

A REVIEW ON PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES OF ALBIZIA JULIBRISSIN: AN ORNAMENTAL PLANT

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ABSTRACT

The present investigation reviews Albizia species to tap out the shelf of bioactive constituents that possess pharmacological properties specially considering Albizia julibrissin. Albizia julibrissin (Persian silk tree, pink silk tree) is a species of tree in the family Fabaceae, The species is usually called "silk tree" or "mimosa" in the United States. It is widely planted in India as an ornamental plant in parks and gardens, grown for its leaf texture and flowers. Now Albizia julibrissin flower extract are showing significant antidepressant, reduction in both its spontaneous activity and passive activities, antidiabetic, anti-inflammatory and anti-obesity properties. It is also well known remedy

for insomnia in Chinese medicine as well as shows an important and very significant in vitro anti-tumor activity. Hence its extract and essential oil are widely used for dysphoria-induced wakefulness, depression, forgetfulness, and dreaminess. The evidence of these amazing Albizia julibrissin effects can be identified from its pharmacological action though not much dimension has been explored, Albizia julibrissin can be beneficial for future research and can be of great medicinal use.

KEYWORDS: Albizia julibrissin, silk tree, Fabaceae, Mimosa Tree.

INTRODUCTION

Albizia julibrissin is a species of tree in the family Fabaceae, native to southwestern and eastern Asia.^[1] known by a wide variety of common names, such as Persian silk tree or pink siris. It is also called Lenkoran acacia or bastard tamarind, though it is not too closely related to either genus. The species is usually called "silk tree" or "mimosa" in the United States, which is misleading the former name, can refer to any species of Albizia which is most

common in any one locale although once included in Mimosa, and very close to the Mimoseae. The genus *Albizia* comprises approximately 150 species, mostly trees and shrubs native to tropical and subtropical regions of Asia and Africa. *A. julibrissin* is widely planted as an ornamental plant in parks and gardens, grown for its leaf texture and flowers. It is a small deciduous tree growing to 5–16 m (16–52 ft) tall, with a broad crown of level or arching branches. Its leaves slowly close during the night and during periods of rain, the leaflets bowing downward; thus its modern Persian name *shabkhosb* means "night sleeper".^[2] The leaves are bipinnate, 20–45 cm (7.9–17.7 in) long and 12–25 cm (4.7–9.8 in) broad, divided into 6–12 pairs of pinnae, each with 20–30 pairs of leaflets; the leaflets are oblong, 1–1.5 cm (0.39–0.59 in) long and 2–4 cm (0.79–1.57 in) broad. The flowers are produced throughout the summer in dense inflorescences, the individual flowers with small calyx and corolla (except the central ones), and a tight cluster of stamens 2–3 cm long, white or pink with a white base, looking like silky threads. The sweet-scented flowers are a good nectar source for honey bees hummingbirds and butterflies. The fruit is a flat brown pod 10–20 cm (3.9–7.9 in) long and 2–2.5 cm (0.79–0.98 in) broad, containing several seeds inside. The seeds are used as a food for livestock and by wildlife. The bark is dark greenish grey in colour and striped vertically as it gets older. This herb is sweet-bitter in flavor and neutral and non-toxic in properties.



CHEMICAL CONSTITUENTS

Medicinally it refers to the dried flowers or buds of *Albizia julibrissin*. As for main chemical constituents, there are in total 25 types of flower aromatic components identified, among which main aromatic components are Julibroside, trans-linalool oxide, linalool, isopentanol,

a-ocimene, 2,2,4-Trimethylpentane, and so on. In addition, it also contains cyanidin-3-glucoside. A. Julibrissin foliage produced an unknown quercetin derivative, hyperoside (quercetin-3-O-galactoside) and quercetin (quercetin-3-O-rhamnoside).^[4] Triterpenoid saponins (julibroside J(29), julibroside J(30), julibroside J(31)) and two phenolic glycosides (albibrissinosides A and B) have been isolated from bark of Albizia julibrissin^[5] Quercitrin^[6], flavonol glycosides and isoquercitrin (2)^[7], were found in Albizia julibrissin. Leaf of A. julibrissin showed total flavonoid content (35.14mg/g). In spite Albizia julibrissin is not one of the top ten herbs in what refers to its use in traditional medicinal remedies, some are still worth mentioning.

