



A REVIEW ON PHARMACOLOGICAL AND CHEMISTRY ACTIVITY OF ALBIZIA LEBBECK (L). BENTH

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Article history:	Abstract:
Received: 6 th January 2023 Accepted: 6 th February 2023 Published: 11 th March 2023	<p><i>Albizia lebbeck (L).</i> is a therapeutically potential plant drug and a financially significant plant with mechanical, therapeutic uses. The plant contains a variety of secondary metabolites such as saponins, alkaloids, nitrogenous compounds, and flavonoids. It has been cultivated recently as a flowering pot plant and therefore abundant propagation of plant material for commercial use is of great importance. This species also produces secondary metabolites, some of which are pharmacological interests. The important pharmacological activities are allergic conjunctivitis, anti-histaminic, anti-bacterial, anthelmintic, anti-convulsive, analgesic, and anti-inflammatory activity. The aim of this paper is to use evidence-based information regarding the photochemistry and pharmacological action of this <i>A. lebbeck</i> plant.</p>

Keywords: *Albizia lebbeck (L).*, Photochemistry, Pharmacological activity, secondary metabolites.

1. 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. lebbeck* belongs to the Legume family ;subfamily Mimosoidae. It is found throughout Iraq. 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 (Faisal et al.,2012). *A. lebbeck* 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 (Troup, 1921). The fruit is a pod, 15–30 cm in length and 2.5-5.0 cm in width, containing six to twelve seeds (Ali,1973). 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(Lowry et al.,1994 and parrotta,1988).

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. (WEBB et al.,1980).

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.(Chouhan et al.2016).

2.TAXONOMIC CLASSIFICATION

Kingdom: Plantae

division: Magnoliophyta

class: Magnoliopsida
 subclass: Rosidae
 order: Fabales
 family: Fabaceae
 subfamily: Mimosoideae
 genus: *Albizia*
 species: *lebbeck* (L).Benth.

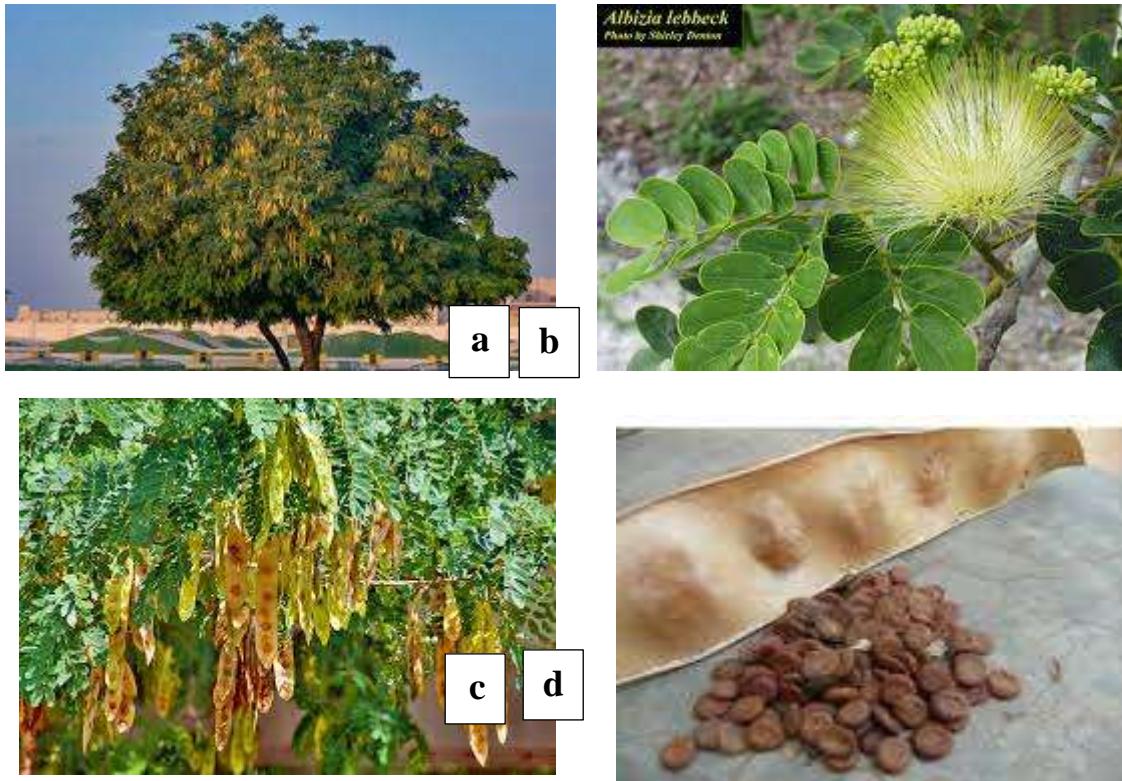


Fig. a: The plant *A. lebbeck* L.

