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A Review on Phytochemical Screening and Pharmacological Potentials of Albezia Lebbeck

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ABSTRACT
The plant species Albizia lebbeck, often called the siris tree or lebbeck tree, has a long history of being used medicinally in traditional cultures. This review paper tries to condense the most recent information on the pharmacological effects and phytochemical screening of Albizia lebbeck. A number of plant parts, including the leaves, bark, seeds, and flowers, have had their chemical compositions and biological characteristics examined. According to a phytochemical study, Albizia lebbeck contains flavonoids, alkaloids, saponins, phenolic compounds, and terpenoids. These phytochemicals help explain the plant's wide range of therapeutic qualities. Flavonoids with antioxidant, anti-inflammatory, and antibacterial properties include quercetin, kaempferol, rutin, and apigenin. Lebbeck amine, tryptamine derivatives, and other alkaloids have the potential to have antiviral, antibacterial, anti-inflammatory, and anti-diabetic properties
Key words: Albizia lebbeck, antibacterial, anti-inflammatory, and anti-diabetic

I. INTRODUCTION

In recent years, there has been growing interest in the potential of plant extraction as a natural and effective approach for managing disease, offering a promising alternative to traditional pharmaceutical interventions. This review focuses on the utilization of plant extraction as a novel therapeutic avenue, exploring its potential pharmacological activities. Sirisha tree (Albizia lebbeck, Fabaceae) vernacular names: East India walnut, Indian siris, women's tongue, Rattle pod.

Geographical Distribution

Sparsely spread throughout south-east Asia and Australia. It grows in the altitudinal range from 0-1800m with a mean annual temperature of 20-35°c. It was originally described by Carl Linnaeus as Mimosa lebbeck, later renamed as Albizia lebbeck. [1]

Taxonomical History

The Swedish botanist Carl Linnaeus published the first description of Albizia lebbeck in 1753 in his landmark book "Species Plantarum." The species was previously categorized by Linnaeus as Mimosa lebbeck. Botanists realized the early 19th century that some Mimosa species required their own independent genus. Consequently, Mimosa lebbeck was moved to the genus Albizia in 1816 by French botanist Michel Félix Dunal. Based on morphological variations seen in the flowers' and fruits' structure, the transfer was made.

Table: -1 Scientific position of Albizia lebbeck

Kingdom	**Plantae**
Division	magnoliophyta
Class	Agnoliopsida
Order.	Fabales
Family	Fabaceae
Sub-family	mimosoideae
Genus.	Albizia
Species.	Albizia lebbeck

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Morphological characteristics

Albizia lebbeck is a legume tree that can grow up to 30M tall in open areas, and 0-15M long in plantation areas. Leaves are bipinnate ranging from 1.5 to 6.5 cm long by 0.5 to 3.5 cm wide.

Table 2: phytoconstituents mentioned below are detected by different solvent extractions of different parts of Albezia lebbeck.

S.no	Phytoconstituent	Result
01	Alkaloids	+
02	Glycosides	+
03	Tannins	+
04	Saponins	+
05	Steroid	-
06	Flavonoids	+
07	Carbohydrates	+
08	Amino acids	+
09	Proteins	-
10	Phlobatanins	-
11	Resins	+
12	Anthraquinones	+

Table 3: list of phytoconstituents in different parts of Albizia lebbeck

Sn.no	Parts of Albizia lebbeck	Phytochemicals
1	Root	Lupeol, stigmasterol, 4-hydroxy-3-methoxy cinnamic acid, Trans-p-coumaric acid [2]
2	Bark	D-catechin, isomers of leucocyanidin & melacacidin, Lebbecacidin, ß- sitosterol [3]
3	Leaves	Flavone, 3', 5-dihydroxy-4', 7-dimethoxy flavone, and, triterpene saponin, albigenic, albigenin [4] N-benzoyl-L-phenylalaninol, friedelan-3-one and g-sitosterol; Hexaglycosylated saponins**.**
4	Flower	Lupeol, alpha & ß amyrin [5] Benzyl acetate, benzyl benzoate and crocheting [6] Sterols: - lupeol, cyclyartemol, campesterol, sitosterol
5	Pod	3' , 5-dihydroxy-4',7 dimethoxy flavone. N-benzoyl- L- phenyl alaninol [7] Albigenin, triterpene, albegenic acid, sapogenin [8]
6	Seed	AL-alpha AI (Albizia lebbeck a-amylase inhibitor) [9, 10], cis-11- eicosenoic acid palmitic, stearic, oleic, linoleic, arachidic.

