Rohilkhand Journal of AYUSH Research

Clinical Case Study

A Systematic Review on Vishaghna Property of *Rauwolfia serpentina* (L.) Benth. ex Kurz *(Sarpagandha)*

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https://doi.org/10.65001/RJAR.2026.V2I1N1

ABSTRACT:

Sarpagandha (Rauwolfia serpentina Benth. ex Kurz) is an important medicinal plant described in classical Ayurvedic literature and widely recognized for its diverse therapeutic applications. Traditionally, it has been used for the management of hypertension, insomnia, psychiatric disorders and toxic conditions. Several Ayurvedic texts describe the plant under various synonyms such as *Nakuli, Bhujangakshi* and *Sarpangi*, which indicate its association with snake-related toxic conditions. Many *Nighantus* and *Samhita*s mention the *Vishaghna* (anti-toxic) property of this drug and its application in the management of snakebite, insect stings and other poisonous conditions. The present review aims to systematically analyze the *Vishaghna* property of *Sarpagandha* by evaluating references from classical *Ayurvedic* texts and correlating them with modern pharmacological evidence. Approximately twenty *Ayurvedic Nighantus*, six to eight classical *Samhitas* and about twenty modern research articles were reviewed for this study. Classical *Ayurvedic* literature describes *Sarpagandha* as possessing *Tikta* and *Katu* rasa, *Ushna virya* and *Kapha-Vata shamaka* properties. These characteristics indicate its role in neutralizing toxins and balancing aggravated *doshas*. Modern phytochemical investigations have identified more than fifty indole alkaloids including reserpine, ajmaline, serpentine and yohimbine. These compounds exhibit diverse pharmacological activities such as antihypertensive, sedative, antiarrhythmic, antimicrobial and neuroprotective effects. The findings of the present review suggest that many of the traditional claims regarding the medicinal importance of *Sarpagandha* are supported by modern scientific evidence. However, limited studies have specifically focused on its anti-venom activity. Further experimental and clinical research is therefore required to validate its classical *Vishaghna* property and to explore its potential therapeutic role in modern toxicology.

Keywords: *Sarpagandha, Rauwolfia serpentina, Vishaghna, Ayurveda,* Anti-venom, Alkaloids

Introduction:

Medicinal plants have played a fundamental role in traditional healthcare systems for centuries. *Ayurveda*, the ancient Indian system of medicine, contains extensive descriptions of numerous medicinal plants along with their pharmacological properties and therapeutic indications.[1] Among these medicinal plants, *Sarpagandha (Rauwolfia serpentina)* occupies an important place due to its wide range of therapeutic applications.

Sarpagandha belongs to the family Apocynaceae and is widely distributed in tropical and subtropical regions of Asia, particularly in India, Bangladesh and Sri Lanka.[2]The roots of the plant are mainly used for medicinal purposes and contain several bioactive compounds responsible for its pharmacological activities.[3]

In *Ayurvedic* literature, *Sarpagandha* is described with several synonyms such as *Nakuli, Bhujangakshi* and *Sarpangi*. These names are believed to reflect its association with serpents and toxicological conditions. Many *Ayurvedic Nighantus* describe the drug as *Vishaghna* or *Vishanashini*, indicating its ability to neutralize toxic substances.[6]Classical texts such as *Charaka* Samhita, *Sushruta Samhita* and *Ashtanga Hridaya* also discuss the therapeutic importance of medicinal plants in the management of poisoning and toxic disorders.[17-19]

Apart from its use in toxicological conditions, *Sarpagandh*a has been widely employed in the treatment of hypertension, insomnia, epilepsy and psychiatric disorders. The discovery of the alkaloid reserpine from Rauwolfia serpentina during the twentieth century attracted global attention to this plant and led to its use in modern medicine as an antihypertensive drug.[4]

Although extensive pharmacological research has been conducted on *Sarpagandha,* most studies have focused on its cardiovascular and neuropharmacological effects. Comparatively limited attention has been given to its traditional Vishaghna property described in *Ayurvedic* texts. Therefore, the present review attempts to systematically analyze classical references and correlate them with modern pharmacological findings.

