



A comparative review on “*Rauwolfia Serpentina*” for antihypertensive potential in modern medicine.

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ABSTRACT:

Rauwolfia serpentina is a medicinal shrub in the milkweed family. It particularly belongs to India, though its name refers to a 16th century German botanist and physician, Leonard Rauwolfia. This shrub is believed to have been used in Indian system of medicine for about 4,000 years. The plant, especially its roots and bark extract, can be found in performance enhancing supplements. The root of *Rauwolfia serpentina* has been employed Indian medicine for various central nervous disturbances including anxiety, excitement, psychosis and epilepsy. The roots of *rauwolfia* contains several alkaloids, the more important being two chemical classes known as ajmaline and the serpentine group. All alkaloids are estimated fairly high in dried roots. *R.serpentina* is used as folk medicine to treat a wide variety of maladies, including snake and insect bites, febrile conditions, malaria, abdominal pain, and dysentery. It is also used as a uterine stimulant, febrifuge, and cure for insanity.

INTRODUCTION

Rauwolfia serpentina (Sarpagandha) also known as Black snakeroot or Indian snakeroot or devil pepper is an evergreen plant, which has been in use since 4000 years in Indian medicine. It is a member of the dogbane or Apocynaceae family. The species are native to tropical and subtropical regions of the world, including Europe, Africa, Asia, Australia, and the Central and South Americas. *Rauwolfia serpentina* is native to the moist, deciduous forests of south east Asia, including India, Burma, Bangladesh, Sri Lanka, and Malaysia. An erect under-shrub, it is a species of flowering plants. The leaves are 7-10cm long, spear-shaped. The flowers are 1 inch long, white and violet. It contains nectar at the deep of the corolla tube. The blooming

time is in the month of August and September. The roots are branched and tuberous.

ISOLATION AND EXTRACTION:

EXTRACTION: 500 gms of dry powdered bark of *Rauwolfia serpentina* was extracted using soxhlet apparatus with chloroform for 5 hours per day and continued for 3 days. The extracted chloroform part was separated, and evaporated to dryness.

ISOLATION OF RESERPINE FROM ROOTS OF *R.SERPENTINA*:

500 mg of the root of *R. serpentina* was crushed into powder and was subjected to chloroform extract under reflux condition. The extraction was continued for 20 minutes and then filtered.

TAXONOMIC CLASSIFICATION: Medicinal plants are characterized according to the habit,

habitat, part used, therapeutic value etc., besides the usual botanical classification. But botanical classification is the most scientific classification and comprehensive. The botanical classification of *R.Serpentina* is as follows

Kingdom- Plantae

Sub-Kingdom- Viridiplantae

Infra Kingdom- Streptophyta (Land Plants)

Super Division -Embryophyta

Division -Tracheophyta (Tracheophytes or Vascular Plants)

Sub Division -Spermatophytina (Spermatophytes or Seed Plants)

Class- Magnoliopsida

Super Order- Asteranae

Order- Gentianales

Family- Apocynaceae (Apocyns or Dogbane)

Genus -Rauwolfia L. (Devil's Pepper)

Species -Rauwolfia Serpentina (Indian Snake Wood or Serpentine Wood)

DESCRIPTION:

Cultivation:

• **Land preparation:-** The plant requires slightly acidic to neutral soils for good growth with medium to deep well drained fertile soils. Clay-loam to silt-loam soils, rich in organic content are suitable for its commercial cultivation. It grows well in frost-free tropical to sub-tropical situations under irrigation.

• **Planting:-** The crop can be propagated by seed, stem cutting and root cuttings. Seed propagation is the best method for raising commercial plantation.

(i) **By root cutting:** Nearly 5 cm long root cutting are planted during spring season closely in nursery beds containing well matured farm yard manures, sand and saw-dust. The beds are kept moist through

watering. The cuttings begin to sprout within 3 weeks. These can be planted in field during rainy season after 8 to 10 cm rains is received. The seedlings are transplanted at 45 cm row to row and 30 cm plant to plant distance. In this manner, an estimated 100 kg of root cuttings are found sufficient for planting one hectare area.

(ii) **By stem cuttings:** Hard wooded stem cutting measuring 15 to 22 cm are closely planted during June in the nursery beds where continuous moisture is maintained. After sprouting and giving out roots, these plants are transplanted in the main field at given spacing.

(iii) **By root stumps:** About 5 cm of roots, intact with a portion of stem above the collar, are directly transplanted in the field having irrigation facilities.

