



NEURO-PSYCOPHARMACOLOGICAL ASPECT OF *RAUWOLFIA SERPENTINA* L. BENTH. EX-KURZ.: AN ENDANGERED PLANT

Pragati Pandey¹ and Tulika Mishra^{2*}

¹Research Assistant, Department of Botany, D.D.U. Gorakhpur University, Gorakhpur. Uttar Pradesh- 273009.

²Assistant Professor, Department of Botany, D.D.U. Gorakhpur University, Gorakhpur. Uttar Pradesh- 273009.



***Corresponding Author: Dr. Tulika Mishra**

Assistant Professor, Department of Botany, D.D.U. Gorakhpur University, Gorakhpur. Uttar Pradesh- 273009.

Article Received on 31/12/2023

Article Revised on 21/01/2024

Article Accepted on 11/02/2024

ABSTRACT

The *Rauwolfia serpentina*, belongs to Apocynaceae family; is a well-known medicinal plant since ancient times, but currently in the need for conservation. It has numerous pharmacological and therapeutic characteristics, which are mentioned in the Atharva-Ved. It is known as a 'medullary stimulant' and possesses neuro-psycopharmacological properties. The presence of bio-functional compounds viz: alkaloids, flavonoids, glycosides, phlobatannins, phenols, resins, saponins, sterols, tannins, and terpenes show potential in curing a variety of ailments. The plant parts, root and rhizome, have been utilized for ages in Ayurvedic remedies to treat a wide range of ailments including high blood pressure, hypertension, mental agitation, epilepsy, traumas, anxiety, schizophrenia, sleeplessness and insanity. Clinical and experimental evidences exhibit that *Rauwolfia serpentina* has potential for curing mental disorders. Reserpine which is clinically found to have analogy with Chlorpromazine, has potential to cure anxiety disorders and nerve restlessness. The present review aims to evaluate the neuro-psycopharmacological aspect of *Rauwolfia serpentina* is like schizophrenia, anxiety, hyperactivity and other nervous disorders.

KEYWORD: Neuro-psycopharmacological, Indigenous drug, anxiety, *Rauwolfia serpentina*, secondary metabolites.

INTRODUCTION

Rauwolfia serpentina plays a great role in the emerging field of neuro –psycopharmacological disorders. It is a climbing herb that belongs to family Apocynaceae. *Rauwolfia serpentina* typically occurs in tropical and subtropical regions; these habitats are found in the geographical area of India, China, Sri Lanka, Burma, Bangladesh, Indonesia and Japan.^[1] In recent years, scientists have shifted their focus to treating neurological and mental disorders by investigating phytochemicals from medicinal plants as potential therapeutic agents. It has deeply rooted itself in traditional medicine and garnered interest due to its historical use and the broad spectrum of pharmacological profile in treating an array of diseases. Recent research has identified a plethora of neuro-active compounds in *Rauwolfia serpentina*, indicating potential utilization in neurological and psychiatric disorders. Understanding the complex interplay between this plant's phytochemicals and intricate brain circuitry opens up possibilities for novel therapeutic approaches.^[2] Advances in neuro-psycopharmacology have an immediate impact on

research related to anxiety, psychotic, degenerative, affective disorders, eating behavior, and sleep behavior.

RAUWOLFIA SERPENTINA: BIOACTIVE COMPOUNDS ROLE IN NEURO –PSYCHIATRIC DISORDERS

Alkaloids, phenols, tannins, and flavonoids are some of the phytochemical substances or secondary metabolites found in *Rauwolfia serpentina*.^[3] For more than two decades *Rauwolfia serpentina* has been the center of research in medicinal field regarding various ailments.^[4] It is clear from the preceding account that between 1930 and 1955, it was widely accepted that certain alkaloid of *Rauwolfia serpentina*, particularly reserpine/ serpasil, had hypotensive, sedative and tranquilizing properties with no significant adverse effects, based on the initial work of Indian scientists, which was later adopted by those in the West, particularly the USA.^[5] The alkaloids ajmaline and serpentine of *Rauwolfia serpentina* are medullary stimulants.^[6] For the treatment of hypertension, tachycardia and thyrotoxicosis, serpasil was used in various countries (Table 1). A poly herbal formulation was given to rat for the study of learning and

memory process which consist of *Rauwolfia serpentina* along with *Emblica officinalis* (Amalki), *Mucuna pruriens* (Kauch bij extract), coral calcium (Praval pishti), *Asparagus raemosus* (Shatavari), *Evolvulus alsinoides* (Shankhpusti) and *Hyoscyamus niger* (Khurasani Ajmo), which has shown that in comparison to control group in elevated plus maze model there is significant decrease in transfer latency, improvement in memory retrieval and passive avoidance acquisition.^[7]

