



RESEARCH ARTICLE

A REVIEW ON PROPERTIES OF ALSTONIA SCHOLARIS

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ARTICLE INFO

Article History:

Received 27th August, 2025
Received in revised form
18th September, 2025
Accepted 24th October, 2025
Published online 30th November, 2025

Keywords:

Alstonia Scholaris, Phytochemicals, Antivenom Activity, Hepatoprotective Activity, Nephroprotective Potential, Analgesic and Anti-Inflammatory Activities.

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ABSTRACT

Alstonia scholaris found widely in tropical regions of Asia. The plant contains a variety of bioactive compounds such as alkaloids, flavonoids and terpenoids, which contribute to its medicinal properties. Alkaloids present in *Alstonia scholaris* such as echitamine, alstonine, and scholaricine have anti-malarial, anti-inflammatory, anti-bacterial, anti-cancer, and anti-diarrheal properties. Flavonoids present in *Alstonia scholaris* such as kaempferol, quercetin have antioxidants that help protect cells from damage and reduce inflammation. They contribute to the plant's anti-inflammatory, anti-cancer, and immune-boosting properties. Terpenoids are found in Lupeol and Ursolic Acid. The terpenoids in *Alstonia scholaris* are used for their strong anti-inflammatory, anti-microbial, and antioxidant effects. They help protect the body from infections, lower inflammation, and support the plant's overall healing ability.

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Citation: Shruti Bhandekar and Charu Sukheja. 2025. "A review on properties of alstonia scholaris.". *International Journal of Current Research*, 17, (11), 35369-35371.

INTRODUCTION

Alstonia scholaris is commonly known as Devil's Tree, Saptaparni, or Blackboard Tree. *Alstonia scholaris* is an evergreen tree found in the tropical regions of Asia. It can grow up to 100 meters tall and produces white flowers. The species name "scholaris" comes from the fact that its wood was traditionally used to make school writing boards. Countries like India and China are famous for their traditional medicine systems such as Ayurveda, Unani, and Siddha. This plant is part of the *Alstonia* genus (Figure 1.1) and has been noted for its usefulness in treating various diseases, including malaria, fever, insomnia, chronic diarrhea, and rheumatic pain (Akhtar and Bano, et. al., 2002). *Alstonia scholaris* has long been recognized for its many medicinal uses. The plant is often used as a tonic for stomach aches, recurring illnesses, and as a general stimulant. Previous studies have shown its effectiveness against fever (Rajakumar & Shivanna, et. al., 2010), arthritis (Yusuf, et al., 2006). It has also been used to treat animal bites (Prusti & Behera, et. al., 2007) and as an antidote for poisons, malaria, various skin diseases (Mollik et al., 2010), leprosy, toe cracks, and cellulitis (Saikia, et. al., 2006). Other reported uses include managing hypertension (Chhetri, et. al., 2005), swelling (Deb, et al., 2009), and pain during delivery (Sharma & Kumar, et. al., 2011). The bark of *A. scholaris* is particularly noted for its effectiveness in treating gastrointestinal issues such as diarrhea, dysentery, jaundice, hepatitis, and ulcers. It has traditional uses in

managing heart-related conditions (Singh & Sangwan, et. al., 2011). These varied applications highlight the importance of *A. scholaris* in both traditional medicine and modern drug research.

Antivenom Activity: (Ghosh, et. al., 2018) found that the bark extract of *Alstonia scholaris* had strong venom-neutralizing activity in Swiss albino mice poisoned by viper venom. It reduced cell damage, liver and kidney necrosis, and local symptoms like pain and swelling. This antivenom effect mainly comes from its triterpenoid and flavonoid content, which block venom enzymes, especially phospholipase A₂ (PLA₂).

Hepatoprotective Potential: *Alstonia scholaris* (L.) R. Br. has strong liver-protective activity. It helps improve liver cell function and supports liver recovery. In a study on rats with CCl₄-induced liver damage, its methanolic extract significantly lowered SGOT, SGPT, ALP, TPP, and TB levels (Kumar, et al., 2012). This confirms its ability to protect the liver. Common liver-protective medications include Ursodiol, Penicillamine.

Nephroprotective Potential: *Alstonia scholaris* shows strong nephroprotective activity. It helps reduce oxidative stress and improve kidney function. In Wistar rats with cisplatin-induced nephrotoxicity, the ethanolic leaf extract significantly lowered MDA and TAS levels. It also restored GSH, thiols, plasma

proteins, and SOD activity. This demonstrates its potential to protect the kidneys (Verma, et al., 2019).