2. Materials and Methods

The present study was conducted as a systematic literature review aimed at evaluating the *Vishaghna* property of *Sarpagandh*a based on classical *Ayurvedic* texts and modern scientific research.

Classical *Ayurvedic* Literature

Information regarding Sarpagandha was collected from major classical *Ayurvedic* texts including i.e *Charaka Samhita[17], Sushruta Samhita[18]*, *Ashtanga Hriday*a[19],

Bhavaprakasha Samhita[16], Madhav nidan and *Sarangdhar Samhita*. In addition, several *Ayurvedic Nighantus* were reviewed, including i.e. *Kaiyadeva Nighantu[3]*, *Dhanvantari Nighantu[6], Bhavaprakasha Nighantu[16], Raj Nighantu* and some other commonly available *Nighantus*.

These texts were examined for references related to synonyms, pharmacodynamic properties and therapeutic indications of *Sarpagandha*, particularly in relation to toxicological conditions.

Modern Scientific Literature

Modern scientific literature related to Rauwolfia serpentina was collected from databases such as PubMed, Google Scholar and AYUSH Research Portal by searching with the key words '*Vishaghna* property of *Sarpagandha*' and 'Anti-poisonous effect of Rauwolfia serpentine'. Studies focusing on phytochemistry, pharmacological activities and therapeutic applications of the plant were included.[5,7,8,20,21]

Initially around twenty-five articles were identified. After removing duplicate and irrelevant studies, approximately fifteen articles were selected for final analysis.

3. Results

Botanical Description

Sarpagandha (Rauwolfia serpentina Benth. ex Kurz) is an evergreen perennial shrub that grows up to a height of about 60 cm. The plant possesses long, tuberous roots that are pale brown externally and white internally.[5] In Hindi it is known as *Nakulkanda, Nakulikanda, Nayi, Harkai Chandra, Rasna-bheda, Chota-chanda, Dhawalbaruwa,etc*. It *Vaidya* community it is a controversial drug.

The leaves are arranged in whorls of three or four and are elliptic or lanceolate in shape. The flowers are small and white or pinkish in colour and appear in terminal clusters. The fruit is a small drupe that becomes black upon maturation.

The plant grows well in humid tropical climates and fertile soil. The root is considered the most important medicinal part and is generally harvested after two to three years of cultivation.

***Ayurvedic* Pharmacodynamic Properties**

In *Ayurveda*, the therapeutic properties of drugs are explained through Rasa *Panchaka*, which includes Rasa, *Guna, Virya, Vipaka* and *Prabhava*.

The pharmacodynamic properties of *Sarpagandha* are described as follows.[15]

Parameter	Description
Rasa	*Tikta, Katu*
Guna	*Ruksha*
Virya	*Ushna*
Vipaka	*Katu*
Dosha-karma	*Kapha-Vata Shamak*

These characteristics suggest that the drug possesses detoxifying and channel-clearing properties. Rauwolfia canescens and Rauwolfia densiflora are used as adulterant of *Sarpagandha*.

Vishaghna Property in Classical Literature

The *Vishaghna* (anti-toxic) property of *Sarpagandha* (Rauwolfia serpentina) is clearly documented in several *Ayurvedic Nighantus*. During the present review, important references describing its ability to neutralize various types of poisons were identified from classical lexicons including *Kaiyadeva Nighantu, Bhavaprakasha Nighantu, Dhanvantari Nighantu, Raj Nighantu and Maha Aushadh Nighantu*. These texts describe the drug under the synonym *Nakuli* and emphasize its effectiveness against poisoning caused by snakes, insects, scorpions and rodents.

According to *Kaiyadeva Nighantu (Oshadhi Varga 777), Nakuli* possesses *Katu* and *Tikta* rasa along with *Ushna virya* and is useful in the management of various types of toxic conditions:

नकुलेष्टाकटुस्तिक्ताकषायोष्णानियच्छति।

व्रणकृमीन्सर्पलूतावृश्चिकाखुविषंगरम्॥

This verse indicates that the drug is effective in alleviating wounds, parasitic infections and poisoning caused by snakes, insects, scorpions and rodents.

