

## To Review On Pharmacognostic Account of Rauwolfia

Pallavi Vijay Sonawane, Jagtap Archana Ravindra, Prof. Bodhak Vikas. I

Dr. Kolpe Institute Of Pharmacy, Kolpewadi, Kopargaon

Submitted: 01-02-2023

Accepted: 10-02-2023

### ABSTRACT-

The existence of Rauwolfia serpentina's extensive therapeutic characteristics makes it a significant medicinal plant in the pharmaceutical industry. Due to the presence of alkaloids, carbohydrates, flavonoids, glycosides, phlobatannins, phenols, resins, saponins, sterols, tannins, and terpenes, the plant is well known for treating a variety of illness. The rhizome and root of the plant have been used.

Since ancient times, sedatives have been used to treat a wide range of illness, including high blood pressure, mental agitation, epilepsy, traumas, anxiety, and excitement as well as schizophrenia and insanity. The monoterpenoid indole alkaloid family or more than 50 distinct alkaloids are present in the plant. Ajmaline, ajmalicine, and ajmalimine, deserpidine, indobine, reserpine, rescinnamine, rescinnamidine, serpentine and serpentinine, as well as yohimbine, are the main alkaloids. Additionally, the antifungal, anti-inflammatory, antiproliferative, antidiuretic, anticholinergic, antibacterial, antimicrobial, properties of R.serpentina are also well known. Because of its cultural acceptance, superior compatibility with the human body, and less side effects, herbal medicines continues to be the foundation of healthcare for 75-80% of the world's population. We must thus look for alternate, readily available natural treatments to help millions of people around the world. The objective of the current review is to assess the various pharmacological, phytochemical, and therapeutic properties of R.serpentina as a result of all these characteristics.

### INTRODUCTION-

The dogbane or apocynaceae family includes the evergreen shrub rauwolfia (Rauwolfia serpentina). 100 or more than 100 species belong to the Rauwolfia genus and are indigenous to tropical and subtropical areas of the world, including as Europe, Africa, Asia, Australia, Central America, and the Caribbean. The moist, deciduous woods of Southeast Asia, including India, Burma, Bangladesh, Sri Lanka, and Malaysia, are home to

Rauwolfia serpentina. The plant produces several spherical, glossy, 0.5 cm in diameter, black or purple fruits. Additionally, it features little pink or white blooms. The plant's tuberosity is quite noticeable. The plant also possesses a tap root that measures between 30 and 50 cm in length and 1.2 to 2.5 cm in diameter [1].

The plant is known by various common names in different places as given below:

- **Hindi:** Chandrabhaga, sarpagandha
- **English:** Rauwolfia or Indian snake root
- **Latin:** Rauwolfia serpentina
- **Kannada:** Keramaddinagaddi
- **Bengali:** Chandra
- **Tamil:** Chevanamalpodu
- **Chinese:** Lu fu mu
- **Sanskrit:** Sarpagandha

A significant medicinal plant known as Sarpagandha, Rauwolfia serpentina, is found from the foothills of the Himalayas to the height of 1300–1400 meters. The herb Rauwolfia serpentina, commonly known as sarpagandha, is widely utilized in modern medicine as well as in Ayurveda, Unani, and traditional medicine. For millennia, Hindus utilized this plant as a remedy for snake bites caused by poison [2]. In the 1940s, many doctors in India used the plant, and by the 1950s, it was being used all over the world, including in the US and Canada [3].

It is also commonly used to treat hypertension, sleeplessness, and a number of problems of the central nervous system. Physical and motor, including ecstatic (extremely happy) and anxious sensations [4]. The root's extracts used to treat gastro intestinal illness like diarrhea and dysentery.

### SCIENTIFIC CLASSIFICATION

- **Kingdom:** plantae
- **Phylum:** Angiosperms
- **Subphylum:** Eudicots
- **Class:** Asteroids
- **Order:** Gentianales
- **Family:** Apocynaceae

- **Genus:** Rauwolfia
- **Species:** Serpentina

The 50 distinct alkaloids of Rauwolfia serpentina are present. Alkaloids and yellow resin were found by Dymock in 1891 in the Rauwolfia serpentina's root [5]. Serpentine and serpetinine are two more potent yellow, crystalline bases that are present.

When negative side effects including depression and cancer were linked to rauwolfia root tablets, which over 90% of doctors prescribed as a regular hypotensive medication and which a single manufacturing company alone had sold about 50 million of, the drug's popularity waned. Other negative effects of the reserpine chemical include drowsiness, sleepiness, hypertension, nausea, and vomiting.

#### PLANT PROFILE OF RAUWOLFIA:

- **Synonym:** sarpagandha, chandrika, chootachand, Indian snake root
- **Biological source:** Rauwolfia consists of dried roots of dried roots of serpentina benth, belonging to family apocyanaceae.
- **Geographical source:** It is an erect, evergreen small shrub native to the orient and occurs from the India to Sumatra. It is also found in Burma, Thailand, Philippines, Vietnam, Indonesia, Malaysia, Pakistan and java. In India occurs in the sub Himalayan tracts from Sirhind eastwards to Assam especially in Deharadun, Siwalik range, Rohelkhand, Gorakhpur, ascending to 1300 meter east and west ghats of Tamil Nadu, Bihar, (Patna and Bhagalpur), Konkan, Karnataka and Bengal.