Analgesic and Anti-Inflammatory Activities: In vivo studies showed that *Alstonia scholaris* extract at 200 mg/kg significantly reduced pain and heightened sensitivity. It did this by reversing biochemical changes caused by nerve injury, which was comparable to pregabalin (Singh, et al., 2017). (Shang, et. al., 2010) demonstrated the extract's anti-inflammatory and pain-relieving effects. They identified key alkaloids like picrinine (Akuammiline Alkaloid), vallesamine, and scholaricine. These compounds lowered levels of NO, PGE₂, and MDA while increasing antioxidants. Similarly, (Zhao, et. al., 2017, 2018) found that the alkaloid extract reduced airway inflammation in rats. It achieved this by decreasing WBCs, LDH, SOD, albumin, and ALP levels and suppressing cytokine production in lung tissues.



a



b

Figure 1. (a) Tree of *Alstonia scholaris* (b) Flower of *Alstonia scholaris*

Taxonomy	<i>Alstonia scholaris</i>
Kingdom	Planta, Vegetal, Plants
Subkingdom	Tracheobionta, Vascular Plants
Division	Mangoliophyta, Flowering Plants
Class	Mangoliopsida, Dicotyledon
Subclass	Asteridae
Order	Gentianales
Family	Apocynaceae
Tribe	Plumeriae
Subtribe	Alstoniinae
Genus	<i>Alstonia</i>

REVIEW OF LITRATURE

Suryakant Verma, Sachin Tyagi (2025) studied on “Pharmacognostic, Phytochemical and Pharmacological Approaches of *Alstonia Scholaris* (Apocynaceae)”. Carried out that *Alstonia scholaris* contains important bioactive compounds like alkaloids, flavonoids, and terpenoids. These compounds show various therapeutic effects, including protecting the liver, reducing inflammation, relieving pain, lowering blood sugar, fighting cancer, and combating bacteria. They point out that these plant chemicals make it a promising option for creating natural treatments. Pawan Kumar Vermaa, Sheen Tukra; Bhawani Singh, Priyanka Sharma, Gholamreza Abdib, Zuhaib F. Bhat (2024) studied on “Unveiling the ethnomedicinal potential of *Alstonia scholaris* (L.) R. Br.: A comprehensive review on phytochemistry, pharmacology and its applications”. They Explained that *Alstonia scholaris* has a rich profile of bioactive phytochemicals. These contribute to its various medicinal activities, such as anti-inflammatory, analgesic, anti-diabetic, anti-hypertensive, nephroprotective, neuroprotective, and anti-cancer effects. They emphasize that plant extracts, especially those high in flavonoids and phenolics, help protect against oxidative stress that can harm the liver, heart, kidneys, and nerves. They point out its strong traditional medicinal use and possible health benefits.

Alyaa Majid, Hadeel Rashid Faraj (2023) studied on “A review Study of the Chemical Constituents and Pharmacological Activities of *Alstonia scholaris* linn”. Conclude that *Alstonia scholaris* is important in traditional medicine. Modern techniques for isolating and characterizing its compounds have renewed scientific interest in its traditional uses. The plant has many pharmacological activities, but many of its isolated compounds are still not well studied. They state that the need for systematic validation of these active ingredients to support its long history of use in tribal communities and to identify its potential for future drug development. Jai Bahadur Singh Kachhawa, Neha Sharma, Swati Tyagi, Radhey Shyam Gupta, Krishna Kumar Sharma (2012) studied on “Antibacterial Activity Of *Alstonia Scholaris*: An In Vitro Study”. Their state that the methanolic bark extract of *Alstonia scholaris* had strong antibacterial effects against several test organisms. This indicates that the extract contains active compounds with significant antimicrobial properties. These findings highlight the plant's potential as a promising source for developing new antibacterial agents, especially given the increasing problem of antimicrobial resistance.

DISCUSSION

The findings in this review show that *Alstonia scholaris* has a wide range of pharmacological activities due to its rich phytochemical makeup. The bioactive alkaloids, flavonoids, terpenoids, phenolics, and other secondary compounds are key to its medicinal benefits. Studies indicate that different extracts of *A. scholaris* have hepatoprotective, nephroprotective, anti-inflammatory, analgesic, anti-diabetic, anticancer, antimicrobial, and anti-allergic effects. This supports its long-time use in traditional medicine. A notable point from the research is the strong antioxidant ability of *A. scholaris*, which helps fight oxidative stress, a major cause of damage to the liver, kidneys, heart, and nerves. The plant's alkaloid-rich parts also display significant anti-inflammatory and analgesic effects by influencing important biochemical markers like NO, PGE₂,

MDA, and inflammatory cytokines. The antibacterial studies, particularly those using methanolic bark extract, show encouraging activity against harmful bacteria, suggesting its potential in creating new antimicrobial agents as antibiotic resistance rises. However, several gaps still exist. Many isolated phytochemicals have not been tested for their pharmacological effects. Most studies are preclinical and involve in vitro or animal models, with few clinical trials. In-depth studies on toxicity, standard dosages, and mechanisms are necessary to confirm the plant's safety and therapeutic use. Therefore, while current evidence backs the medicinal potential of *A. scholaris*, more systematic research is needed to turn these findings into clinically useful treatments.

