



International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

IJPT

A REVIEW ON BIOCHEMICAL AND PHARMACOLOGICAL PROPERTY OF *ALBIZIA LEBBECK*

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ABSTRACT

Albizia lebeck is commonly known as Shirish, has various therapeutic properties. Use of *Albizia lebeck* has been comprehensively recommended to remove toxins from the human body. It also use for the treatment of respiratory tract problem like asthma, allergies, anti-tussive and seasonal cold. Researches on *Albizia lebeck* also reported anti-inflammatory, anti-asthmatic, anti-microbial and anaphylactic, analgesic, anti-diarrhoeal, immunomodulatory properties of the plant. It is considered as an antidote against all types of poisons. The plant contains saponin, alkaloids, glycosides and flavonoids. *Albizia lebeck* potential in some antioxidants such as DPPH free radical scavenging activity, nitric oxide scavenging activity, hydrogen peroxide scavenging activity and reducing power assay. *Albizia lebeck* has taken as an important medicinal tree found in India arid zone resion.

Key Words:- *Albizia lebeck*, Anti-tussive, DPPH, Saponin, Antidote, Immunomodulatory.

INTRODUCTION

Herb and plants products for combating diseases since olden times. Indian system of medicine has a deep root in our tradition and caters to the large section of our population. Other alternative medicines attractiveness and uplifting uses the common people health is still not become as efficient as they due. The human and animals uses the active constituent are more beneficial than the vitamins and minerals that are present in herbal medicines *Albizia lebeck* is one of them which are commonly used in ayurvedic system of medicines (Sivakumar B *et al.*, 2013; Barbosa ADP *et al.*, 2014).

The world *Albizia lebeck* has arrived from the eighteen century. Albizi lebeck as an exotic species whose assault is from Australia to India. Its vernacular name is shirish. *Albizia lebeck* found throughout the india, asending to the 13000 m. in the Himalayas. It is

wild, available plant in the tropical and subtropical Asia and Africa with economic important for industrial medicinal uses. *Albizia lebeck* is a large grayish tree bark; young shoot glabrous. Leaves are evenly 2-pinnate and leaflets are 5-9 in pairs, 2.5-5.0 cm long, broadly oblong and pale green, unequal sided, very obtous glabrous above and reticulately veined below (Yadav SS *et al.*, 2011; Sivakrishnan S and kottaimuthu A, 2013).

Flowers are stalked, white fragarant in globose umbellate head 2-3.8 cm diameter. Peduncles 3.8-7.5 cm long, solitary or 2-4 together from the axils of the upper leaves (Une HD *et al.*, 2001). Calyx 4mm. long teeth short, coroll 1 cm long ; tube glabrous; lobes 2.5m long, statement much larger than the corolla. Pods are 10-30 cm long and 2.5-5.0 cm broad, flat straw colours and contain 4-12 pale brown seeds. Flower and fruiting periods are april to june (Padamanabhan V *et al.*, 2012. Chhimwal J *et al.*, 2013).

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Vernacular names

There are some common names of *Albizia*

lebbeck hindi- Garso, Siris, Sanskrit- Barhapusha, bhandi, kalinga, urdu-darash, west indies-women tongue, brazil-heart to back, Ceylon-kona, English-parrot tree. French *Acasia-lebbeck*, Bois noir *Albizia lebbeck* is found throughout the India. *Albizia lebbeck* is a large, erect, unarmed, deciduous, spreading tree belonging to the arid zone region.

Scientific classification

Chemical composition

Low moisture content makes the shelf life longer period. Low lipid content is a favourable aspect in the preventing the rancidity so its store for long period of time. The ash content is higher than that of other legumes which has been reported to range between 7.8%, an indication that it may possess a higher mineral content. Therefore the *Albizia lebbeck* is cheap potential source of protein, energy and minerals for supplementation (Chandra J and Mali MC, 2014).