Fig. b: Inflorescence of *A. lebbeck* L.

Fig. c &d: Immature pods-Seeds.

3.ECONOMIC IMPORTANCE:

The wood of this species was exported from Asian countries to Europe under the trade name East Indian walnut (Rao and Purkayastha, 1972). It is substituted for teak and sal. 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 durable. It seasons and works well and is used for furniture flooring, veneer, paneling, boat building, carving, posts, turnery toys, and a variety of agricultural implements. Pulp is short-fibered and used for paper production only when mixed with long-fibred pulp (Nfta, 1988). Wood provides good fuel and has a caloric value of 22 kilojoules per kg (Anon, 1970). Bark also yields tannin used for fishing nets. It is planted as an avenue tree and used for roadside planting, shelterbelts, and green manure.

4.MEDICINAL IMPORTANCE:

The bark of stem is anti-inflammatory, antidote, healing agent, and blood purifier (Kabiruddin, 1937), and strengthens gums and teeth (Nabi, 2007). Besides, Excellent tonic and alternative when used with pure ghee, (Shirazi, 2014) ulcers, cough, jaundice, migraine, (Khan, 2012; Khan, 1847) leprosy, numbness, boils and furuncles, pruritus, paralysis, facial palsy, orchitis, neurological diseases (Ghani, 2010), ascites, Skin diseases, (Nabi, 2007) wounds, acne (Sharma and Dubey, 2015). Ash is useful for Da al-Salab (alopecia) and Behaq Abyaz (Pityriasis alba)(Sina, 1998)Leaves are used in eye troubles (Sastry and Kavatthekar, 1990) helminthiasis conjunctivitis, gonorrhea, earache, corneal opacity, and gastralgia (Shirazi, 2014; Khan, 2012). The root is anti-inflammatory. Root bark strengthens gums and teeth (Ghani, 2010). Flower and its oil have also been used for Leprosy, skin diseases, inflammation, blood impurities, cough, headache, migraine, epilepsy, insanity(Khan, 2012), jaundice (Ghani, 2010; Khan, 1847), and scorpion bite (Sina, 1998). Seeds and oil are used as Semen inpiissant, anti-diarrheal, and anti-catarrhal. Gum is useful for a toothache(Ghani, 2010).

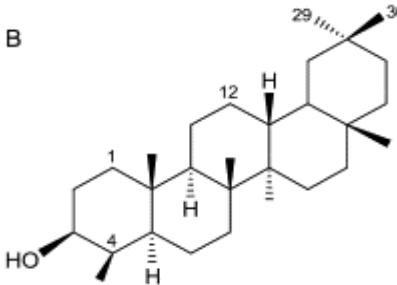
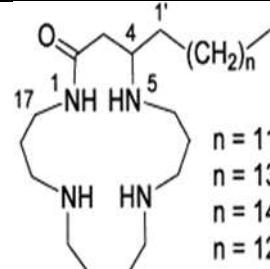
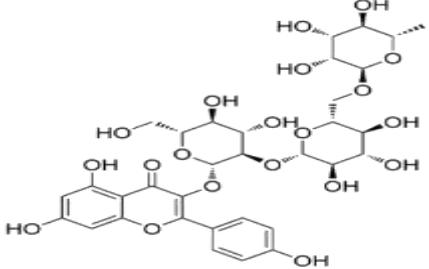
5.CHEMICAL CONSTITUENTS:

Knowledge of the topical composition of botanicals resulting from research is only sought to discover the benefits of treatment, but the information may be of great value in uncovering new sources of chemical compounds that can be

used in the manufacture of complex chemicals(Milne and Beamish, 1999). Too, the ascending plants are sources of many vital compounds that have an important role in maintaining the health of the plant human health; several reports stated that green plants constitute a storehouse of safe and effective chemical compounds in the treatment of many diseases(Chaman and Verma, 2006).

The following are some representative examples of secondary metabolites isolated from species *A. lebbeck*.