Similarly, *Bhavaprakasha Nighantu (Haritakyadi Varga 165–166)* describes several synonyms of the drug such as *Nakuli, Bhujangakshi* and *Sarpangi* and highlights its *Vishanashini* (anti-toxic) nature:

नाकुलीसुरसानागसुगन्धागन्धनाकुली।

नकुलेष्टाभुजङ्गाक्षीसर्पाङ्गीविषनाशिनी॥

नाकुलीतुवरातिक्ताकटुकोष्णाविनाशयेत्।

भोगिलूतावृश्चिकाखुविषज्वरकृमिन्व्रणान्॥

The text explains that *Nakuli* possesses *Tikta* and *Katu* rasa with *Ushna* potency and is capable of destroying toxins produced by snakes, insects, scorpions and rodents. It is also beneficial in conditions associated with fever and parasitic infections.

Dhanvantari Nighantu (Karaviradi Varga 92) further supports this property by describing the drug as effective in neutralizing rodent poison and eliminating parasitic disorders:

नाकुलीकटुरुष्णास्यात्तिक्ताऽपिपरिकीर्तिता।

मूषिकस्यविषंहन्तिकृमिदोषविनाशिनी॥

This verse indicates that *Nakuli* possesses *Katu* and *Ushna* properties and is particularly effective in destroying rodent poison and parasitic infestations.

Similarly, *Raj Nighantu (Mulakadi Varga 96)* describes the drug as capable of destroying various types of toxins and balancing the three *doshas:*

नाकुलीयुगलंतिक्तंकटूष्णंचत्रिदोषजित्।

अनेकविषविध्वंसिकिञ्चिच्छष्ठद्वितीयकम्॥

The text highlights its *Tikta* and *Katu* qualities along with *Ushna* potency and indicates its ability to neutralize multiple forms of poison.

Another important reference is found in *Maha Aushadh Nighantu (Vidyoatini commentary 98):*

नाकुलीकटुकातिक्ताकषायोष्णाविनाशयेत्।

भोगिवृश्चिकलूताखु-विषज्वरकृमिव्रणान्।

रक्तचापस्यचाऽधिक्यंमर्दयेदविकल्पतः॥

This verse describes *Nakuli* as possessing *Katu, Tikta and Kashaya rasa* with *Ushna virya*. It states that the drug is effective in destroying poison produced by snakes, scorpions, insects and rodents. Additionally, the text also indicates its role in reducing elevated blood pressure.

The consistent description of *Sarpagandha as Vishanashini or Vishaghna* across multiple *Nighantus* demonstrates that classical *Ayurvedic* scholars recognized its detoxifying potential. These textual references collectively indicate that the plant was traditionally used in the management of toxic conditions such as snakebite, insect stings and rodent poisoning.

Phytochemical Constituents

Rauwolfia serpentina is a rich source of indole alkaloids, which are primarily responsible for its diverse pharmacological activities. More than 50 alkaloids have been identified from different parts of the plant, particularly the roots, which serve as the main reservoir of bioactive constituents. Among these, reserpine is considered the most significant and pharmacologically active compound.

Based on their chemical nature and basicity, the alkaloids of Rauwolfia serpentina can be broadly classified into the following three categories:

i) Weakly Basic Indole Alkaloids

This group comprises the principal alkaloids of the plant, which are predominantly tertiary indole derivatives. The most important constituents in this category include reserpine, rescinnamine and deserpidine. These alkaloids are mainly responsible for the antihypertensive and sedative activities of the drug. Reserpine, in particular, has been extensively studied and is regarded as the chief bioactive molecule contributing to the therapeutic efficacy of *Sarpagandha*.

ii) Indoline Alkaloids of Intermediate Basicity

These alkaloids possess moderate basicity and are structurally classified as indoline derivatives. Important alkaloids in this group include *ajmaline, isoajmaline, reserpiline* and *rauwolfinine*. Among these, *ajmaline* is well known for its *antiarrhythmic* activity and plays a significant role in the management of cardiac disorders. These compounds contribute to the cardiovascular effects of the plant.

iii) Strong Anhydronium Bases

This category includes strongly basic alkaloids such as serpentine, *serpentinine and alstonine (alsotonine)*. These compounds exhibit distinct physicochemical properties due to their strong basic nature and are believed to contribute to certain central nervous system and antimicrobial activities of the plant.

