preliminary phytochemical screening of the ethanolic extract of *Albizzia lebbeck (L)* pods revealed the presence of proteins, glycosides, flavanoids, saponins, tannins, carbohydrates & reducing sugar. The total Ash value, acid insoluble ash, water soluble ash was calculated for bark and pods of Albizzia lebbeck. The moisture content of bark was calculated as 10.04±0.178 and of pods it was 5.65±0.654. The ethanol and water soluble extractive value was also determined for barks and pods.

Keywords: *Albizzia lebbeck*, phytochemical screening.

INTRODUCTION

Herbal medicines have the ability to affect body systems. The effects are dependent on the chemical constituents present in the plant used. Scientists first started extracting and isolating chemicals from plants in the 18th century and since that time we have grown a custom of looking at herbs and their effects in terms of the active constituents they contain. Encyclopedias provide details of all the main active constituents of the medicinal herbs featured and explaining their actions. *Albizzia lebbeck* is a tree, well known in the Indian subcontinent for its range of uses. Although geographically widespread, little is known about the species outside India. It appears to have potential for increasing pastoral production in extensive systems in the wet-dry tropics where the major problem is low feed quality of the basal diet, mature tropical grasses. *Albizzia lebbeck* addresses this problem in three ways: as a feed, as a supplement and by improving grass quality. The genus *Albizzia* comprises approximately 150 species, mostly trees and shrubs native to tropical and subtropical regions of Africa and Asia. The tree has been introduced as an ornamental and plantation tree throughout the tropics and subtropics.[1] Therapeutically bark is used in bronchitis; bark & seeds in piles; root in hemicranias; flowers in cough, bronchitis, tropical pulmonary eosinophilia & asthma.[2]

The seeds contain echinocystic acid & β- sitotosterol, leaves contain Quercetin, αβ- unsaturated carboxylic acid methyl ester, a triterpene saponin, Albigenic, albigenin, and Albiziahexoside, a new hexaglycosylated saponins.[3, 4, 5] The heartwood contains melacacidin & lebbeacacidin. The bark contain d-catechin leucocyanidin and condensed tannins (7-11%), acacic acid. The pods contain proteins, iron etc. The flowers contain benzyl acetate, benzyl benzoate and crocetin.[3] It has been reported that *Albizzia lebbeck* modulates both humoral and cell mediated immune responses in mice.[6] It has reported that *Albizzia lebbeck* have anti bacterial activity[7], analgesic and anti-inflammatory activity[8], antioxidant[9], anti-asthmatic and antianaphylactic[10], nootropic & anxiolytic activity[11] and anticonvulsant activity[12]. Only a few phytochemical studies have been reported on this plant in the literature and several therapeutic efficacies reported as above. The present investigation focus on phytochemical screening on bark & pods of *Albizzia lebbeck* along with other therapeutic application.

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MATERIALS AND METHODS

Collection and authentication of Plant material

The chemicals used in the experiment were of analytical grade. The bark & Pods of *Albizzia lebbeck* were collected from station road Sipri Bazaar Jhansi, Uttar Pradesh with the help of field botanist. The bark & pods of *Albizzia lebbeck* were authenticated by Dr Madhuri Modak, Professor of Botany Department, Motilal Vigyan Mahavidyalayas College Bhopal.

Extraction of the plant material and sample preparation

The bark & pods of plant was dried initially under shade. It was preserved in air tight containers and powdered as per requirements by a mechanical grinder. Dried and powered bark & pods were defatted firstly to remove fatty material

for this purpose 150 gm of weighed powered bark & 100 gm of weighed powdered pods of *Albizzia lebbeck* was packed in Soxhlet extractor separately and extracted with petroleum ether at 60-80°C for 36 hrs and completion of extraction was confirmed by pouring a drop of extract from the thimble on a filter paper, which does not show the presence of any oil spot. The marc of bark & pods were removed and dried, then they were subjected separately to continuous hot extraction with absolute ethanol in soxhlet apparatus for 24 hrs and completion of extraction was confirmed by pouring a few drop of extract from the thimble, left no residue on evaporation. After complete extraction the solvent was evaporated and concentrated to dry residue. The percentage yield was calculated.

Physical Evaluation

Physical investigations of bark and pods extract were carried out, including the determination of extractive values, moisture content and ash values.

