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A Comprehensive Review on Alstonia scholaris (Saptaparna): An Ayurvedic Medicinal Marvel

[*]Dr. Maan Singh Meena, [1]Dr. Rajesh Sharma
[*]PG Scholar, Department of Dravyaguna, A & U Tibbia College & Hospital, Karol Bagh, New Delhi [1]Associate Professor, Department of Dravyaguna, A & U Tibbia College & Hospital, Karol Bagh, New Delhi

Abstract:
Alstonia scholaris (*Saptaparna*), a venerable member of the Apocynaceae family, has been extolled for its therapeutic significance in the annals of Ayurveda. The etymology of its name "Saptaparna" reflects its unique characteristic, where "*Sapta*" signifies seven, and "*Parna*" denotes leaves. This ornamental tree, colloquially known as the Devil's tree or Dita bark, has earned its place of prominence not only for its aesthetic appeal but also for its remarkable medicinal properties.

The bark of *Saptaparna* finds itself as a vital constituent in the formulation of Ayush- 64, an indigenous antimalarial drug developed by the Central Council for Research in Ayurvedic Sciences (CCRAS) in India. Traditional medicine systems have long cherished this botanical treasure, employing it to treat a diverse array of ailments, including *Jwara* (fever), *Shwas* (respiratory disorders), *Kushtha* (skin diseases), *Gulma* (abdominal tumors), and *Vrana* (wounds).

Beyond its traditional applications, Alstonia scholaris has garnered widespread recognition in the field of pharmacology due to its multifaceted therapeutic activities. This review provides an exhaustive exploration of its pharmacological profile, delving into its roles as an antidiabetic, antibacterial, antianxiety, anti-inflammatory, antiulcer, anticancer, antimicrobial, antidiarrheal, antioxidant agent, and a potent wound healer. The plant's diverse pharmacological prowess can be attributed to its rich reservoir of phytoconstituents, including alkaloids, steroids, reducing sugars, and flavonoids.

This comprehensive review aims to shed light on the ethnomedicinal applications, chemical constituents, and multifarious medicinal values of Alstonia scholaris, thereby enhancing our understanding of this botanical gem and its potential contributions to contemporary healthcare and drug discovery endeavors.

Keywords:
Devil's tree, Traditional medicine, Ethnomedicinal use, Therapeutic properties

Introduction :

In the realm of contemporary healthcare, herbal medicine has assumed a pivotal role, drawing from the rich tapestry of traditional wisdom and ongoing scientific exploration. Within the vast treasury of herbal remedies, one finds Ayurveda, an ancient system of medicine that employs a plethora of herbs to combat a wide spectrum of ailments. Among these botanical wonders, Saptaparna stands as a stalwart, its significance echoing through the pages of numerous Ayurvedic texts and Nighantus[1], repositories of traditional knowledge.

Stepping back in time to the 5th century AD, the illustrious Sanskrit poet, while penning the epic '*Raghuwansha Mahakavya*,' graced Saptaparna with poetic verses,

extolling its fragrant blossoms and milky sap[2], encapsulating its essence as a symbol of natural beauty.

Scientifically known as Alstonia scholaris R. Br., and belonging to the Apocynaceae family, this remarkable tree bears the monikers "Devil's tree" and "Dita bark" in common parlance. The Apocynaceae family, comprising approximately 250 genera and 2000 species of tropical trees, shrubs, and climbers, is home to Alstonia scholaris
R. Br., a species that flourishes in the sub-Himalayan belt, West Bengal, and Southeast Asia[3]. Interestingly, the wood of this tree has found utility in crafting school blackboards, lending credence to its botanical name, 'Scholaris[4].' In this introduction, we embark on a journey to unravel the multifaceted facets of Saptaparna, from its traditional roots to its contemporary relevance in the world of herbal medicine.

Synonyms :
Certainly, here are synonyms of *Saptaparna* (Alstonia scholaris) with descriptions[5]:

Vishaltwak - The botanical wonder known for its expansive leaves. Chatraparna - A medicinal plant often associated with regal attributes. Shalmalipatrak - A botanical entity recognized by its Shalmali-like leaves.
Gucchapushpak - A herb celebrated for its floral splendor.
Sharada - A nature's gift reminiscent of the autumn season. Saptacchada - A plant adorned with seven-fold foliage.
Madaganda - A herbal gem characterized by its fragrant essence.

These synonyms offer different perspectives on the characteristics and attributes of *Saptaparna*, highlighting its diverse facets and cultural significance.