Phytochemicals

Tri-O-glycosides: kaempferol and quercetin 3-O-rhamnosyl-a-, glycopyranosyl-a-galactopyranosides, were known in the leaves of *Albizia lebbeck*. Pods have 3,5 dihydroxyl 4,7 dimethoxy flavones and N-benzoyl L phenyl alaninol. The beans of the plant contain albigenic acid a new triterpenoids saponin. The plant also contains saponin, alkaloids, phenolic glycosides and flavones. *Albizia lebbeck* potential utility as source of phenolic compounds like saponin, alkaloids, glycosides, flavonoids and tannins in methanolic extract (Suruse PB *et al.*, 2013; Imran I *et al.*, 2014).

Antioxidant activity

Albizia lebbeck have pharmaceutical properties in some diseases. Polyphenols compounds have radical scavenging activity that's why can use in treating free radical damages and diseases. Methanol extract of *Albizia lebbeck* potential in DPPH, Hydroxyl radical, Iron chelating assay and ABTS. The antioxidant capacity of *Albizia lebbeck* bark was considerably higher. The ethanol root extract of *Albizia lebbeck* was examine for its antioxidant potential by nitric oxide scavenging, hydrogen peroxide scavenging activity and reducing power assay taking ascorbic acid as a standard (Priyanka *et al.*, 2013; Siahpoosh A and Mehrpeyma Z, 2014). The methanolic extract of *Albizia lebbeck* can be used as a source of natural antioxidant and as a possible use in pharmaceutical industries (Kumar S *et al.*, 2014).

Pharmacological activity

Saponin is glycosides constituent often referred

to as natural detergent because of their foamy nature. It has been the saponin has anti-carcinogenic activity, immune modulation activity and regulation of cell proliferation as well as health reimbursement such as cholesterol lowering capacity. The toxic effect of cyanogenic glycosides decreases heart rate, decrease sympathetic activity and decrease systematic vascular resistance. Tannin decreases the protein solubility by foaming a complex with protein causing decreases the digestibility and causing miserable growth. Tannin content is negligible in tree. The alkaloids present in *Albizia lebbeck* are fungicidal and cytotoxic for the cancer cell increasing in vitro (Swathy B *et al.*, 2010, Malla S *et al.*, 2014).

Ayurvedic Pharmacology Properties of *Albizia lebbeck*

Ayurvedic pharmacology of *Albizia lebbeck* is depends on the experimental, biophysical, inferential and intuitional mechanism. The action of the substances based on the five system of the action or attributes of a substances Rasa (taste), Guna (property), vipaka (metabolites), Virya (potency) and prabhava which are given in table-2.

Effect on anaphylactic shock

The use of *Albizia lebbeck* bark had a significantly cromoglycate like action on the mice mast cells. The crude extract of seed of *Albizia lebbeck* at a dose of 0.5mg/ml has exhibited stabilizing effect on the mast cells in mestenry and peritoneal fluid on aphyllaxis mice. *Albizia lebbeck* barks also have a beneficial cromoglycate activity on the mast cell of mice (Johri RK *et al.*, 1985, Mohammad F *et al.*, 2012).

Anti-asthmatic activity

The studies on *Albizia lebbeck* stem bark decoction reported notably decreases in WBC (white blood cells) eosinophilic count and ESR. *Albizia lebbeck* was given in 48 cases of bronchial asthma at a dose 40ml per day for one month. The investigation indicated mild improvement in case of bronchial asthma no adverse reactions were reported. *Albizia lebbeck* flower decoction of 50mg/kg body weight has significantly exploited against histamine induced bronchospasm (Jaiswal M *et al.*, 2007; Kumar D *et al.*, 2010; Kajaria D *et al.*, 2013).

Pulmonary eosinophilia

The recent studies on preliminary screening 35 cases of tropical eosinophilia were treated with *Albizia lebbeck* flower for 6 weeks. The dose 200mg twice a day with water. The results indicate that 82% cases showed excellent response, 12% showed good response where as

6% showed poor response. No side effect observed (Sharma DGK and Dubey DN, 2015).