IMAGE OF WHOLE PLANT OF RAUWOLFIA



**ROOTS OF RAUWOLFIA**

#### **Morphological Features:**

The maximum height of Rauwolfia, an evergreen perennial shrub with glabrous leaves, is 60 cm. The roots are whitish and tuberous. A dark cork. The thin, three-whorled leaves are elliptic to lanceolate to obvate, below brilliant green, and above bright green. Its flowers are white with frequently violet tipped corymbose cymes. According to Indian circumstances, the blossoming season lasts from March to May. The inflorescence has red pedicles, a calyx, and a white corolla, and the fruits are drupes that are single or didymous and glossy black.

#### **CULTIVATION:**

**Land preparation:** The plant needs medium to deep, fertile, slightly acidic to neutral soils for richer, healthier growth. They are suited for commercial production because of their high organic content.

**Planting:** The best approach for growing commercial plantations is seed propagation. By using seeds, stem cuttings, or root cuttings, the plant can be multiplied.

**By stem cutting:** During the month of June, nursery beds with constant wetness are filled with hard hardwood stem cuttings measuring 15 to 22 cm.

**By root cutting:** During the spring, carefully spaced nursery beds are planted with root cuttings that are almost 5 cm long. Watering is used to maintain moisture in the beds.

#### **CHEMICAL CONSTITUENTS OF RAUWOLFIA SERPENTINA:**

Reserpine is the main alkaloid found in the plant's roots, stem, and leaves. In 1952, reserpine was originally discovered, and its chemical  $C_{33}H_{40}O_9N_2$  was discovered to be the formula [7]. Reserpine has a yield that ranges from 1.7 to 3.0%. The root barks contain around 90% of the root's alkaloid content [8]. Ajmalicine, ajmaline, isoajmaline, ajmalinine, chandrine, rauwolfinine, renoxidine, rescinnamine, reserpiline, reserpine, and reserpinine are the minor alkaloids found in the plant. Yohimbine, 3-epi-yohimbine, sarpagine, serpentine, serpentinine, and tetraphyllicine.

Ophioxyline, resin, starch, and wax are all present in the root. From plant to plant, alkaloids are present in varying amounts. Research revealed that. The output of total alkaloids varied between 0.8 and 1.3% of the plant's dry weight. According to a different study, the total yield of alkaloids ranges from 0.7 to 3.0% of root content. The maximum amount of alkaloid found in the regenerated roots was 3.3%.

#### **MEDICINAL USES OF RAUWOLFIA:**

According to research [9], Rauwolfia serpentina has the following pharmacologic effects:

1. It induces widespread vasodilatation and a reduction in blood pressure caused by vasomotor centre activation.
2. It calms the central nervous system by acting as a depressant on the cerebral ganglia [10].
3. The bronchial musculature is stimulated.



**ANTIPSYCHOTIC [11,12]:** Reserpine has traditionally been used to treat tardive dyskinesia and schizophrenia. An upright herb with a smooth stem is called rauwolfia. It is used as a drug to reduce fever or as a febrifuge.

**INSOMNIA [11,12]:** Due to its calming qualities, rauwolfia is a useful treatment for "insomnia". The crucial part of. The Rauwolfia herb is very effective in the treatment of madness. 250 ml of goat's milk sweetened with sugar candy and 1 g of powdered root can be taken twice daily.

**TREATMENT OF HYSTERIA:** Rauwolfia is useful in treating "hysteria". 1g of powdered root can be administered thrice with milk. Treatment should be continued till a complete cure is obtained.

**ANTI-HYPERTENSIVE:** It is also used to treat high blood pressure, and the medical community has adopted it in most countries. These alkaloids that directly affect the. It has a specific effect on hypertension. And are frequently employed by those who practise modern medicine. It reduces urticaria's itching.

**OTHER USES:** Additionally, R. serpentina extracts can be used to treat other illnesses like pneumonia, fever, malaria, and eye diseases. AIDS, asthma, headache, skin conditions, and spleen dysfunction [15–21].

#### **MECHANISM OF ACTION:**

Reserpine's mechanism of action has been extensively studied and recorded. Reserpine binds to vesicular protein receptors. In the organelle membranes of specialised Secretory vesicles of presynaptic neurons are monoamine transporters (VMATs). Reserpine blocks secretory vesicles from absorbing neurotransmitters and prevents intracellular neurotransmitters from attaching to VMAT proteins. Reserpine administration ultimately ensures that little or no neurotransmitters are produced from the presynaptic cell. As a result, the postsynaptic neuron experiences little to no or no nerve impulse propagation.

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prevents intracellular neurotransmitters from attaching to VMAT proteins. Reserpine administration ultimately ensures that little or no neurotransmitters are produced from the presynaptic cell. As a result, the postsynaptic neuron experiences little to no or no nerve impulse propagation. It has a strong affinity and binds almost irreversibly to specific receptors in platelets [22,23]

#### **SIDE EFFECTS:**

1. Less common
2. Drowsiness or faintness.
3. impotence or decreased sexual interest.
4. lack of energy or weakness.
5. mental depression or inability to concentrate.
6. nervousness or anxiety.
7. vivid dreams or nightmares or early-morning sleeplessness.

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