

THE COMPREHENSIVE AND PHYTOPHARMACOLOGICAL STUDY OF SAPTAPARNI (ALSTONIA SCHOLARIS) IN DIFFERENT DISEASE - INDIAN MEDICINAL PLANT

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Article Received on
07 November 2020,

Revised on 27 Nov. 2020,
Accepted on 17 Dec. 2020

DOI: 10.20959/wjpr20211-19504

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ABSTRACT

Nature has best bestowed our planet with an enormous Wealth of medicinal plants which are highly esteemed all over the world as a rich source of therapeutic agents for the prevention and cure of diseases and Aliments. Mentioning of this plant under Kushthghna and Udardaprasamana groups indicates about its utility in skin disorders, It's utility in skin disorders in the from of generally used as Antimalarial drugs. Alstonia Scholaris has a promising place in the Ayurvedic system of medicine due to it's various medicinal uses like AntiDiabetic (Pramehaghna), Antibacterial (Jivanunashak), Anti anxiety (Awsadhnashak), Anticancerous (Arbudhnashak), Hepatoprotective (Yakrutrakshak), Anti inflammatory (Sothanasahk), and AnalGestic effect. The plant is rich in Alkaloids, Flavonoids,

Saponoids, Saponin, Steroids reduce sugar and phenolic compound which hamper critical amount of medicinal potential of Herbs. In the present review the complete update on the plant has been enlightened to evaluate the medicinal values of the plant.

KEYWORDS: Alstonia scholaris (Saptarni), Medicianl use, Pharmacoligical Study.

INTRODUCTION

In Kesava Paddhati Saptarni garland is described. Patanjali Bhasaya described it is as the tree possessing seven leaves at each node. Dalhan also provides its morphological description mentioning that its leaves are those of salamali. Sivadatta mentioned it Bahuguccha i.e. with multiple Inflorescence. Charaka quoted its flowers under Sirovirechana and Susruts delineated it under Adhobhagahara dravyas. Finding healing powers in plant is an ancient

idea. The increasing interests on traditional Indian medicine may lead to discovery of novel therapeutic agents. Many of the plant species have been documented pharmacologically and clinically in the world, which are endowed phytochemicals with marked activity on different pathological condition of different diseases. Herbal medicine has become an integral part of standard healthcare, based on a combination of time-honored traditional usage and ongoing scientific research. Rising interest in medicinal herbs has increased scientific scrutiny of their therapeutic potentials and safety. The Apocynaceae family consists of about 250 genera and 2000 species of tropical trees, shrubs and vines. This family is known for plants that have a very high biological activity and medicinal properties. Some of the well-known of this family such as *Rauwolfiaserpentina*, *Alstonia scholaris* and *Alstoniavenenata* are known for the ample amount of medicinal potential. *Alstonia scholaris* Linn, which is popularly known as “Saptaparni” or the “Devil tree” is one of the most versatile medicinal plants having a wide spectrum of biological activity. It is a common tree, growing up to 3.0 meter in height, distributed throughout the sub-Himalayan belt, West Bengal, Bihar, peninsular India and Southeast Asia. It is a beautiful foliage tree with a large canopy, and because of this, it has become a popular ornamental tree in the landscapes and gardens in the warm and temperate regions of Florida, Texas, and California in the United States. Historically, the plant was scientifically named by Linnaeus as *Echites scholaris*. However, to commemorate the great botanist Professor C. Alston, the generic name was changed to *Alstonia*, whereas the species name *scholaris* was retained to signify its use in schools in South East Asia, where the wood is traditionally used to make blackboards and wooden slates. *Alstonia scholaris*, known to be a powerful medicinal plant has been studied well for the bio active principles present in the leaf, stem and the root barks.

Table 1: Vernacular name of *Alstoniascholaris*.

Language	Name
English	Dita bark, White cheese wood
Hindi	Chitavan, Satouna
Sanskrit	Saptaparna
Bengali	Chattim
Tamil	Pala
Gujarati	Saptaparni

Table 2: Systematic position of Alstoniascholaris.

Kingdom	Plantae
Order	Gentianales
Family	Apocynaceae
Tribe	Plumeriae
Subtribe	Alstoniinae
Genus	Alstonia
Species	Alstoniascholaris

Synonyms

Shalmalipatraka, Vishaltwak, Chatraparna, Sharada, Sharada Suparnaka etc.

Morphological Characteristics Leaves

Leaves are 4-7 in a whorl, coriaceous, bluntly acuminate, dark green above and pale beneath. Leaf stalk is 1-1.5 cm long, the lamina is elliptical or elliptical-lanceolate, glabrous or sparsely hairy, tapering towards the base, 11.5-23 x 4-7.5cm is the size. Upper surface is dark green; the lower surface is green-white. The tip of the leaf is rounded or shortly pointed, tapering towards the base.