(iv) **By seed:** Seed germination in *Rauwolfia* is highly variable. It is reported to vary from 5 to 30 percent even when only heavy seeds are chosen for sowing purpose. Light and heavy seeds can easily be separated by simple water flotation. Germination of heavy seeds during May-June after soaking them in water for 24 hours was 20-40 percent and 62.77 % germination was recorded in freshly collected heavy seed lot. In all, 6 kg of seeds are sufficient to raise one-hectare plantation. The nursery is prepared by raised beds of 10x10 m. dimension under partial shade made up of one third of well matured farm yard manures and leaf mould, and two-thirds amount medium of silt-loam soil. About 500 sq m. seed bed area is sufficient for raising seedlings enough for planting one hectare land. The seeds sown, 2-3 cm apart in rows in shallow furrows during April end. The furrows are then covered with a fine mixture of soil and farm yard manures. Keep the beds just moist by light watering. Germination starts after 15-20 days and continues up to 30 to 40 days. Seedlings are ready by mid-July for transplanting. The seedlings are transplanted at 30 cm distance within the rows spaced at 45 cm. If rains are

not received during or immediately after transplantation irrigation is necessary for better stand. Rauwolfia is long duration (18 months) and slows growing.

Plant parts of *R.serpentina* used as medicinal purposes or medicines. Its roots, leaves and mostly barks are useful in the medicinal purposes.

Monograph of *R.serpentina*

Bengali name: Sarpagandha

English name: Indian Snake Wood, Serpentine Wood

Botanical name: Rauwolfia Serpentina

Family: Apocynaceae

Duration: Perennial

Growth habit: Moist forests

Native: Indian subcontinent & East Asia

Table 1: PHARMACOLOGICAL ACTIVITY:

Activity	Plant part used	Chemical constituent	Method	Dose
Antihypertensive	Aqueous extract of leaves	Reserpine, Rescinnamine, Deserpidine	HHL method	25 µl
Antipsychotic (neuroleptic)	root powder	Reserpine, Ajmaline, Serpentine		
Antivenom activity	Ethanollic extract of whole plant	-	-	0.14 mg
Hepatoprotective Activity	Ethanollic extract of rhizomes of <i>R. serpentina</i>	Alkaloids	Paracetamol-induced hepatic damage	425 mg/kg
	Methanollic extract of rhizomes of <i>R. serpentina</i>		CCl4-induced hepatotoxicity model	400 mg/kg
Antioxidant	Methanollic extract of leaves	Flavonoids	DPPH assay	100 µg/ml
	Ethanollic extract of roots		FRAP method	50–5000 µg
Antibacterial	Methanollic and acetonic extracts of leaves	Alkaloids	-	
Antifungal	Methanollic and acetonic extracts of leaves	Alkaloids	-	
Anti-proliferative	Indole alkaloids from <i>R. serpentina</i>	Indole alkaloids	-	

* DPPH: 1,1-diphenyl-2-picryl hydrazyl, FRAP: Ferric reducing ability of plasma or plants, HHL: Hippuryl-histidyl-leucine

MODERN MEDICINAL USES:

- It is used for the treatment of high blood sugar. Hence called as universal medicine for lowering blood pressure.
- It cures insomnia, hysteria and hypertension.
- It is also useful for in the treatment of cataract.
- It also cures plague and fever.
- It is used for the treatment of Schizophrenia.
- It is used in different countries as a sedative and tranquilizer.
- It cures anxiety, psychosis and epilepsy.
- It is also used for the treatment of colic and cholera.
- The roots are used for the difficult childbirth.
- It is used to stimulate uterine contraction.
- It is used in various part of the world for the treatment of snake (cobra), scorpion or reptile bite and stings of any poisonous insects.
- It is used in the treatment of hypochondria, mental disorders and a certain form of insanity.
- It cures toxic goitre.
- It is also useful some gynecological problems like frigidity and moliminia.
- It also balances Vata and pitta in the body
- Sarpagandha is also used for rheumatism, edema and intestinal diseases.
- It is also used against constipation and dizziness.

CONCLUSION:

Rauwolfia Serpentina root powder is useful for lowering and managing the blood pressure. Reserpine presents in the roots binds the vesicular monoamine transporters and inhibits the uptake of norepinephrine into secretory vesicles and depletes serotonin and catecholamines from the central and

peripheral axon terminals. It results in depletion of neurotransmitters and reduces promulgation of the nerve impulses occurring in the postsynaptic nerve cells. This depletion results in suppression of sympathetic nerve function, which decreases arterial blood pressure and heart rate. This action reduces the blood pressure. This action may also cause many side effects for which rauwolfia is used in modern medicine.

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