Morphology[6,7,8] :
Bark: The bark of the tree is characterized by a grayish-brown hue and possesses a rough texture. When cut, it exudes a swift-flowing white milky latex.

Leaves: Typically, the tree's leaves are arranged in clusters of 4 to 7 in a whorled pattern. They have bluntly acuminate tips and appear pale on the lower surface.

Flowers: The tree produces small, scented flowers that are greenish-white in color. These flowers are abundant and are arranged in umbrella-like clusters known as panicles.

Fruits: The tree bears dehiscent follicles, which can be brown or green. They are spindle-shaped and dangle pendulously from the branches. These follicles are characterized by having two lobes.

Seeds: The seeds of the tree are flat and oblong in shape, with a brownish appearance. They exhibit a small tuft of hair at each end.

Properties and action mentioned in Ayurveda[9]:
In Ayurveda, the *Rasapanchak* (Fivefold Classification) of *Saptaparna* is described as follows

Guna (Quality): *Saptaparna* exhibits properties of being light (*Laghu*) and having an oily or unctuous quality (*Snigdha*).

Rasa (Taste): Its taste is characterized by bitterness (*Tikta*) and astringency (*Kashaya*).

Vipaka (Metabolic Outcome): *Saptaparna* has a pungent (*Katu*) metabolic outcome after digestion.

Veerya (Potency): It possesses a hot (*Ushna*) potency.

Dosha (Effect on Doshas): *Saptaparna* is known to pacify or balance *Kapha* and *Pitta doshas*, making it effective for various ailments such as *Kushtha* (skin diseases), *Shwas* (respiratory disorders), *Gulma* (abdominal tumors), *Jwara* (fever), and *Visarpa* (erysipelas).

Phytochemistry[10] :
Phytochemical constituents found in various parts of Alstonia scholaris are:

Stem Bark: The stem bark is notably enriched with echitamine, a novel glycoside known as renoterpine, glucoside triterpenes, aamyring acetate, echitamidine, and ditamine.

Roots: The roots contain akuammigine, tubaitowine, akuammigine, and Hydroxyl-19, contributing to the plant's chemical diversity.

Leaves: In the leaves, one can find an indole alkaloid called picrinine, along with botalin, ursolic acid, β-sitosterol, and a recently discovered alkaloid known as Scholarin.

Flowers: Picrinine and strictamine are among the noteworthy alkaloids present in the flowers of this plant.

Fruits: The fruits harbor Akuammidine (rhazine), adding to the plant's repertoire of bioactive constituents.

Physical Characteristics[11]:
When assessing the physical attributes of this substance, several key parameters are:

Foreign Matter: The presence of foreign matter within the substance should not exceed 2% of the total composition.

Total Ash: The total ash content in the substance should not surpass 11% of its composition.

Acid Insoluble Ash: The portion of ash that remains insoluble in acid should not account for more than 3% of the overall composition.

Water Soluble Extractives: A minimum of 12% of the substance should consist of components that are readily soluble in water.

Alcohol Soluble Extractives: Similarly, not less than 4% of the substance should comprise constituents that can be dissolved in alcohol.

Propagation and Cultivation[10,12]:
The cultivation and propagation of this tree serve both aesthetic and utilitarian purposes. Often chosen for its ornamental value, the tree can be effortlessly cultivated from seeds, thriving best under conditions that maintain a moderate level of moisture.

When considering the suitable environment for cultivation, it is worth noting the following factors:

Altitude Range: The tree demonstrates adaptability to altitudes ranging from sea level up to 900 meters above it.

Annual Rainfall: The optimal mean annual rainfall for successful cultivation falls within the range of 1200 to 1400 millimeters.

Soil Variability: This versatile tree can be cultivated in a variety of soil types, including alluvial soils, basaltic red earth, yellow earth with grey-brown topsoil, and sandy grey earth.

Pharmacological Activities[6,13]:
Alstonia scholaris has exhibited remarkable pharmacological activities in various studies:

It has demonstrated the ability to mitigate liver injuries induced by substances such as carbon tetrachloride, β-galactosamine, acetaminophen, and ethanol. This protective effect is evidenced by reduced levels of serum transaminases and amelioration of histopathologic changes, including necrosis and inflammatory cell infiltration[13].

Within the realm of Ayurveda, Alstonia scholaris finds a special place, particularly in addressing bowel complaints. It is recommended for lactating mothers to enhance lactation, alleviate post-delivery weakness, and aid in digestion. Virtually all parts of the plant find utility in traditional medicine.