Table 1: Distribution of Chemical constituents in the *Albizia lebbeck*.

Chemical constituents	Plant part	Chemical Name	Compound
saponins	Whole plant	Lebbekanin E	 <p>B</p> <p>Lebbekanin E was isolated from <i>A. lebbeck</i> and its structure was determined based on its IR spectrum and hydrolysis products [Varshney, Pal, and Vyas, 1976]</p>
Alkaloids and nitrogenous compounds	Seeds	Budmunchiamines L1-L3	 <p> $n = 11$ budmunchiamine L4 $n = 13$ budmunchiamine L5 $n = 14$ budmunchiamine L1 $n = 12$ budmunchiamine L2 </p> <p>Three macrocyclic spermine alkaloids, budmunchiamines L1-L3 (45-47) were isolated from the methanol extract of seeds of <i>A. lebbeck</i> [Misra, Dixit, and Wagner, 1995]</p>
Flavonoids	leaves	Quercetin and kaempferol 3-O- α -rhamnopyranosyl (1 \rightarrow 6)- β -glucopyranosyl (1 \rightarrow 6)- β galactopyranosides	 <p>Two new tri-O-glycoside flavonols, quercetin and kaempferol 3-O-α-rhamnopyranosyl (1\rightarrow6)-β-glucopyranosyl (1\rightarrow6)-β-galactopyranosides (56&57), were identified from the leaves of <i>A. lebbeck</i> [El-Mousallamy, 1998].</p>

Anti-histaminic activity:-

Babu *et al.* reported that the alcoholic extract of *A. lebbeck* has antihistaminic properties, by neutralizing the histamine or due to corticotrophic action as showed by raising cortisol levels in plasma. Histological analysis of the lungs of guinea pigs treated with *A. lebbeck* has shown a reduction in tissue edema, epithelial cell hypertrophy, infiltration of inflammatory cells, and airway lumen plugging, thereby decreasing inflammation and bronchoconstriction, which leads to normal lumen size (Tiwari *et al.*, 2015).

Analgesic and Anti-inflammatory activity:-

The anti-inflammatory effect of various solvent extracts of *A. lebbeck* on acute and chronic phases of inflammation as well as the anti-inflammatory effect of the extracts in adjuvant-induced arthritis was studied in animal models. Extracts of the drug displayed considerable potency in anti-inflammatory action and have prominent effects on adjuvant arthritis by alleviating paw edema (Narsimham *et al.*, 2009; Nikhat, *et al.* 2018). The Analgesic and Anti-inflammatory activity of the Extract of *A. lebbeck* in an Animal Model was reported by (Saha and Ahmed, 2009).

Anti-bacterial activity:-

Bobby *et al.*, 2012 reported that ethyl acetate extract demonstrated inhibition against *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumonia*. Whereas the methanolic extracts of *A. lebbeck* illustrated inhibitory activity against the pathogens *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Escherichia coli*, *Salmonella typhoid*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, and *Proteus vulgaris*.

Anti-convulsive activity:-

Anti-convulsive action of leaves of *A. lebbeck* against pentylenetetrazol, and maximal induced seizures in mice were reported (Kasture, 1996). The same source indicated reported the ethanolic extracts of leaves of *A. lebbeck* and flowers of *Hibiscus rosa sinensis* and the petroleum ether extract of flowers of *Butea monosperma* exhibited anticonvulsant activity in mice. In another study, Srivastava Neeti *et al.* 2016 reported the potent anticonvulsant activity of ethanolic extract of the leaves of *A. lebbeck* in rats. It may help in the development of a natural antiepileptic drug.

Allergic conjunctivitis:-

In a clinical study, it was revealed that oral administration of 29% of ghansatva of *A. lebbeck* bark and 500 mg capsule of *A. lebbeck* showed a very favorable response in all kinds of allergic conjunctivitis (Mukhopadhyay *et al.*, 1992). A significant reduction in symptoms of allergic conjunctivitis was reported in a clinical trial conducted on 60 patients suffering from the allergic type of conjunctivitis. *A. lebbeck* is used in the form of eye drop given 2 drops 3 times a day for 30 days and compared with standard drug treatment sodium cromoglycate 2% eye drop (Haramohan, 2017).

Anthelmintic activity:-

In an in vitro study, an alcoholic extract of the bark showed Anthelmintic activity against live *Ascaris lumbricoides* (Raj, 1975).

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