Other Alkaloids In addition to the above major groups, several other alkaloids have been reported in Rauwolfia serpentina. These include *ajmalinine, ajmalicine, chandrine, renoxidine, reserpinine, sarpagine, tetrahydroalstonine (tetraphyllicine), yohimbine* and 3-epi-yohimbine. Although present in smaller quantities, these compounds collectively contribute to the overall pharmacological profile of the plant.

Quantitative Standards and Variability The plant is known to contain not less than 0.15% of total reserpine-rescinnamine group alkaloids, calculated as reserpine. The concentration of these alkaloids varies significantly depending on several factors, including:

i. Geographical location of cultivation
ii. Season of collection
iii. Age of the plant
iv. Post-harvest processing conditions

Among all plant parts, the roots contain the highest concentration of alkaloids, followed by stems and leaves. Due to this, the root is considered the most therapeutically important part and is widely used in both traditional and modern medicinal preparations.

Pharmacological Activities

Ayurveda classics reports its use for Raktachhap *samak, Vatik-unmaad, Anindra, Tamak-swas, Paitik-shool, Vrikka-shool, Mansik-awasaad, Savrana-sthulantra soth, Grabhasaya-uttejak, Jwarhar and Vish-har actions*.

Modern pharmacological investigations have revealed that Rauwolfia serpentina possesses a wide spectrum of biological activities due to the presence of numerous indole alkaloids and other phytochemical constituents. Among these, reserpine, *ajmaline, ajmalicine* and serpentine are considered the most pharmacologically important compounds. These bioactive constituents influence various physiological systems including the cardiovascular, nervous and immune systems, thereby contributing to the therapeutic potential of the plant.[7,8]

I) Antihypertensive Activity

One of the most well-known pharmacological properties of Rauwolfia serpentina is its antihypertensive activity. The alkaloid reserpine plays a crucial role in lowering blood pressure. Reserpine acts by irreversibly blocking the vesicular monoamine transporter (VMAT) in adrenergic nerve endings. This results in depletion of catecholamines such as norepinephrine, dopamine and serotonin from sympathetic nerve terminals. As a consequence, sympathetic tone is reduced,

leading to vasodilation and a decrease in peripheral vascular resistance.[9]

In addition to reducing blood pressure, reserpine also decreases cardiac output and slows the heart rate, further contributing to its antihypertensive effect. Due to these properties, reserpine was widely used as one of the earliest antihypertensive agents in modern medicine during the mid-twentieth century. Although newer drugs have largely replaced it, the compound remains an important milestone in the development of cardiovascular pharmacology.

ii) Sedative and Antipsychotic Activity

Rauwolfia serpentina also exhibits significant sedative and antipsychotic properties. The central nervous system depressant effect of the plant is primarily attributed to the depletion of neurotransmitters such as serotonin and dopamine in the brain. This reduction in neurotransmitter levels produces a calming effect on the nervous system and helps alleviate symptoms such as anxiety, agitation and insomnia.[10]

Historically, preparations of *Sarpagandha* were used in traditional medicine to treat conditions like insanity, hysteria and sleep disorders. The discovery of reserpine later led to its use in modern psychiatry for the management of psychotic disorders, including schizophrenia. Although its use in psychiatry has declined due to the availability of newer antipsychotic drugs, the historical importance of *Sarpagandha* in psychopharmacology remains significant.

iii) Antiarrhythmic Activity

Another important pharmacological activity of *Rauwolfia serpentina* is its antiarrhythmic effect. The alkaloid *ajmaline* has been extensively studied for its action on cardiac electrical activity. *Ajmalin*e belongs to the class I antiarrhythmic drugs and works by blocking sodium channels in cardiac muscle cells. This action slows the conduction of electrical impulses through the heart and stabilizes abnormal cardiac rhythms.[11]