Specifically:

Bark[14]: The bark, considered the most intensively utilized part of the plant, possesses a range of properties, including bitterness, astringency, antipyretic (fever-reducing), digestive, laxative, anthelmintic (anti-parasitic), and cardiotonic (heart-toning). It is employed in the treatment of skin diseases and chronic ulcers, as well as in managing conditions like asthma.

Leaves[15]: Leaves of Alstonia scholaris have been employed for diverse therapeutic purposes, including the treatment of malaria, snakebites, diarrhea, dysentery, beriberi, congested liver, and as an antimicrobial agent.

Fruits[16]: The fruits of this plant have been utilized in addressing conditions such as epilepsy and syphilis, exhibiting antiperiodic and anthelmintic properties.

Additionally, Alstonia scholaris is a key component of various Ayurvedic formulations, including *Saptaparnasatvadi vati*, *Saptacchadadi tail*, *Saptacchadadi kwath*, and *Sattaparna ghanasara*[17]. It is also an essential ingredient in the antimalarial drug Ayush-64, formulated by CCRAS in India, which has demonstrated effectiveness in combating malaria and clearing parasitemia[18].

Conclusion :

Alstonia scholaris R. Br., commonly known as the *Saptaparna* tree, graces the landscape with its splendid foliage and expansive canopy. This botanical wonder has been harnessed for generations in traditional medicinal systems for its noteworthy antibacterial and antimicrobial properties. Within its botanical makeup, a treasure trove of chemical constituents, primarily alkaloids, bestows health benefits and aids in combating various ailments.

Notably, this remarkable plant plays a pivotal role as an ingredient in the antimalarial drug Ayush-64, a creation of the CCRAS, further underscoring its medicinal significance. The Saptaparna tree beckons the attention of researchers worldwide due to its promising pharmacological activities.

In essence, Alstonia scholaris R. Br. stands as a symbol of nature's bounty and its potential to contribute to human well-being. Its therapeutic attributes and rich chemical profile make it a compelling subject for continued exploration and scientific investigation on a global scale.

References :

1. Acharya Bapalal G. Vaidya, Nighantu Adarsha, Chaukhamba Bharti Academy, Varanasi; Editia 1990

2. Kalidas, Raghuwansha Mahakavya 4123

3. Psteve Thomas, Anil K, Dipankar G, Rajiv D and Chandrakanta K. Alstoside: A secoiridoid glucoside from Alstonia scholaris. Ind J CHEM 2008;47:1298-1302

4. Pawan K, Dhirendra K, Neha S, Ranaj. Alstonia scholaris:It's phytochemistry and pharmacology. Chrom Young sci. 2011;2:71-8.

5. Dr. Brahmanand Tripathi, Charaka Sanhita, Charak chandrika, Hindi vyakhya, Chaukhamba surbharati prakashan, Varansi.

6. Nadakarni A k. Indian Materia Media. 3rd edition. Mumbai, India: popular press; 1976

7. http:// www. Worldagoforestry.org/treedb2/ AFTPDFS/ Alstonia scholaris. Pdf visited on 2.12.2011.

8. Flowers- Meena A K, Nikita G, Jajpreet N., Meena RP, Rao MM. Review on ethanobotany, phytochemical and pharmacological profile on Alstonia scholaris. Int. Res. J pharm 2001, 2(1):49-54

9. Pro. P. V. Sharma, Dravyagunavigyan Vol.2, Chaukhamba orientalia, Varanasy. 1995.

10. Database Vol.I Pg.No.385

11. The Ayurvedic pharmacopoeia of India, Govt. of India, Ministry of health and family welfare dpt., The controller of publication, Delhi, part-I, Vol.-3(1990-2001)

12. The wealth of India, Raw materials, VolI,CSIR, New Delhi, 50-51(2004)

13. Lin SC, Lincc, Lin YH. Supriyatha S, Pan SL. The protective effect of Alstonia scholaris on hepatotoxin. Induced acute liver damage. Am J Chin Med1996;34:153-64.

14. Warrier P K, Nambiar VPK, Raman Kutty C. Indian medicinal plants. Hyderabad India: Orient Longman; 1996.

15. Kirtikar K R, Basu B D. Indian medicinal plants, Allahaad: LM Basu publication; 1935, Vol. I

16. Pawan K, Dhirender k, Neha S, Ranas. Alstonia scholaris: It's phytochemistry and pharmacology Chron Young Sci. 2011:2:71-8

17. The wealth of India, Raw materials, VolI,CSIR, New Delhi, 50-51(2004)

18. The Ayurvedic pharmacopoeia of India, Govt. of India, Ministry of health and family welfare dpt., The controller of publication, Delhi, part-I, Vol.-3(1990-2001)