CONCLUSION

Alstonia scholaris is an important medicinal plant with many therapeutic properties backed by traditional uses and modern scientific research. Its phytochemicals, including alkaloids like echitamine, alstonine, and scholaricine, along with flavonoids and terpenoids, support significant hepatoprotective, nephroprotective, anti-inflammatory, analgesic, antimicrobial, anti-diabetic, and antioxidant effects. Its strong antibacterial and antioxidant potential further highlights its value in tackling current health issues, including oxidative stress-related disorders and resistance to antibiotics. Despite its pharmacological potential, many of its isolated compounds have not been fully explored, and clinical evidence is limited. Future research should focus on standardizing its phytochemicals, studying its mechanisms, profiling its toxicity, and conducting clinical trials to confirm its effectiveness. Overall, *Alstonia scholaris* is a valuable natural resource with strong potential for development into effective medicinal products, reflecting the growing interest in plant-based treatments.

REFERENCE

- Banerji A, Banerji J, Isolation of pseudoakummigine from the leaves of *Alstonia scholaris* R. Br., Indian Journal of Chemistry, Vol 15, 1977, 390-391.
- Banerji A, Banerji J, Isolation of pseudoakummigine from the leaves of *Alstonia scholaris* R. Br., Indian Journal of Chemistry, Vol 15, 1977, 390-391.
- Chopra RN, Chopra IC, Handa KL, Kapur LD, Chopra's indigenous drugs of India. Dhur, U.N. & Sons Pvt Ltd Calcutta, 2nd ed., 1958, pp 26.
- Deena Prakash, Divya Bisht, Arvind Kumar Shakya, Medicinal Properties and Phytoconstituents of *Alstonia scholaris*, New Delhi, 2021.
- Jai Bahadur Singh Kachhawa, Neha Sharma, Swati Tyagi, Radhey Shyam Gupta, Krishna Kumar Sharma, Antibacterial Activity Of *Alstonia Scholaris*: An In Vitro Study, Rajasthan, 2012.
- Joshi SG, Medicinal plants, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi, 2000.
- Khyade MS, Vaikos NP, Phytochemical and antibacterial properties of leaves of *Alstonia scholaris* R. Br., African Journal of Biotechnology, Vol-8(22), 2009, 6434-6436.
- Kinghorn AD. Quality Standards of Indian Medicinal Plants, AK Gupta, Coordinator (Medicinal Plants Unit, Indian Council of Medical Research). Indian Council of Medicinal Research, Ansari Nagar, New Delhi, India; c2003. Vol. 1. ISBN-0972-7213.
- Mahavir Chhajed, Atika Jain, Ashish Pagariya, Sumeet Dwivedi, Neetesh Jain, Vijay Taile, *Alstonia scholaris* Linn. R. Br.: An Assessment of its Botany, Conventional Utilization, Phytochemistry and Pharmacology, Madhya Pradesh, 2022.
- Nadkarni AK, Indian Materia Medica, Popular Prakashan, Bombay, 1976.
- Pawan Kumar Verma, Gholamreza Abdi, Sheen Tukra, Zuhaib F. Bhat, Bhawani Singh, Priyanka Sharma. Unveiling the ethnomedicinal potential of *Alstonia scholaris* (L.) R. Br.: A comprehensive review on phytochemistry, pharmacology and its applications, Jammu and Kashmir, 2024.
- Safeekun Nisha, AR Singh, Phytochemical and antimicrobial study of *Alstonia scholaris* (L) R. of family apocynaceae, Madhya Pradesh, 2020.
- Shang JH, Cai XH, Feng T, Zhao YL, Wang JK, et al. Pharmacological evaluation of *Alstonia scholaris*: anti inflammatory and analgesic effects. Journal of ethno pharmacology. 2010 May 27;129(2):174-81.
- Shrestha De, Rajat Das, Mrityunjy Adhikari, Pallab Ghosh, Jyochhana Priya Mohanty and Chandrika Sharma, An updated review on *Alstonia scholaris*: A delightful therapeutic plant, East Sikkim, 2024.
- Suryakant Verma, Sachin Tyagi, Pharmacognostic, Phytochemical and Pharmacological Approaches of *Alstonia Scholaris* (Apocynaceae), Meerut, 2025.