Ajmaline is particularly useful in the diagnosis and treatment of certain cardiac conduction disorders such as ventricular arrhythmias and Brugada syndrome. Its ability to modulate cardiac electrophysiology makes it an important compound in cardiology.

iv) Antimicrobial Activity

Several experimental studies have demonstrated that extracts of Rauwolfia serpentina exhibit antimicrobial activity against various pathogenic microorganisms. Both aqueous and alcoholic extracts of the plant have shown inhibitory effects against bacterial species such as Staphylococcus aureus, Escherichia coli and Pseudomonas *aeruginosa.[12]*

The antimicrobial activity of the plant is

believed to be associated with its alkaloids and other secondary metabolites such as phenolic compounds and flavonoids. These compounds may interfere with microbial cell wall synthesis, disrupt membrane integrity or inhibit essential enzymatic processes in microorganisms.

v) Anti-inflammatory and Antioxidant Activity

Inflammation and oxidative stress are major contributing factors in the pathogenesis of many diseases. Extracts of Rauwolfia serpentina have been reported to exhibit anti-inflammatory and antioxidant properties. These activities may be attributed to the presence of phenolic compounds, flavonoids and indole alkaloids in the plant.[20]

Antioxidant compounds help neutralize reactive oxygen species (ROS) and prevent oxidative damage to cellular structures such as lipids, proteins and DNA. By reducing oxidative stress and inflammatory responses, the plant may provide protective effects against various pathological conditions.

vi) Anticancer Activity

Recent research has also explored the potential anticancer properties of Rauwolfia serpentina. Certain alkaloids present in the plant have been reported to exhibit cytotoxic activity against various cancer cell lines. These compounds may inhibit tumor growth by inducing apoptosis, suppressing cell proliferation and interfering with tumor angiogenesis.[13]

Experimental studies have shown that extracts of the plant may inhibit the growth of prostate cancer cells and other malignant cell lines.[21] Although these findings are promising, further research including clinical trials is necessary to establish the therapeutic potential of *Sarpagandha* in cancer treatment.

vii) Neuroprotective Activity

Another emerging area of research is the neuroprotective potential of Rauwolfia serpentina. Some studies suggest that its bioactive compounds may help protect neurons against oxidative stress and neurodegenerative damage. The antioxidant properties of the plant may contribute to maintaining neuronal integrity and reducing the risk of neurological disorders.

This neuroprotective effect may also explain its traditional use in *Ayurveda* for the management of neurological and psychological conditions.

4. Discussion

The findings of this review demonstrate that *Sarpagandha* has been recognized as an important medicinal plant in both classical *Ayurvedic* literature and modern pharmacology. Classical texts consistently describe the plant as possessing Vishaghna properties, suggesting its role in neutralizing toxins and managing poisonous conditions.

The synonyms used in Ayurvedic literature provide insight into the traditional

understanding of the plant. Names such as *Nakuli* and *Bhujangakshi* indicate an association with serpents and snakebite. Such terminology often reflects therapeutic indications described in traditional medicine.

The pharmacodynamic properties described in *Ayurveda* further support its detoxifying role. *Tikta rasa* is known to possess blood-purifying and toxin-neutralizing effects, while *Katu* rasa promotes metabolic activity and removes obstructions in body channels.

Modern research has revealed the presence of numerous bioactive alkaloids in Rauwolfia serpentina. The discovery of reserpine was particularly significant, as it became one of the earliest plant-derived antihypertensive drugs used worldwide.[9]

Other alkaloids such as *ajmaline* and serpentine contribute to the pharmacological activities of the plant. *Ajmaline* is widely used as an antiarrhythmic agent in cardiology.

Several experimental studies have also demonstrated antioxidant and antimicrobial properties of the plant extracts.[20] These properties may indirectly support its traditional *Vishaghna* activity, as many toxic conditions involve oxidative stress and inflammatory processes.

Despite these findings, relatively few modern studies have specifically investigated the anti-venom potential of *Sarpagandha*. Considering the repeated classical references to its *Vishaghna* property, further experimental research is required to validate its use in toxicological conditions.

Another important issue is the conservation of Rauwolfia serpentina. Due to excessive harvesting of roots for medicinal use, the plant has become endangered in several parts of India. Sustainable cultivation and conservation strategies are therefore essential.