Anti-tussive activity

Albizia lebbbeck exhibited antitussive activity on sulphur dioxide induced cough in experimental animals group. Results indicates significant decrease cough incident in comparison to control group (Yadav SS *et al.*, 2010).

Anti-fertility activity

Albizia lebbbeck methanol extract of pods shown anti-spermatogenic property by reduction in spermatogosity, srematocyte, and spermgonia count, reduction in sperm density and sperm motility and diminish in size of testes in male rats. Oral administration of the 50mg/kg body weight in male rat's results in significantly decreases in weight of testes, epididymis, seminal vesicle and ventral prostate (Gupta RS *et al.*, 2004).

Anti-diarrheal activity

Aqueous and methanol extract of *Albizia lebbbeck* exhibited activity against the Salmonella, E. coli. Hexane and petroleum ether extracts did not exhibit any activity. *Albizia lebbbeck* posses anti bacterial activity against infectious diarrhea. None of extracts showed action against Shigella and Candida. It has also been shown that *Albizia lebbbeck* has moderate activity against V. cholerae, A. hydrophilis and B. subtilis (Acharya S *et al.*, 2009, Balekar N *et al.*, 2010).

Allergic conjunctivitis

In comparative clinical studies shows the effect of *Albizia lebbbeck* bark extract on rats. Results indicated significantly decreased in all kind of allergy symptoms in a clinical study the role of 29% of *Albizia lebbbeck* bark and 500 mg capsule of *Albizia lebbbeck* showed very favorable response in all kinds of allergic conjunctivitis (Mishra SS *et al.*, 2010; Venkatesh P *et al.*, 2010).

Anti-microbial activity

Albizia lebbbeck stem bark exhibited anti-microbial activity against the staphylococcus aureus, Pseudomonas aeruginosa, Trichophyton rubrum, Bacillus cereus and Escherichia coli but the bark is glycosides isolated (Chulet R *et al.*, 2010).

Anti-arthritis activity

Localized bone erosions take as great signs for the diagnosis of rheumatoid arthritis. The effect of *Albizia lebbbeck* methanol extract on the bone erosion turnover was considered. Various marker of bone erosion like histological and radiological examination of the joints in arthritis induced rats. The results indicate that the methanol extract of *Albizia lebbbeck* possesses strong anti-arthritic property (Pathak N *et al.*, 2009, Pandey S *et al.*, 2010).

Analgesic activity

The analgesic property of *Albizia lebbbeck* bark was considered by acetic acid induced writhing test. The bark extract at 400mg/kg dose showed significantly reduction in the number of writhes at the 52.4% inhibition. The *Albizia lebbbeck* bark administration in a dose of 250mg/kg indicating analgesic activity (Kajaria D *et al.*, 2011).

Antidiabetic activity

The stem barks extract of *Albizia lebbbeck* potential against the diabetase. The results verified the antidiabetic potential of *Albizia lebbbeck* the hypoglycemic effect exhibited by the extract is mediated by the increasing glucose adsorption, decreasing glucose dispersion rate and at the cellular level by promoting glucose transport crossways the cell membrane (Bhutkar M and Bhise S, 2013, Kumar D *et al.*, 2013).

Immunomodulatory Activity and Antipyretic activity

The bark extract of *Albizia lebbbeck* has shown significantly immunomodulatory activity. The ethanol and aqueous extract of *Albizia lebbbeck* leaves were administration to the experimental animal shown to be exhibit strong immunomodulatory effect (Chaudhary M *et al.*, 2012). *Albizia lebbbeck* flower ethanol extract was significantly decreases the body temperature at the dose of 1g/kg body weight (Mohamed E *et al.*, 2013).

Anti-inflammatory activity

Albizia lebbbeck methanolic extract of bark given at the dose of 400mg/kg inhibited of edema at the end of 4 hr. anti-inflammatory effect of *Albizia lebbbeck* has been reported at the end of 6 hrs in evaluation to control group (Saha A and Muniruddin A, 2009; Yadav *et al.*, 2010).

