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Comparative study of standards of mother tincture from wild and cultivated roots of *Rauwolfia serpentina* with the standards of H.P.I.

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Abstract

Background of the study - *Rauwolfia serpentina*, a medicinal plant renowned for its therapeutic properties. *Rauwolfia serpentina*, commonly known as Indian snakeroot, has been traditionally used in various medicinal systems for its potential in managing cardiovascular and neurological disorders. As the wild variety of *rauwolfia* is slowly getting extinct, it's important to cultivate it but first we have to see if the cultivated ones are as same in constituents as the wild ones. The research focuses on evaluating the chemical constituents, pharmacological activities, and quality control parameters of *Rauwolfia serpentina* in comparison to the standards set by the H.P.I, which is a crucial reference for the preparation and standardization of homeopathic medicines in India. The comparative analysis not only contributes to the scientific understanding of *Rauwolfia serpentina* but also informs the potential integration of this medicinal plant into the framework of homeopathic formulations outlined by H.P.I.

Keywords: *Rauwolfia serpentina*, Homoeopathic Pharmacopoeia of India (H.P.I), organon of medicine, homoeopathic pharmacy, provings and symptomatology

Introduction

Rauwolfia serpentina is a well-known medicinal plant since ancient times and for its efficacy in the therapeutic system. This medicinal plant is not only used in homeopathy but also in ayurvedic, unani and siddha systems of medicines. It is very well given in the sixth volume of homoeopathic pharmacopeia of India. It is officially covered by German homoeopathic pharmacopeia.

Rauwolfia serpentina is a potential drug for anti - arrhythmic effect, control nerve impulses, reduce heart rate and lower down the blood pressure. But slowly it has become at the verge of extinction in India due to climatic changes and increased demand in the system of medicines.

In the 17th century, a French botanist described a plant that was named *Rauwolfia serpentina* in honor of Dr. Leonhard Rauwolf, a German botanist and physician. The plant made its way into Homeopathy through the work of Dr. W. Templeton, with the proving conducted by the faculty of Homeopathy in London. *Rauwolfia serpentina* is widely used for conditions such as insanity, hypertension, epilepsy, dysentery, and also serves as an antidote for insect and snake bites.

Description: Widely distributed across various states, particularly in the sub-Himalayan regions, the Western Ghats, and the northeastern states like Assam, West Bengal, and Sikkim.



Rauwolfia serpentina/Sarpagandha plant



Sarpagandha roots

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Rauwolfia serpentina, commonly known as Sarpagandha, is a small, evergreen shrub that is native to the Indian subcontinent. It's characterized by its erect, glabrous stem, tuberous roots with pale brown cork, and leaves in whorls of three, which are bright green above and pale green below. The flowers are small, white, and appear in irregular corymbose cymes, often tinged with violet. The plant's fruit is a small, oval, fleshy drupe that turns shiny purple-black when ripe.

Growth habit: It is an erect, perennial, glabrous shrub, reaching a maximum height of about 60 cm. Roots: The plant has tuberous roots with a pale brown cork.

Leaves: The leaves are arranged in whorls of three, elliptic to lanceolate or obovate in shape, with a bright green upper surface and a pale green underside.

Flowers: The flowers are small, white, and are arranged in irregular corymbose cymes, often with red pedicels and a calyx.

Fruit: The fruit is a small, oval, fleshy drupe that ripens to a shiny purple-black color.

Homoeopathic uses of *Rauwolfia serpentina*

1. Hypertension (High blood pressure)

Rauwolfia serpentina is widely used for managing high blood pressure, especially when associated with symptoms like headaches, dizziness, and a feeling of fullness in the head.

2. Insanity and mental disorders

Psychotic conditions: Effective in treating violent behavior, delusions, and acute episodes of insanity.

Restlessness and anxiety: Used for patients who are extremely restless, anxious, or suffer from constant agitation.

Depression: Alleviates symptoms of deep-seated depression, especially when accompanied by suicidal thoughts or a sense of hopelessness.

3. Epilepsy

Seizure control: Used as a preventive remedy for epilepsy, reducing the frequency and intensity of seizures.

Premonitory symptoms: Helps manage the aura (a sense of foreboding) that precedes an epileptic attack, potentially averting the seizure.

4. Sleep disorders

Insomnia: Useful for those suffering from sleeplessness due to anxiety, hypertension, or mental overactivity. Improved

Sleep quality: Helps in achieving deeper and more restful sleep by reducing mental stress and nervous excitement.

5. Headaches and migraines

Hypertensive headaches: Particularly effective for headaches caused by high blood pressure, characterized by a throbbing or pulsating pain.

General headaches: Can be used for various types of headaches, especially when they are linked to stress or nervous tension.

6. Dysentery and gastrointestinal disorders

Chronic dysentery: Treats severe cases of dysentery with symptoms like abdominal pain, frequent stools, and the presence of blood or mucus in the stool.

General digestive aid: Also useful for managing nausea,

vomiting, and other digestive disturbances associated with nervous conditions.

7. Antidote for insect and snake bites

Venom neutralization: *Rauwolfia serpentina* acts as an antidote to insect and snake bites, reducing local symptoms like pain and swelling, and preventing systemic effects.

Emergency use: Can be administered in emergency situations to control the effects of venom until further medical treatment is available.