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Pharmacological activities

A number of pharmacological studies revealed that Albizia lebbeck, leaves, bark, and flowers had significant antiallergic, anticancer [11], anticonvulsant, antidiabetic, anti-inflammatory, antimicrobial [12], antinociceptive, antioxidant, antiparasitic, antivenom, neuroprotective, nootropic, antipyretic, antidiarrheal, adulticidal, estrogenic, and wound healing activities. Some of them are discussed below [13, 14]

1. **Hypoglycaemic Activity: -** Scientific studies on Albizia lebbeck showed anti-hyperglycemic activity. methanolic extract from bark exhibited hypoglycemic effect against Certain drugs induced type-ll diabetis such as, streptozotocin-nicotinamide in rats by significantly decreasing the level of serum glucose, creatinine, urea, cholesterol, triglycerides, LDL-cholesterol, and VLDL-cholesterol and increasing HDL levels as compared to diabetic control [15]
2. **Anti-inflammatory:** Albizia lebbeck has been researched for its therapeutic benefits, but little scientific study has been done on how it affects inflammation. Albizia lebbeck contains a number of substances, including flavonoids, alkaloids, and saponins, which have demonstrated potential anti-inflammatory effects in a number of studies. A class of plant molecules called flavonoids is well known for its anti-inflammatory and antioxidant capabilities. According to certain research, flavonoids can reduce inflammation by preventing the formation of inflammatory mediators including prostaglandins and cytokines [16].
3. **Anti-bacterial:** The selected clinical isolates were used to test the methanol extract's antibacterial effectiveness. The numerous tests' results revealed that A. lebbeck's methanolic extract had the best spectrum actions, which prevented the growth of all test microorganisms in different zones. The strongest inhibitory activity was displayed by S. typhi, followed by E. coli and S. aureus [17].
4. **Anti-fertility:** Methanolic extract of A. Lebbeck given account of antifertility activity in other studies Bark and pod methanolic extracts containing saponin have anti-spermatogenic properties.
5. **Anti-cancer:** some priliminary studies have investigated the potential anti-cancer properties of A. lebbeck [18]. It is believed that antioxidant and anti-inflammatory properties of this plant play important role in cancer prevention. Numerous scientific research has revealed promising anti-cancer capabilities for the A. lebbeck. The extracts from the plant have shown substantial promise in preventing the spread and growth of cancer cells. Flavonoids, saponins, and other bioactive substances found in Albizia lebbeck, as well as alkaloids, have been proven to have anti-cancer properties by causing apoptosis (programmed cell death), blocking angiogenesis (the growth of new blood vessels), and preventing metastasis (the spread of cancer).
6. **Aphrodisiac:** This plant has long been revered for its aphrodisiac qualities [19], The plant has a long history of use as a natural treatment to boost libido and sexual vitality in several traditional medical systems. It is thought that Albizia lebbeck has some bioactive substances that can increase sexual performance and arouse desire. Albizia lebbeck may have potential as a natural aphrodisiac, even if there is no scientific research on its aphrodisiac effects. This is because of anecdotal evidence and historical use. Individual experiences may differ, it is crucial to remember, and further research is required to confirm and comprehend the precise mechanisms underlying its aphrodisiac benefits [20, 21].

II. CONCLUSION

Albizia lebbeck's phytochemical analysis found that it has a wide variety of bioactive substances. Alkaloids, flavonoids, tannins, saponins, and terpenoids are just a few of the phytochemicals that exhibit a variety of pharmacological properties and have a great deal of promise for therapeutic use. Albizia lebbeck contains alkaloids that have proven to have potent antibacterial, anti-inflammatory, and analgesic effects. The powerful antioxidant and anticancer properties of flavonoids, on the other hand, make them useful in reducing oxidative damage and thwarting malignant cells. While saponins have anticancer activities, tannins are recognized for their antibacterial and wound-healing qualities. Another group of phytochemicals called terpenoids has demonstrated strong anti-inflammatory, antibacterial, and anticancer effects. A promising source of phytochemicals with a wide range of bioactivities and significant therapeutic potential is Albizia lebbeck. Continued study in this field will

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advance the discovery of fresh, potent natural treatments for a variety of diseases as well as our understanding of the therapeutic characteristics of the plant.

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