Bark (Twak)

Bark is rough, tessellated corky grey to grey white and contains whorled branches. The outer blaze is cream to yellowish in color with abundant, milky latex that flows rapidly when cut.

Flowers (Pushpa)

Greenish white flowers in umbrellately branched manner. They are 7-10 mm long, white, cream or green. The tube is hairy lobes sparsely or densely pubescent; 1.5-4 mm long, the left margins overlapping, stronglyperfumed.

**(The flower of sapta parni).****Fruits (Phala)**

Fruit a pendulous, two lobed, dehiscent follicles, brown or green, dry or wood, spindle shaped, 15-32 cm long, 4- 6mm in diameter, containing numerous flat, oblong, brownseeds.

Biochemical Constituents

The phytochemical constituents of *Alstoniascholaris* have been extensively investigated; nearly four hundred compounds have been isolated and characterized. Alkaloids, iridoids, coumarins, flavonoids, leucoanthocyanines, reducing sugars, simple phenolics, steroids, saponins and tannins were documented as the chief chemical constituents. A scholaris contains some of the important alkaloids such as echitamine, tubotaiwine (stem and root bark), akuammicine (root bark), echitamidine (stem bark), pseudthe chief o-akuammidine (leaves, root bark), picrinine(8) (stem bark, leaves, flowers), picralinal, nareline (leaves), strictamine (flowers), (leaves), ditamine (stem bark), echitenine (stem bark), an indole alkaloid (flowers). The new indole alkaloid, alstonamine and a sirsiriketypetype indole alkaloid, rhazmanine, have been isolated from the leaves. Non alkaloid constituents of the flowers are n-hexacosane, lupeolt Beta-amyryn, ursolic and palmitic acids. On steam distillation, flowers yield an essential oil. *Alstoniascholaris*flowers were found to contain alkaloids, carbohydrates, amino acids, phenols, tannins, cardiac glycosides, saponins, flavonoids, terpenoids, steroids, fixed oils and fats. Among other constituents, isookanine-7-o-alpha-Irhamnpyranoside, a new flavanone glycoside and Alstonoside, a secoiridoid glycoside has been recorded. Presence of agr-amyryn, bgr-amyryn, lupeol acetate, venenative, rhazine and yohimbine have been noted. Linalool, cis and Trans linalool oxides, alpha- terpineol, 2-phenylethyl acetate and terpinen-4-ol and steroids are among the other phytoconstituents of the plant.

Traditional Uses Bark (Twak)



(Twak of Sapta parni)

The bark of *Alstonia scholaris* is useful in malarial fevers, abdominal disorders, dyspepsia and in skin diseases. The bark is bitter, astringent, digestive, laxative, anthelmintic, antipyretic, stomachic, cardiotoxic and tonic. The bark extract has been reported to possess antiplasmodial, immunostimulant, anticancer effect and is also hepatoprotective. In Ayurveda

it is reported that the bark of the plant when soaked in water overnight, can reduce the blood glucose level after oral administration. Bark is also used as febrifuge, depurative and galactagogue. It is effective in leprosy, skin diseases, pruritis, chronic and foul ulcers, asthma, bronchitis, agalactia and debility. In folklore medicine, milky juice is applied on wounds, ulcers and rheumatic pains; mixed with oil and dropped into ear, it relieves earache.

Leaves (Patra)

The leaves have been used traditionally as folk remedies for the treatment of many diseases including diarrhea, dysentery, and malaria and snake bites. Juice of the leaves acts in certain cases as a powerful galactagogue. Leaves used in beriberi, dropsy and congested liver. Latex applied to sores, ulcers, tumors and rheumatic swellings.



(Patra of Sapta parni)

Fruits (Phala)

The ripe fruits of the plant are used in syphilis and Epilepsy. It is also used as a tonic, antiperiodic, and anthelmintic, in Ayurveda Saptaparni used to cure many diseases such as Kushta, Shwasa, Gulma Jwara and Visarpa.

Properties (According to AYURVEDIC Samhitas)

Rasa-Tikta (Bitter) Kasaya (Astringent)

Guna-Laghu (light) Snigdha (Oily)

Virya-Usna (Hot)

Vipaka-Katu(Pungent)

Karma-Tridosaharan, Dipana, Hrdya

Dosha- It suppress the Kapha and Pitta Doshas in Body.