Determination of Extractive values: This method determines the total solid content in a given amount of medicinal plant material when extracted with various solvents. For determining the extractive values, 5 gm of coarse powder of bark & pods of *Albizzia lebbeck were* macerated with 100ml of ethanol, & distilled water separately in a conical flask for 24 hours, shaking frequently during the first 6 hours and allowing standing for 18 hours. After there, filter rapidly taking precautions against loss of ethanol, & distilled water. Evaporate 25 ml. of the filtrate to dryness in a treated flat bottom shallow dish, dry at 105°C and weighed. The percentage of ethanol, & distilled water soluble extractive with reference to the air-dried drug were calculated separately. Results are depicted in table **1**.[3, 13]

Table 1. Physiochemical evaluation of bark & pods.

Parameters	Mean of *bark (n=3)* % w/w	Mean of *pods (n=3)* % w/w
Extractive Values		
Water soluble	16.52±0.521	15.06±1.026
Ethanol soluble	10.59± 0.362	12.23±1.065
Ash values		
Total	6.15±0.225	4.12±0.140
Water soluble	2.03±0.395	2.10±0.554
Acid insoluble	3.95±0.614	2.24±0.127
Moisture Content	10.04± 0.178	5.65±0.654

Determination of Ash values: A high ash value is indicative of contamination, substitution, adulteration or carelessness in preparing the crude drugs for marketing. For determining the total ash values, 2 gm of *bark & pods of Albizzia lebbeck* were taken in a tarred china dish, then it was subjected to incinerate under muffle furnace at 450°C. After cooling in a dessicator, the weight of white ash was taken to determine total ash value in % w/w. While determining the total ash at very high temperature (more than 600°C) may result in the conversion of carbonates to oxides. Acid insoluble ash is the part of total ash which is insoluble in acid. For determination of acid insoluble ash total ash was boiled with 25ml of 2M hydrochloric acid for 5 minutes. The insoluble matter was collected on Whattmann filter paper, washed with hot water & ignited. Cooled in a dessicator & weight was measured. The % of acid insoluble ash was calculated in % w/w.[3, 13, 14]

Water soluble ash was determined by taking total ash in a silica crucible & boiled with 25ml of water. After that insoluble matter was collected on Whattmann filter paper. The residue was ignited in crucible & cooled. Then the residue was weighed & water soluble ash was calculated on dry wt. basis by differentiates water insoluble ash from total ash. Results are depicted in table **1**.[3, 13, 14]

Determination of moisture content: The percentage of active chemical constituent in crude drugs is mentioned on air dried basis. Hence, the moisture content of a drug should be determined and should also be controlled. The moisture content of a drug should be minimized in order to prevent decomposition of crude drug either due to chemical change or microbial contamination. Drugs may contain excess of water. The presence of moisture is uneconomical. Also it will lead to proliferation of microorganisms. Moisture content of bark and pods were determined by subjecting the 2gm of each at 105°C. Cooled in a desiccators & weight was measured till the constant weight was achieved. Results are depicted in table **1**.[3, 13, 14]

Phytochemical Evaluation: The ethanolic and petroleum ether extract of bark and pods were subjected to preliminary phytochemical screening, as per the method given in WHO Guidelines and Ayurvedic Pharmacopoeia. Results are depicted in table **2** & **3**.[3, 13, 15]

Table 2. Phyto-constituents present in Bark extracts

S No	Phytoconstituents	Pt.ether extract	Ethanolic extract
1	Alkaloids	-	+
2	Carbohydrates	-	+
3	Glycosides	-	+
4	Saponins	-	+
5	Tannins	-	+
6	Flavanoids	-	+
7	Steroids	-	+
8	Fats & Oils	+	-

Table 3. Phyto-constituents present in Pods extracts

S No	Phytoconstituents	Pt.ether extract	Ethanolic extract
1	Alkaloids	-	+
2	Carbohydrates	-	+
3	Glycosides	-	+
4	Saponins	-	+
5	Tannins	-	+
6	Flavanoids	-	+
7	Fats & Oils	+	-
8	Protein	-	+

