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**Research Article**

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**ANTIBACTERIAL ACTIVITY OF DIFFERENT EXTRACT OF *Albizia lebbek* STEM BARK****Chhimwal Jyoti\*, Sharma Anu, Saini Priyanka, Kabra Mahaveer, Bhandari Sanjay**

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**Received: 04 December, 2013****Revised and Accepted: 13 Jan 2014****ABSTRACT**

*Albizia lebbek* (family Fabaceae), is used as a medicinal plant and also finds its application in pharmaceutical industry which is attributed to a credible biologically active component present in stem bark. A study was conducted to explore antibacterial activity of *Albizia lebbek* different extract of stem bark (hexane, methanol, aqueous) on two bacterial species *S. aureus* and *E. coli*. It was found out that *S. aureus* was highly susceptible to aqueous and methanolic extract of *A. lebbek* whereas no activity was observed with hexane extract. In other hand *E. coli* was resistant to all above extracts.

**Keyword:** *Albizia lebbek*, Antibacterial activity, *E. coli*, *S. aureus*, infection, anti-inflammatory, Microorganisms, MTCC.

**INTRODUCTION**

*Albizia lebbek* is a fast-growing, medium-sized deciduous tree with a spreading umbrella-shaped crown of thin foliage and smoothish, finely fissured, grayish-brown bark. Depending on site conditions, annual height growth ranges from 0.5 to 2.0 m; on good sites, individual trees attain an average maximum height of 18 to 25 m and 50 to 80 cm d.b.h.[1,2]. The species grows well from sea level to 1500 m on sites receiving between 500 and 2500 mm annual rainfall and tolerates both light frosts and drought [2, 3]. While it grows poorly on heavy clay soils, it tolerates saline, sodic and lateritic sites. The tree grows best on moist, well drained soils[2,4].

*Albizia lebbek*, a valued timber species within its native Asian range, was previously exported to Europe under the trade name East Indian walnut [2, 5]. Its light yellowish-brown to light brown heartwood has a specific gravity of about 0.55 to 0.90 and is coarse-grained, strong, and relatively durable. It seasons and works well and is used for furniture, flooring, veneer, paneling, carving, posts and a variety of agricultural implements. The cut bark yields a reddish-brown gum that is used as a substitute for gum Arabic obtained from *Acacia Senegal* Wild[6]. Its leaves, seeds, bark, and roots are all used in traditional Indian medicine [7]. In its native range, the species is sometimes planted as a shade tree in coffee, tea, cardamom, and cacao plantations. It is also pollarded to use as a host for the lac insect [3, 8].

There are also lots of data on therapeutic properties of *Albizia lebbek*: The Ethanolic extract of pods possesses antiprotozoal, hypoglycemic and anticancer properties. The

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methanolic extract of the pod was investigated for antifertility effect [9]. Although *A. lebbeck* has traditionally been used in the treatment of many types of pain and inflammatory conditions. The analgesic and anti-inflammatory effects of *A. lebbeck* have been reported [10]. The *in vitro* antibacterial activities of 80% methanolic crude extracts prepared from the seeds of *Albizia gummifera* was tested for inhibitory activity against the clinical isolates of six *S. pneumoniae* and twenty two *S. pyogenes* using agar diffusion method [11]. This study is an attempt to determine antimicrobial activity of *Albizia lebbeck* bark methanolic, hexane and aqueous extract on selected pathogenic bacteria.

#### Scientific Classification:

Kingdom :Plantae

Class :Magnoliopsida

Subclass :Rosidae

Family :Fabaceae

Subfamily :Mimosideae

Genus :Albizia

Species :*A. lebbeck*



#### MATERIALS AND METHODS

##### Plant Material

*Albizia lebbeck* was collected from the premise garden of Himalaya Drug Co.

##### Extraction of Plant Material

The air dried material (150gm) was finely ground into powder using electric blender and extracted by percolation with water, methanol and hexane (400ml each) for one week at room temperature. The three extracts were filtered and concentrated using rota-vapour to obtain crude extracts about 10 gm each of aqueous, methanol and hexane extract.

#### ANTIMICROBIAL ASSAY

The agar well diffusion method was used to test antimicrobial activity of the extracts against two bacteria viz. *Staphylococcus aureus* (MTTC no 737) and *Escherichia coli* (MTCC 452).

#### Agar well diffusion method

Antimicrobial activity of *A. lebbeck* bark extract was tested by using well agar diffusion method [12]. The prepared culture plates were inoculated with different selected strains of bacteria using streak plate method. Wells were made on agar surface with 6mm cork borer. The Hexane, Aqueous and Methanolic extract of bark were poured into the well using sterile micropipette. The plates were incubated at  $37^{\circ}\text{C} \pm 2^{\circ}\text{C}$  for 24 hrs. The plates were observed for zone of inhibition around the wells.

Control plates were made using ciprofloxacin as positive control and extraction solvents as negative control. The positive results were established by the presence of clear zone of

inhibition around the well.

The zone of inhibition was calculated by measuring the diameter of zone around the well (in mm) including the well diameter. The readings were taken in three different directions in all replicates and the average values were tabulated.

#### RESULTS AND DISCUSSION

The antimicrobial activities of various plants have been reported by many Researchers [13, 14]. As the plant produce secondary metabolites in order to protect themselves from microorganism, herbivores and insects, thus antimicrobial effect is somehow expected from plants namely flavonoids, alkaloids and triterpenoid are producing a better opportunity for testing wide range of microorganism. In the present study gram positive (*S. aureus*) and gram negative (*E. coli*) strains were selected for screening antimicrobial effects of hexane, aqueous and methanolic extract of *Albizia lebbeck* bark. These extracts of the stem bark



of *Albizia lebbeck* has shown antibacterial effect against *S. aureus*.

