American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

The Medical, Agricultural and Economic Importance of *Albisia Julibrissin*

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Received: 2024, 15, Dec
Accepted: 2025, 21, Jan
Published: 2025, 22, Feb

Annotation: The use of the Albizia plant in traditional medicine by various countries around the world is of great importance due to the potential health benefits it can provide. Different portion of the plant are employed for their various medicinal uses, including the treating of conditions such as asthma, cough, and digestive disorders. It is noteworthy that the active compounds present in the plant have anti-inflammatory and antibacterial properties, in addition to antioxidant effects. Economically, the Albizia plant is of great importance as it is used in the production of wood, which is a valuable resource used in construction, furniture manufacturing, and the manufacture of various wood products. It also contributes to supporting biodiversity by providing habitats for many birds and insects. The plant shows importance in regulating shade and local climate, as Albizia trees provide wide shade, contributing to a cooler local climate. In this study, the medical, economic, and environmental importance of the Albizia plant is reviewed.

Keywords: Albizia, medicinal

importance, active compounds.

Introduction

Medicinal plants have occupied a large place in the field of medicine and pharmacy and have become a safe source for the pharmaceutical industry at the beginning of the current century, as attention has been paid to their use in the programs of the World Health Organization [WHO] despite the great development in the fields of chemistry, pharmacy and the chemical pharmaceutical industry, as recent studies have indicated the importance of medicinal plants as alternative antioxidants to drugs and chemical treatings. Recent scientific studies and research have proven the pharmaceutical effectiveness of many plant compounds that have antioxidant properties that protect against infection or reduce the severity of some diseases, especially cancer in humans, in addition to the low risk of chronic diseases in people who consume fruits, as the World Health Organization [WHO] has listed about 21 thousand plants used for medical purposes around the world in the treating of many diseases and cancers [1] [2]

Plant medicine is an essential portion of the traditional medical heritage that has developed over the ages, as it aims to maintain health and prevent physical and mental diseases, in addition to its role in treating them [3]. Herbal medicine is a popular choice for many because it is a healthy option at a low cost, and focuses more on customization, in addition to its side effects being less compared to compound chemical drugs, according to a study [4].

Pharmacological tests of plant extracts have shown antibacterial and anti-inflammatory effects. Albizia components are used in traditional medicine to treat a variety of diseases, such as lung infections, asthma, hemorrhoids, diarrhea, gonorrhea, ulcers, anxiety, depression, and insomnia [5]. Experiments have shown that different solvent extracts of the genus Albizia have excellent efficacy against several bacterial species, including S. Enteritidis, S. Dublin, S. Typhmurium, and S. Aureus. The interaction between scientific community and traditional medicine is accelerating to explore and document the medicinal properties of Albizia, which contributes to enriching modern medical knowledge and practices [6].

Albizia julibrissin originally discovered in Iran and South and East Asia from Azerbaijan and Korea to China. Albizia species were used to curing a wide range of dieses such as depression, insomnia, fever, headache, abdominal pain, diabetes, and rheumatism, as well as to treat wounds, snake bites, and hemorrhoids. [7]

Literature Review

Plant nomenclature and classification

The Albizia julibrissin plant belongs to the legume family Fabacea and includes several species that may reach 150 species. Among its common names are called the Silk tree after the flowers and Mimosa, and in many areas it is mistakenly called Pasha's chin or Al-Labakh, although these two names refer to another tree, which is a dicotyledonous plant with covered seeds [8]. Scientific classification of the plant [9]

Kingdom:Plantae

Phylum: Magnoliophyta

Class: Magnoliopsida

Order : Fabaceae

Tribe:Ingeae

Albizia :Genus

Botanical Description

Albizia is a genus containing many small trees and shrubs with a short lifespan and rapid growth. It was named after the Italian "Filippo degli Albizia" in his honor, as he introduced this species to Europe in the mid-eighteenth century. Albizia is characterized by small flowers with a distinctive shape, and is considered one of the plants used as ornamental plants because of the beauty of its attractive flowers. These trees are characterized by their fast growth, with a length of 15-25 meters and a diameter of 120-150 cm. They are of great importance in the wood industry and have a smell that distinguishes them from other types. [10]

Albizia flowers develop and grow during the months of March and April, and are characterized by their many stamens, each flower having five petals. Its seeds are brown in color and have a thin shell to facilitate the process of seed germination. The leaves are arranged in a feathery manner, and each feather consists of 20-30 green leaflets that are dark green at the top and pale green at the bottom. The seeds are found inside pods that are large and terminal in location and in groups. These pods are light green in color if they are not ripe and are reddish brown when ripe. There are approximately 8-12 seeds in each pod, and the length of each pod ranges between 13-20 cm. [11] [12]

Habitat and Ecology

Albizia trees are distributed in several regions, including tropical and subtropical regions. These trees grow and flourish in stable temperatures and prefer warm climates and cannot tolerate low temperatures. The Albizia genus, which includes a variety of flowering trees and shrubs, grows in many regions of Asia, America, Australia and Africa. Good soil drainage is essential for these trees, so they prefer sandy or sandy clay soil. Albizia trees need moderate and regular irrigation, with the ability to tolerate drought for short periods. These trees can grow and tolerate shaded areas, but they prefer open areas with full sunlight. [13] [14] [15]

Materials and Methods

The methodology employed in this study focuses on a comprehensive review and analysis of the medical, agricultural, and economic significance of *Albizia julibrissin*. A qualitative research approach was adopted to synthesize existing literature, including scientific articles, pharmacological studies, and ecological assessments. Data collection involved an extensive review of peer-reviewed journals, botanical records, and ethnomedicinal sources to evaluate the plant's bioactive compounds and their therapeutic potential. The study also integrates botanical classification and phytochemical composition analysis to understand the mechanisms underlying *Albizia julibrissin*'s medicinal efficacy.