Allopathic uses of *Rauwolfia serpentina*

1. Reserpine (an alkaloid of *rauwolfia*) was historically used as an antipsychotic, particularly in treating schizophrenia. It works by depleting dopamine and other neurotransmitters, which helps reduce symptoms like delusions and hallucinations. Reserpine was also explored for its effects on cardiac arrhythmias, though its use has been largely replaced by more effective and safer drugs.
2. Studies have shown that reserpine can help prevent migraines, although this use is less common today due to the availability of better-tolerated medications.

Ayurvedic uses

1. Charaka Samhita

Although *Sarpagandha* is not explicitly mentioned in the ancient text of *Charaka Samhita*, its usage is aligned with treatments for conditions such as hypertension (which is conceptually similar to "Raktagata Vata"), insomnia, and mental disturbances, for which Sarpagandha has been traditionally prescribed in later Ayurvedic practices.

2. Sushruta Samhita

Sushruta Samhita also doesn't directly list *Sarpagandha*, but its properties align with herbs used for treating heart diseases, hypertension, and mental disorders, which Sarpagandha addresses in Ayurvedic medicine.

3. Bhavaprakasha

Bhavaprakasha, a later Ayurvedic text, mentions *Sarpagandha* for its powerful calming and blood pressure lowering effects. It is described as having a bitter and pungent taste (Rasa) with a cooling effect (Virya), and it is beneficial in pacifying the Vata and Pitta doshas.

4. Raja Nighantu

Raja Nighantu, a renowned ayurvedic materia medica, provides a detailed description of *Sarpagandha*. It highlights the herb's use in treating insanity, epilepsy, hypertension, and snake bites, reflecting its broad application in traditional medicine.

5. Chakradatta

In Chakradatta, an important Ayurvedic text focusing on treatments, *Sarpagandha* is recognized for its use in managing various mental disorders, insomnia, and high blood pressure.

Materials and Methodology

Collection of samples: Wild and cultivated roots of *Rauwolfia serpentina* in powdered form is collected from nurseries at Bhopal, Madhya Pradesh.

Method of collection: Parts used - roots of rauwolfia plant are used as mentioned in the Homoeopathic Pharmacopoeia of India (vol. I)

Identification: The plant used in this research process are taken after genuine recognition and verified according to the data mentioned in homoeopathic pharmacy books, botany, Homoeopathic pharmacopoeia.

General rules for collection

Only undamaged and fine roots are taken. Roots having fungus or any kind of pollutant on them should be discarded. In clear weather when there is no rain or storm.

Laboratory instruments

- Macerating jar with lid
- Water bath
- Hot air oven
- Desiccator
- Pre coated Silica G slide
- UV light Chamber
- Double Beam UV- VIS spectrophotometer
- Distillating apparatus
- Measuring Cylinders
- Pycnometer
- pH meter
- Electronic weight balance
- Funnel, Beakers, droppers, pipettes etc.

Chemicals and reagents

- Strong Alcohol (95% alcohol)
- Distilled water
- Chloroform Methanol

Sample size: 2mother tinctures and 6 parameters.

Study design: Experimental and Comparative study

Sampling method: Simple randomization

Selection of samples

Inclusion criteria

1. Roots taken after proper botanical identification.
2. Healthy plants that show no sign of disease.
3. Include plants that have full root maturity.
4. Standardized agricultural practices for cultivated plants.
5. Plants should be collected from geographically verified source and location

Exclusion criteria

1. Plants from contaminated site. Plants showing signs of disease, fungal infections, or pest infestations should be excluded.
2. Exclude plants that are not harvested during their optimal growing or harvesting season, as the concentration of active alkaloids can vary significantly depending on the time of year.
3. Exclude cultivated plants that have been grown using non-standardized agricultural practices, such as excessive use of fertilizers, growth hormones, or irregular watering schedules.
4. Exclude plants with immature or underdeveloped roots, as the alkaloid content may be insufficient for producing a mother tincture that meets H.P.I.

Calculation: To prepare 250 ml of mother tincture 125gm of drug substance and 125ml of strong alcohol is taken (Ratio 1:1) Observation and Results:

S. No.	<i>Rauwolfia serpentina</i>			
1.	Common name		Sarpagandha	
2.	Parts used		Roots	
3.	Family		Apocynaceae	
4.	Drug strength		1/10	
			S I	S II
5.	Wt./per ml	Group A	0.877	0.877
		Group B	0.862	0.873
6.	pH	Group A	6.3	6.3
		Group B	5.33	6.24
7.	Total solid	Group A	0.90	0.90
		Group B	6.80	8.40
8.	Alcohol content	Group A	79%	79%
		Group B	62.47%	66.10%
9.	Lambda max	Group B	298nm	298nm

Results and Conclusion

The primary objective of this study was to compare the results of parametric tests conducted on In-House prepared mother tinctures with the standard values provided in the Homoeopathic Pharmacopoeia of India (H.P.I.). Analytical testing revealed that there was no significant difference between the values obtained from the In-House tinctures and the H.P.I. standards. To verify this observation, a paired t-test was applied to the data.

The statistical analysis confirmed that the null hypothesis was accepted, indicating that the quality of the In-House prepared mother tincture aligns with the standard quality as defined by H.P.I., since no significant difference was found. As a result, the In-House prepared Rauwolfia mother tincture is deemed suitable for marketing and can be used to produce further potencies.

In conclusion, both wild and cultivated plants of Rauwolfia serpentina can be effectively used for the preparation of mother tinctures, as neither shows any significant variation in comparison to H.P.I. standards.

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