Table 1. Scientific Classification of *Albizia lebbbeck*

Kingdom	<i>Plantae</i>
Order	<i>Fabales</i>
Family	<i>Fabaceae</i>

Genus	<i>Albizia</i>
Species	<i>Lebbeck</i>
Subfamily	<i>Mimosoideae</i>
Class	<i>Dicotyledonae</i>

Table 2. Chemical composition of *Albizia lebbeck*

Components	Value (% composition)
Moisture	4.55
Crude protein	38.04
Crude lipid	5.66
Crude fiber	11.96
ash content	8.76
Nitrogen free extract	32.3

Table 3. Phytochemical present in different part of *Albizia lebbeck*

Part of <i>Albizia lebbeck</i>	Compounds
Flowers	Various sterols (taxerol, cycloartemol, lupeol, campesterol, sitosterol)
Leaf	Pipelicand derivatives
Root	Echinocystic acid (saponin)

Table 4. Ayurvedic properties of the *Albizia lebbeck*

Rasa	Guna	Virya	Vipaka	Prabhava
Tikta, Kasaya, Madhura, Katu	Lghu, Tikshna, Rukshna	Anushna	Katu	Tridosha shamaka, Vishaghna

Fig 1. Tree of *Albizia lebbeck***CONCLUSION**

Albizia lebbeck plant has been accredited with a number of properties. The various activities have been revalidated in present time on several well designed clinical new models and trials. *Albizia lebbeck* review reveals antidiabetic, anti-inflammatory, antipyretic, antifertility and anti diarrhea etc. activities of the plant in different forms with no side effects and safety aspects of this plant. The *Albizia lebbeck* provides healthy and useful food with many nutrients to the human body as high in protein, low cholesterol and high fibers. Antioxidant

activity along with other activity seems to be gifted drug for various disease conditions so this plant future explored pharmacological industries. *Albizia lebbeck* a cheap, reliable and safe resource based on plant to meet the demand of nutrients rich food.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