To assess the plant's economic importance, sources related to its industrial applications in timber production, agroforestry, and biodiversity conservation were examined. Environmental aspects were explored by reviewing its role in nitrogen fixation, soil enhancement, and climate regulation. Studies investigating the antibacterial, anti-inflammatory, antioxidant, and sedative properties of its phytochemicals were analyzed to establish the scientific basis for its medicinal uses. The research methodology ensures credibility by emphasizing recent findings from pharmacological and botanical research while validating traditional medicinal knowledge with modern scientific insights.

The study synthesizes qualitative data to highlight the plant's multifaceted significance, relying on an interdisciplinary approach that integrates ethnobotany, pharmacology, and environmental science. This methodology provides a structured yet holistic framework to explore the diverse applications of *Albizia julibrissin*, contributing to an enhanced understanding of its value in medicine, industry, and ecological sustainability. The findings aim to bridge the gap between traditional practices and contemporary scientific validation, underscoring the need for further experimental studies to confirm the plant's therapeutic and economic potential.

Results and Discussion

The most important active compounds in the Albizia plant

Albizia julibrissin is one of the well-known species of the genus Albizia, which includes many species, including the mimosa tree or what is known as the silk tree. Albizia trees contain many active compounds of medical importance that are naturally present in these trees. One of these compounds is saponin, which is characterized by soap-like properties. This substance is often found in the leaves, bark and seeds of Albizia [16].

The ethanolic extract of the roots, bark and leaves of Albizia contains many active compounds that were detected by chemical analysis, including phenols, glycosides, carbohydrates, flavonoids, alkaloids, saponins and tannins, according to the results obtained [17]. The following are some of the active compounds found in some Albizia species [18] [19]:

1. 1- Flavonoids: These compounds have antioxidant properties and are found in many types of plants and help protect the plant from damage caused by free radicals. Among the types of flavonoids in Albizia are quercetin and kaempferol.

2- Alkaloids: These are nitrogenous compounds that play a major role in the chemical defense of the plant and have calming effects. Examples include cyperine.

3- Tannins: These are important phenolic compounds in the plant and play an important role in defending the plant against diseases and predators. The presence of tannins gives it properties that resist microorganisms.

4- Saponins: These are compounds characterized by their foaming properties that reduce surface tension. These substances are characterized by their antimicrobial and anti-inflammatory properties.

5- Other compounds: Sugars and organic acids are among the secondary metabolite compounds found in some species. All of these compounds play a role in the therapeutic medical properties of anti-inflammatory, antioxidant and antimicrobial.. [20] [21] [22]

The role of Albisia in the medical field

Given that Albisia contains a variety of active compounds, the plant is used in its various parts, such as the bark, leaves and roots, to treat many diseases, such as treating various infections such as arthritis, infections affecting the digestive system and hemorrhoids, as a laxative and is used as a herbal treatment for diabetes, headaches, nervous system disorders, skin diseases, some respiratory problems and reproductive problems in women. It is also used to treat stress and anxiety [23] [24]. Pharmacological studies have revealed that Albisia has an acetylcholinesterase inhibitor, anthelmintic, anti-amoebic, antibacterial, anti-inflammatory, antifungal, and antioxidant activity. [25].

Albisia, especially the species Albizia julibrissin, commonly known as the mimosa tree or silk tree, has been used traditionally in many traditional medicine systems. While scientific research on the medicinal properties of Albisia is ongoing, some potential health benefits have been identified, including:

1. Anti-anxiety and sedative effects: Albizia julibrissin has been used traditionally in some cultures for its potential calming and sedative effects.
2. Antimicrobial properties: Due to the plant containing tannins and saponins, it has antimicrobial activity and makes the plant useful in treating fungal and bacterial infections.
3. Antioxidant properties: Flavonoids found in Albizia act as antioxidants, which contribute to protecting cells from free radical damage, which contributes to reducing the incidence of cancer and chronic heart disease.

4. Anti-inflammatory properties: Some compounds found in Albizia, such as tannins, flavonoids and saponins, play a role in reducing various inflammations such as gastrointestinal infections and arthritis.
5. Strengthening the immune system: Some studies indicate that Albizia may help strengthen the immune system, which contributes to improving the ability to resist diseases.
6. Calming properties: Siberian is an alkaloid that has calming properties and contributes to treating stress and anxiety. [. [26][27][28][29]

The importance of the plant from an environmental perspective]30] [31]:

1. Improving soil quality: Some Albizia species have the ability to improve soil quality and improve its biological composition through the process of fixing atmospheric nitrogen by plant roots
2. Combating desertification: Some Albizia species may contribute to combating desertification and improving the sustainability of dry areas.
3. Providing shelter and food for wildlife: Albizia provides shelter for many living organisms, including birds and insects, and is a source of food and shelter.
4. Enhancing biodiversity: Some Albizia species contribute to enhancing biodiversity in the areas in which they are found.

Conclusions

Albisia, portionicularly *Albisia julibrissin*, shows medicinal significance with potential applications in traditional medicine. Its historical uses and preliminary studies suggest a range of health benefits, including anti-anxiety, sedative, anti-inflammatory, antidepressant, antioxidant, immunomodulatory, anti-allergic, and antimicrobial properties. These results are promising, but more research is needed to fully validate and understand medicinal properties of Albisia. Caution should be exercised when using Albisia or any herbal remedy. The diverse bioactive compounds found in the plant contribute to its potential therapeutic effects, making it a subject of ongoing scientific research.

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