Miscellaneous uses and as Herbal formulations

Alstoniascholaris is an antimalarial drug used in many marketed Ayurveda preparations. The methanolic extract of this plant was found to exhibit pronounced antiplasmodial activity. The plant is reported to have anti-mutagenic effect. The drug is reported to cause paralyzing effect

on the motor nerves and consequent fall in blood pressure. The plant has hepatoprotective activity on liver injury. Saptaparna has been reported to be used in the management of hypertension by tribal people of Sikkim.

Physical Contents

Foreign matters-Not more than 2%

Total Ash -Not more than 11 %

Acid Insoluble Ash-Not more than 3%

Water soluble extractives Not less than 12%

Alcohol soluble Extracts -Not less than 4%

Important Preparations

It is used in various Ayurvedic preparations like Saptaparnasatvadivati, Saptachadadivati, Saptacchadadivati, Saptacchadaditaila, Saptacchadadikvatha and saptaparnaghanasara.

Alstonia scholaris is one of the main ingredients of an antimalarial drug AYUSH-64 prepared by CCRAS NEW DELHI, INDIA which proved quite effective in combating malaria and it was also found effective in clearance of parasitemia.

Dose

Churan (Powder):4-8 gm

kwatha: 50-100 ml

Satva: 1-3 gm

Phytochemistry

The Plant enriched with wide range of chemical compounds. It is known to be rich source of Alkaloids which are useful for medicinal purpose. Alkaloids stand as class of major importance in developing new drugs because alkaloids own a great variety of chemical structure and have been identified as being responsible for the pharmacological properties of medicinal plant.

Pharmacological activity

Alstonia scholaris also been reported to in habited liver injuries induced by carbon tetrachloride β - galactosamine, acetaminophen, ethanol as remarked by reduced elevation of level of serum transamiases and histopathological changes such as necrosis and inflammatory

cell infiltration. Ayurveda recommends for bowel complaints. The herb is given to lactating mother to increased lactation, helps the post delivery weakness and digestion.

Antidiabetic and antihyperlipidemic activity

The aqueous extract of *Alstoniascholaris* significantly reduced elevated blood glucose level without showing any hypoglycemic effect. The antidiabetic effect of the extract could be due to increased utilization of glucose by peripheral tissues, improved sensitivity of target tissues for insulin or it may be due to improved metabolic regulation of glucose. *Alstonia schoalris* bark significantly reduced serum triglyceride levels support its long term use not only for better control of blood glucose but also for normalization of disturbances in lipid metabolism which may prevent further predisposition of the patients to cardiovascular complications. Thus bark of *Alstonia scholaris* possesses anti diabetic and anti hyperlipidemic effects. The antiatherogenic potential of the bark extract indicates its usefulness not only in diabetes mellitus but also in long term complications associated with diabetes mellitus.

Antibacterial activity

In-vitro antibacterial activity of methanolic, aqueous and total alkaloid extracts from the trunk bark was evaluated against two gram-positive bacteria including *Bacillus subtilis* and *Streptococcus pyrogens* and four gram negative bacteria, *Escherichia coli*, *Pneumonia*, *Pseudomonas aeruginosa* and *Proteus mirabilis* using disk diffusion method. All extracts showed varying degrees of inhibitory activity against all bacteria. Aqueous extract was found very active against both gram-positive and gram-negative bacteria in comparison to other extracts. Total alkaloid extract was found only active against gram-negative bacteria. Demonstration of antibacterial activity of *A. scholaris* against test bacteria is an indication that the possibility of sourcing alternative antibiotic substances in this plant for the development of newer antibacterial agents. Bacteria used in this study are associated with different type of infections including wounds, burns, typhoid fever, cough, urinary infection and skin infections.

Anticancer activity

The anticancer properties of this medicinal plant, The tumor incidence, tumor yield, tumor burden and cumulative number of papillomas were found to be higher in the carcinogen treated control compared to animals treated with *Alstonia scholaris* extract.

Cultivation and Propagation

It is easily raised through seeds and prefers fairly moist conditions. The Tree is sometime planted in gardens for ornamental purpose. soil including alluvia basaltic red earth yellow earth with grey brown top soil sandy grey earth.

Substitute and Adulterants

Trachelo spermum fragrant hook, Trachelospermum lucidom.

CONCLUSION

The present study shows the pharmacognostic and phytochemical properties of various bioactive compounds present in *Alstonia scholaris*. Some of the meticulous studies on this plant have proved its medicinal value beyond any doubt as mentioned in the article which can form the basis for motivating the scientist community in exploring more information about this plant. Therefore, our efforts should be directed towards the review of medicinal plant, screening of activity, isolation and characterization of the active principles and elucidation of the relationship between structure and activity that can aim towards clinical relevance. The plant contains various chemical constituents mostly alkaloids that can promote health and reduce illness. The global scenario has shown a great increase in phyto medicine research. So, the drug development from this plant has tremendous scope in the future.

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