RESULTS AND DISCUSSION

The results of preliminary phytochemical screening of the ethanolic extract of *Albizzia lebbeck (L)* bark revealed the presence of alkaloids, glycosides, flavanoids, saponins, tannins, carbohydrates & reducing sugar while the ethanolic extract of *Albizzia lebbeck (L)* pods revealed the presence of proteins, glycosides, flavanoids, saponins, tannins, carbohydrates & reducing sugar. The percentage yield of *Albizzia lebbeck* bark extract Petroleum ether was 6.31%w/w, brown in color and the ethanolic extract was 8.38%w/w, brown in color. The percentage yield of *Albizzia lebbeck pods* extract Petroleum ether was 6.56% yellow in color and the ethanolic extract was 9.7% yellow in color. The ethanol soluble extractive value of bark & pods are 10.59±0.362 and 12.23±1.065. The water soluble extractive value of bark & pods are 16.52±0.521 and 15.06±1.026. The total Ash value of bark is 6.15±0.225, acid insoluble ash is 3.95±0.614 and water soluble ash is 2.03±0.395. The total Ash value of pods is 4.12±0.140, acid insoluble ash is 2.24±0.127 and water soluble ash is 2.10±0.554. The moisture content of bark is 10.04±0.178 and of pods is 5.65±0.654.

CONCLUSION

From the ongoing studies, it can be concluded that the

above determined parameters together may be used as tool for identification of *Albizzia lebbeck*. These phytochemical parameters are also helpful for standardization of the plant material in the quality determination. The phytochemical screening of the bark & pods of *Albizzia lebbeck* showed the presence of chemical compounds which suggests as plant may possess various pharmacological activities. Saponins are glycoside component often referred to as "natural detergent" because of their foamy nature. Saponins in bark and pods have been known to possess both beneficial & deleterious properties depending on their concentration in sample. Seiglar (1998) reported that saponins have anti-carcinogenic properties, immune modulation activity & regulation of cell proliferation as well as health benefits such as inhibition of growth of cancer cells & cholesterol lowering activity. In high quantities however they may lead to the rupture of blood vessels. Tannins reduce protein solubility by forming a complex with protein thereby causing a reduction in digestibility. The presence of phenolic compounds the plant is recommended as potential antioxidant, anti-inflammatory, immunomodulatory and lowering of blood pressure from natural resources.

REFERENCES

1. Dunn G M et al "Early tree and pasture growth in an agroforesty system evaluating *Albizzia lebbeck*, Casuarina cunninghamiana & Eucalyptus maculata in south-east Queensland" Tropical Grasslands. 1994; 28:170-181.
2. Kirtikar K R and Basu B D; Indian Medicinal Plants Published by Singh B and Singh M P, Dehradun, India 2nd ed. 1980; 936-938.
3. "Ayurvedic Pharmacopoeia of India" Vol 3 pp201-202.
4. Gupta S S et al "Prospects & perspectives of natural products in medicine" *Indian J of Pharmac* 1994; 26:1-12.
5. Jangwan J S et al. "New cytotoxic saponins of Albizzia lebbeck" *Indian Journal of Chemistry* vol. N49B, Jan 2010; 123-126.
6. Barua C C et al "Immunomodulatory effect of *Albizzia lebbbeck*" Journal of Pharmaceutical Biology. 2000; 38:(3)161-166.
7. Rashid A et al "Constituents of Albizzia lebbeck and antibacterial activity of an isolated flavones derivative". *Saudi Pharmaceutical Journal*. 2003; 11:(1-2)52-56.
8. Saha Achinto et al Analgesic & Anti-Inflammatory Activity of *Albizzia lebbeck*. *Pak J Pharm*. 2009; 22:(1)74-77.
9. Resmi C R et al Antioxidant activity of *Albizzia lebbeck* in Alloxan Diabetic Rats. *Indian J Physiol Pharmacol*. 2006; 5D(3)297-302.
10. Tripathi M R et al "Studies on anti-asthmatic & anti-anaphylactic activity of Albizzia lebbeck" *Ind J Pharmac.* 9(3)189-194.
11. Une H D et al Nootropic & anxiolytic activity of saponins of *Albizzia lebbeck* leaves. Pharmacology Biochemistry & Behavior. 2001; 69:439-444.
12. Vyawahare N S "Herbal anticonvulsants" *Journal of herbal medicine & toxicology* 2007; 1(1):9-14.
13. Anonymous, Quality Control methods for medicinal plant material (World Health Organization), 2002.
14. *Indian Pharmacopoeia*, Vol 3, Government of India, Ministry of Health and Family welfare. Ghaziabad: Indian Pharmacopoeia Commission, 2007.
15. Khandewal K R; Practical Pharmacognosy, Nirali Prakashan Pune. 2000; 149.