REFERENCES

- Acharya S, Patra A, Prasanta KB. Evaluation of the antimicrobial activity of some medicinal plant against enteric bacteria with particular reference to multi-drug resistant vibrio cholera. *Tropical Journal of Pharmaceutical Research*, 8(3), 2009, 231-237.
- Balekar N, Jain D, Dixit P, Nair V. Evaluation of anti-diarrhoeal activity of ethanol stem bark extract of *Albizia lebbek* Linn. In rats. *Songklanakarin Journal of Science and Technology*, 34(3), 2010, 317-322.
- Barbosa ADP. Anti-inflammatory activity of butanolic extract of *Albizia lebbek*. *European Journal of Medical Plants*, 4(12), 2014, 1400-1407.
- Bhutkar M and Bhise S. In vitro hypoglycemic effects of *Albizia lebbek* and *Mucuna puries*. *Asian Pacific Journal of Tropical Biomedicines*, 3(11), 2013, 866-870.
- Chandra J and Mali MC. Nutritional evaluation of top five fodder tree leaves of mimosaceae family of arid region of Rajasthan. *International Journal of Innovative Research and Review*, 2(1), 2014, 14-16.
- Chaudhary M, Sharma AK, Kumar R, Chauhan B, Kaushik K, Agrawal V. Comparative immunomodulator activity of leaves and bark of *Albizia lebbek* (LINN.) benth. *International Journal of Research and Development in Pharmacy and Life Sciences*, 1(1), 2012, 25-27.
- Chhimwal J, Sharma A, Saini P, Kabra M, Bhandari S. Antibacterial activity of different extract of *Albizia lebbek* stem bark. *Asian Journal of Pharmaceutical Research and Development*, 1(6), 2013, 84-87.
- Chulet R, Pradhan P, Sharma KS, Jhaharia KM. Phytochemical screening and anti-microbial activity of *Albizia lebbek*. *Journal of Chemical and Pharmaceutical Research*, 2(5), 2010, 476-484.
- Desai S, Tatke P, Gabhe SY. Isolation of catechin from stem bark of *Albizia lebbek*. *International Journal of Analytical, Pharmaceutical and Biomedical Sciences*, 3(2), 2014, 31-35.
- Gupta RS, Kachhawa JB and Chaudhary R. Anti-fertility effect of methanolic pod extract of *Albizia lebbek* benth. In mice rats. *Asian J. Androl*, 6(2), 2004, 155-159.
- Imran I, Muhammad Z, Luca C, Teresa M, Nicoletta P. Phenolic profile and Antioxidant potential of selected plants of Pakistan. *Journal of Applied Botany and Food Quality*, 87, 2014, 30-23.
- Jaiswal M, Prajapati PK, Ravishankar B. A comparative pharmaceutico-pharmaco-clinical study of Shirisharishta prepared by twak and sara katha of Shirisha w.s.r to its shwasahara effect, Dept. Rasa Shastra and Bhaishjya Kalpana I.P.GT. And R.A., Jamnagar, Gujarat, 2007.
- Johri RK, Zutshi U, Kameshwaran L, Atal CK. Effect of quercetin and *Albizia* saponins on rat cell. *Indian J. Physiol Pharmacol*, 29(1), 1985, 43-46.
- Kajaria D, Kajaria A, Tripathi JS, Tiwari SK. In vitro and in vivo assessment of anti-asthmatic activity of polyherbal Ayurvedic drug. *Journal of Pharmacy and Biological Sciences*, 6(3), 2013, 60-70.
- Kajaria D, Tripathi JS, Tiwari SK, Pandey BL. The analgesic and anti-inflammatory activities of the hydroalcoholic extract of Shrishadi compounds in animal model. *Journal of Applied Pharmaceutical Science*, 1(10), 2011, 98-101.
- Kumar A, Kavimani GS, Uma S, Tamilarasan M. Quality evaluation of in vitro antioxidant activity of *Albizia lebbek*. *World Journal of Pharmacy and Pharmaceutical Sciences*, 3(10), 2014, 1267-1276.
- Kumar D, Dash GK, Tripathy NK. Hypoglycemic activity of bark extract of *Albizia lebbek* benth in streptozotocin induced diabetic rats. *International Journal of Pharmaceutical Sciences Review and Research*, 18(2), 2013, 28-32.
- Kumar S, Bansal P, Gupta V, Sannd R, Rao MM. Clinical efficacy of *Albizia lebbek* stem bark decoction on Bronchial asthma. *International Journal of Pharmaceutical Sciences and Drug Research*, 2(1), 2010, 48-50.
- Malla S, Shrotri CK, Jain R. Antimicrobial, phytochemical and antioxidants screening of leaves and stem bark from *Albizia lebbek* (L). *International Journal of Pharma and Bio Sciences*, 5(2), 2014, 259-270.
- Mishra SS, Gothecha VK, Sharma A. *Albizia lebbek* – a short review. *Journal of Herbal Medicines and Toxicology*, 4(2), 2010, 9-15.
- Mohamed F, Ali EG, Ashraf K, Adnan A, Omran EM. Evaluation of some biological activities of *Albizia lebbek* flowers. *Pharmacology and Pharmacy*, 4, 2013, 473-477.
- Mohammad F, Singh PP, Irchhaiya R. Review on *Albizia lebbek* a potent herbal drug. *International Research Journal of Pharmacy*, 3(5), 2012, 63-68.
- Muhammad Z, Ahmad S, Qayum M, Ercisli S. Compositional studies and antioxidant potential of *Albizia lebbek* (L.) BENTH. Pods and seeds. *Turkish Journal of Biology*, 37, 2013, 25-32.
- Padamanabhan V, Ganapathy M, Evanelene VK. Preliminary phytochemical and anti-bacterial studies on flowers and pods of *Albizia lebbek*. *International Journal of Emerging Technology and Advanced Engineering*, 3(9), 2013, 541-544.