Overall, the present review highlights the strong correlation between traditional *Ayurvedic* knowledge and modern scientific findings regarding the therapeutic importance of *Sarpagandha*.

5. Conclusion

Sarpagandha (Rauwolfia serpentina) is an important medicinal plant described extensively in *Ayurvedic* literature. Classical texts emphasize its *Vishaghna* property and its use in the management of poisoning conditions such as snakebite and insect stings.

Modern scientific research has identified numerous alkaloids responsible for its diverse pharmacological activities including antihypertensive, sedative and antimicrobial effects. Although many of its traditional uses have been validated scientifically, the anti-venom potential of the plant remains relatively unexplored.

Further experimental and clinical studies are therefore required to validate its traditional *Vishaghna* property and to explore its

therapeutic applications in modern toxicology.

References

1. Kamboj VP. Herbal medicine. Curr Sci. 2000;78:35-51.
2. Monachino J. Rauwolfia serpentina: Its history, botany and medical use. Econ Bot. 1954;8:349-365.
3. Sharma PV. Kaiyadeva Nighantu. Varanasi: Chaukhambha Orientalia; 1998.
4. Vakil RJ. Rauwolfia serpentina in treatment of hypertension. Circulation. 1955;12:220-229.
5. Kumari R, Rathi B. Rauwolfia serpentina: phytochemical and pharmacological aspects. Int J Pharm Sci Rev Res. 2013;23:348-355.
6. Sharma PV. Dhanvantari Nighantu. Varanasi: Chaukhambha Orientalia; 2002.
7. Tyler VE, Brady LR. Pharmacognosy. 9th ed. Philadelphia: Lea and Febiger; 1988.
8. Harisaranraj R, Suresh K. Chemical composition of Rauwolfia serpentina. Adv Biol Res. 2009;3:174-178.
9. Bhatara VS. Rauwolfia serpentina: the first antipsychotic. Am J Psychiatry. 1997;154:894.
10. Rathi P, Kumari R. Therapeutic characteristics of Rauwolfia serpentina. Int J Pharm Pharm Sci. 2013;5:1038-1042.
11. Bemis DL. Antiprostate cancer activity of Rauwolfia extract. Int J Oncol. 2006;29:1065-1073.
12. Yu J, Yan M. Antitumor activities of Rauwolfia extract. Curr Ther Res. 2013;75:8-14.
13. Fabricant DS, Farnsworth NR. Value of plants in traditional medicine. Environ Health Perspect. 2001;109:69-75.
14. Sharma PV. Dhanvantari Nighantu. Varanasi: Chaukhambha Orientalia; 2002.
15. Sharma PV. Dravyaguna Vijnana. Vol II. Varanasi: Chaukhambha Bharati Academy; 2005.
16. Chunekar KC, Pandey GS. Bhavaprakasha Nighantu. Varanasi: Chaukhambha Bharati Academy; 2010.
17. Tripathi B. Charaka Samhita. Varanasi: Chaukhambha Surbharati Prakashan; 2017.
18. Shastri AD. Sushruta Samhita. Varanasi: Chaukhambha Sanskrit Sansthan; 2014.
19. Murthy KR. Ashtanga Hridaya. Varanasi: Chaukhambha Krishnadas Academy; 2012.
20. Gupta RS, Sharma R. Antioxidant and antimicrobial activity of Rauwolfia serpentina extracts. J Ethnopharmacol. 2006;104:281-285.
21. Kumar A, Bhandari A. Pharmacological evaluation of Rauwolfia serpentina. J Pharm Res. 2012;5:456-459.

Cite this article as (NLM):

Pal S, Singh A, Pandit RD. A Systematic Review on Vishaghna Property of Rauwolfia serpentina (L.) Benth. ex Kurz (Sarpagandha). Rohilkhand Research. 2026 Mar-Aug;2(1):1-10. doi:10.65001/RJAR.2026.V2I1N1

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Submitted: 20/04/2026 | *Revised:06/05/2026* | *Accepted:26/05/2026* | *Published:30/09/2026*