**Table-1: Antibacterial activity of bark of *Albizia lebbeck***

S.No.	Bacterial species	Diameter of zone of inhibition (mm)				
		Hexane extract	Aqueous extract	Methanolic Extract	Negative control	Positive control
1	<i>S. aureus</i>	No activity	15	18	No activity	26
2	<i>E. Coli</i>	No activity	No activity	No activity	No activity	26

The antimicrobial activity of Hexane, Aqueous and Methanolic extract of *Albizia lebbeck* was resulted to a growth inhibition pattern against the tested microorganism. The results of the antimicrobial activity

were given in the Table 1. These data revealed that the aqueous and methanolic extract showed good antimicrobial activity against *S.aureus*. Hexane extract showed no activity against any of bacteria.



**Fig 1: Zone of inhibition shown by methanolic extract****Fig 2: Zone of inhibition shown by aqueous extract**

The result of this study showed that the aqueous and methanolic extract of *Albizia lebbeck* exhibited varied range of antimicrobial activity against the gram positive bacteria, which is comparable to standard antibiotic effect. *Staphylococcus aureus* are gram positive non-sporing non-motile usually non-capsulated aerobic and normally facultatively anaerobic cocci. It causes superficial infection characterized by intense suppuration, local tissue necrosis and formation of local abscesses fluid with pus. According to the good effects of *Albizia lebbeck* on *S. aureus* it has antiseptic effects and could be used as a therapeutic agent and therefore, it appears to be a potent antimicrobial agents

that could be considered as a medicinal plant *Escherichia coli* was resistant to methanolic, hexane and aqueous extract that probably could be due to cell membrane permeability or due to other genetic factors[15, 16].

## CONCLUSION

The stem bark of the plant also showed moderate antimicrobial activity against Gram +ve strain viz. *Staphylococcus aureus*. Based on the result of this study it can be said that it is an effective antimicrobial plant that can be used for folk medicine and will be a good source for finding new antimicrobial agents in order to treat and control infections.

## REFERENCE:

1. Parrotta JA. Early growth and yield of *Albizia lebbek* at a coastal site in Puerto Rico. Nitrogen Fixing Tree Research Report, 1988; 6, 47-49.
2. Troup RS. The silviculture of Indian trees. Oxford, England: Clarendon Press, 1921; 3.
3. Venkataramany P. Silviculture of genus *Albizia* and species. Silviculture of Indian Trees 22, New Delhi: Government of India, 1968; 54.
4. Bangash SH. Salt tolerance of forest species as determined by germination of seeds at different salinity. Pakistan Journal of Forestry. 1977; 27(2): 93-97.
5. Allen ON, Allen, Ethel K. The Leguminosae: a sourcebook of characteristics, uses, and nodulation. Madison, WI: University of Wisconsin Press, 1981; 812.
6. Farooqi MIH, Kapoor LD. Some Indian plant gums-their botany, chemistry and utilization, Indian Forester, 1968; 94(9): 662-666.
7. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian medicinal plants, New Delhi: Council of Scientific and Industrial Research, 1956; 330.
8. Macmillan HF. Tropical plants and gardening. Quinta edición. London: Macmillan and Co, 1962; 560.
9. Gupta RS, Kachhawa JB, Chaudhary R. Antifertility effects of methanolic pod extract of *Albizia lebbek* Benth. in male rats, Asian J. Androl, 2004; 6(2): 155-159.
10. Achinto Saha and Munirudin Ahmed. The Analgesic and anti-inflammatory activities of the extract of *Albizia lebbek* in animal model. Pak. J. Pharm. Sci, 2009; 22: 74-77.
11. Abayneh Unasho. Investigation of antimicrobial activities of *Albizia gummifera* and *Ferula communis* on *Streptococcus pneumoniae* and *Streptococcus pyogenes* causing upper respiratory tract infections in children. Thesis Biology, Faculty of Science, Addis Ababa University 2005.
12. Bauer AW, Kirby WM, Sherris JC, Turck. Antibiotic susceptibility testing by a standardized single disk method. Am. J. Clin. Pathol. 1996; 45: 493-496.
13. Cowan MM. Plant products as antimicrobial agents. Clinical Microbial Review, 2007; 22: 564-582.
14. Dewanjee S, Maiti A, Majumder R, Majumder A. Evaluation of antimicrobial activity of hydroalcoholic extract of *Schima wallichii* bark. Pharmacologyonline, 2008; 1: 523-528.
15. Motamedi H, Safary A, Maleki S, Seyyednejad SM. *Ziziphus spina-christi*, a native plant from Khuzestan, Iran, as a potential source for discovery new antimicrobial agents. Asian J. Plant Sci., 2009; 8: 187-190.
16. Nazif NM. Phytoconstituents of *Ziziphus spina-christi* L. fruits and their antimicrobial activity. FoodChem., 2002; 76: 77-81.
17. Ali SI. *Albizia lebbek* (L.) Benth. In: Flora of Pakistan. University of Karachi, Karachi, 1973; 36.
18. International legume database & information service (ILDIS): *Albizia lebbek* (L.) Benth. November 2005; Version 10.01.
19. Duke JA. Dr. Duke's Phytochemical and Ethnobotanical Databases - *Albizia lebbek*, 2008.
20. Salehi Sormaghi MH. Medicinal Plants and Phytotherapy. World of Nutrition Publisher, Tehran Iran, 2008; 47-48.
21. Serrentino J. How Natural Remedies Work. Harley and Marks Publishers, 1991; 20-22.