- Pandey S, Devmurari V, Rathanand M. Biological evaluation of free radical activity of *Albizia lebbbeck* methanolic extract in arthritic rats. *Scholars Research Library*, 1(1), 2010, 116-123.\
- Pathak N, *et al.* Curative effect of *Albizia lebbbeck* methanolic extract against adjuvant artheritis with special referance of bone erosion. *International Journal of Pharmaceutical Sciences and Drug Research*, 1(3), 2009,183-187.
- Priyanka, *et al.* Evaluation of antioxidant activity of ethanolic root extract of *Albizia lebbbeck* (L.) Benth. *International Research Journal of Pharmaceutical Applied Sciences*, 3(2), 2013, 93-101.
- Saha A and Muniruddin A. The analgesic and anti-inflammatory activites of the extract of *Albizia lebbbeck* in animal model. *Pak. J. Pharm. Sci*, 1(4), 2009, 74-77.
- Sharma DGK and Dubey DN. Review of Shirish therapeutic properties. *International Journal of Ayurvedic & Herbal Medicine*, 5(1), 2015, 1683-1688.
- Siahpoosh A and Mehrpeyma M. Antioxdant effects of *Albizia lebbbeck* and *Prosois julifora* barks. *International Journal of Biosciences*, 5(9), 2014, 273-284.
- Sivakrishnan S and Kottaimuthu A. In vivo antioxidant activity of ethanolic extract of aerial parts of *Albizia lebbbeck* procera roxb (benth) against paracetamol induced liver toxicity on wistar rats. *Journal of Pharmaceutical Sciences and Researh*, 5(9), 2013, 174-177.
- Sivakumar B and Velmurugan C, Bhargava A, Kumar LPR. Diuretic activity of methanolic extract of *Albizia lebbbeck*. *Journal of Pharmacology and Toxicological Studies*,1(1), 2013,1-3.
- Suruse PB, Bodele SB, Duragkar NJ, Saundankar YG. In-vitro evaluation of antioxidant of *Albizia lebbbeck* bark. *International Journal of Biological Sciences and Ayurveda Research*, 1(1), 2013, 6-17.
- Swathy B, Lakshmi SM, Kumar AS. Review on herbal drugs for analgesic and anti-inflammatory activities. *International Journal of Biological and Pharmaceutical Research*, 1(1), 2010, 7-12.
- Une HD, Pal SC, Kasture VS, Kasture SB. Phytochemical constituents and pharmacological profile of *Albizia lebbbeck*. *Journal of Natural Remedies*, 1(1), 2001, 1-5.
- Venkatesh P, Mukherjee PK, Kumar NS, Bandyophyay A, Fakul H, Mizuquchi H, Islam N. Anti-allergic activity of standardized extract of *Albizia lebbbeck* with reference to catechin as a phytomarker. *J. Erhnopharmacol*, 32(2), 2010, 272-276.
- Yadav SS, Galib, Prajapati PK, Harish CR. Pharmacognostical and physic-chemical investigation of *Albizia lebbbeck* benth. Flower. *International Journal of Pharmaceutical and Biological Archives*, 2(5), 2011, 1434-1438.
- Yadav SS, Galib, Prajapati PPK, Ravishankar B, Asok BK. Evaluation of anti-tussive activity of Shirishavaleha- an Ayurvedic herbal compound formulation in sulphur dioxide induced cough in mice. *Indian Drugs*, 47(9), 2010, 38-41.
- Yadav SS, Galib, Ravishankar B, Prajapati PK, Ashok BK, Varun B. Anti-inflammatory activity of Shrishvaleh-an Ayurvedic compound formulation. *International Journl of Ayurveda Research*, 1(4), 2010, 205-207.
- Yadav SS, Jaiswal M, Galib, Prajapati PK. Therapeutic potential of Shirisha (*Albizia lebbbeck*)- a review. *International Journal of Ayurvedic Medicines*, 2(4), 2011, 153-163.