PHARMACOLOGICAL ACTIVITY

Now Albizia julibrissin flower extract and essential oil are widely used for dysphoria-induced wakefulness, depression, forgetfulness, and dreaminess. The evidence of these amazing albizia julibrissin effects can be identified from its pharmacological actions as follows.^[5]

Sedative property

Experimental studies have shown that mice drenched with this decoction significantly reduced both its spontaneous activity and passive activities. That's to say, this herb can work with the central inhibition of barbiturates to prolong the pentobarbital and phenobarbital induced Anesthesia time in mice and prompt the anesthesia in mice by subthreshold dose of pentobarbital sodium and amobarbital sodium. And both a single dose and continuous 3 doses can have significant effect; Its decoction drenched to rabbits showed no obvious change in EEG and no anti-convulsant effect caused by pentetrazole in mice^[7]

Antidepressant effect

Its main functions are resolving depression for tranquilization, regulating qi to whet the appetite, dispersing wind to improve eyesight, and promoting blood circulation to arrest pain. And its key uses and indications include depression, insomnia, chest tightness, indigestion and loss of appetite, wind-fire eye problems, blurred vision, back pain, and injuries from falls. Recommended dosage is from 3 to 9 grams in decoction, powder, or tea pills.^[8]

Anti-obesity properties:

It is only recently that scientist discovered that the extract of Albizia julibrissin flowers exerted **anti-obesity properties** by inhibiting adipogenesis^[9] the process by which our organisms generate fat cells. In the mentioned study, the extract of Albizia julibrissin

inhibited adipogenesis in 3T3-L1 preadipocytes (cells that still didn't become fat cells of adipocytes). This opened a potential line of study for the use of this herb as anti-obesity agent.^[10]

For Insomnia

Traditional herbal remedies against insomnia in **Chinese medicine** became very popular in the past. A well known remedy for insomnia in Chinese medicine included Albizia julibrissin as part of the most commonly prescribed triple drug combination for that purpose, together with **Suan-zao-ren-tang**, and *P. multiflorum*, traditionally used in China for insomnia.^[11] Bark, leaves and flowers are part of many traditional herbal remedies in China, from where this herb is native.

Anti-Tumor Properties

Albizia julibrissin bark, served as anti-tumor by the induction of apoptosis in certain cell types (human acute leukemia junket T-cells) and butanol extract from the bark of Albizia julibrissin^[12]

Antioxidant properties

There are many reports on the antioxidant property for Albizia species. *A. julibrissin* quercetin derivative, hyperoside (quercetin-3-O-galactoside) and quercitrin (quercetin-3-O-rhamnoside) that showed excellent antioxidant activity.^[13] The albibrissinoside B was found to be a radical scavenger on the 1, 1- diphenyl-2-picrylhydrazyl (DPPH) radical.^[14]

Antidiabetic properties

Two flavonol glycosides, quercitrin and isoquercitrin from the flowers of *A. julibrissin* showed diabetic activity.^[15]

Antibacterial activity

Methanolic extracts of leaf samples of *A. julibrissin* showed highest extractive value (5.14g/100g) and total flavonoid content (35.14mg/g). In overall leaf extracts of *A. julibrissin* showed maximum zone of inhibition towards *P. vulgaris* (10.1 mm*) and least susceptible microorganism is *S. typhi* (3.5 mm*). Stem and flower extracts inhibited bacterial growth only at higher concentrations (MIC, 160-215 and 65-180µg/ml respectively).^[16]

Anti-inflammatory activity

It was found out that the ethanol and hydro alcoholic extracts of the leaves of *Albizia julibrissin* possess a significant anti-inflammatory action while comparing with diclofenac sodium as standard. HRBC membrane stabilization was taken as the screening procedure for obtaining the results. In this particular method inhibition of membrane lysis was taken as the measure of anti-inflammatory property. The haemoglobin content in the supernatant solutions was estimated using spectrophotometer at 560 nm. The percentage haemolysis was calculated by assuming the haemolysis produced in presence of distilled water as 100%. Finally the data obtained which showed 1000 µg/ml solution of ethanol extract of the plant possess 60.87% of percentage inhibition of membrane lysis, whereas std diclofenac sodium showed 69.56% of inhibition at 50 µg/ml.^[17]

Anti leprotic Activity

It is found that the chloroform and methanolic extract of seeds *Albizia julibrissin* have potent antileprotic activity.^[18]

TRADITIONAL USES

Albizia julibrissin is traditionally used drug for snake bite^[19] and leprosy.^[18] In traditional Indian and Chinese medicine, *Albizia* plants are used therapeutically for insomnia, irritability, wounds, as antidysentric, antiseptic, antitubercular etc.^[20]

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