Alstonine is another class of phytochemical found in *Rauwolfia serpentina* with the unique profile of antipsychotic agent which targets the central nervous system and can play innovative role in the drug action and development through the understanding and practicing the traditional medical concept.^[8] Many bioactive molecules have proven themselves effective for remedy of neuro- psychotic disorders.

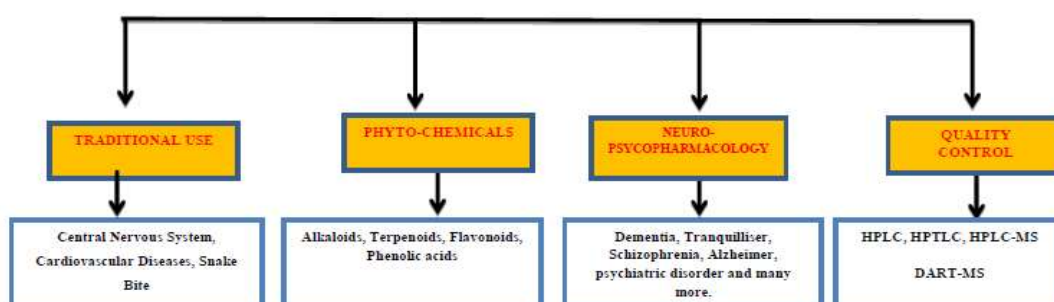
Table 1: Various bioactive molecules present in *Rauwolfia serpentina*.

	Active Compounds <i>Rauwolfia sp.</i>	Ailments
1.	Ajmaline	Hyperpiesia, type -1 Brugada syndrome (Brs) Depressant to heart, respiration and central nervous system ^[9]
2.	Serpentine	stimulation of the heart ^[10]
3.	Reserpine	Hypertension, tachycardia, thyrotoxicosis, sedative, tranquiliser, Parkinson disease and schizophrenia. ^[11, 12]
4.	Yohimbine	Schizophrenia ^[13]
5.	Terpenoid	Hyperglycemic, inflammations, dementia ^[14]
6.	Serpenil	Acute mania, schizophrenia, post- leucotomy ^[15]
7.	Isoajmaline	Treats high blood pressure, dementia ^[16]
8.	Neoajmaline	Lower the blood pressure ^[16]
9.	Serpina	Hypertension; mental illness ^[17]
10.	Alstonine	Treatment of cancer ^[8]

The ajmaline group operates as a general depressant to heart, respiration, and central nervous system, whereas the serpentine group induces respiratory paralysis, nerve depression and heart stimulation.^[18] The root of *Rauwolfia serpentina* causes generalized vasodilation and blood pressure reduction by acting on the vasomotor center. It calms the nervous system by acting as a

depressant on the cerebral regions. *Rauwolfia serpentina* (Indian snakeroot) is a well-known source of phyto-pharmaceuticals for treating insomnia. Many important pharmacological properties are attributed to its various alkaloids, including the active root-alkaloid reserpine. Even psychopharmacological studies primarily focused on reserpine for sedation for its tranquillizer.^[19]

Different Aspect of Rauwolfia Serpentina in Field of Neuro- Pscopharmacology



CONCLUSION

This paper emphasizes on the potential role of the very important and endangered plant of our region *Rauwolfia serpentina*, which being a cure to several ailments like hypertension, skin disorders, epilepsy, snake-bite, cardiovascular diseases and exhibits various traditional uses. But its efficacy in the area of neuro-psychopharmacology is new research regarding this species. Recent studies have shown that *Rauwolfia serpentina* is the emerging, active medicinal plant for the treatment of various types of central nervous system related disorders, depression, neurodevelopment and neurodegenerative disorders. This serious ailment of psychotic troubles requires alternate medicines, as medical science is still inefficient in solving its condition with the existing drugs and medicinal plants like *Rauwolfia* can be of help in this regard with more research in its bio-functional compounds. Initiatives have been taken for neuro-psychopharmacology with the knowledge gained from past experiences to combat the diseases with the secondary metabolites isolated from *Rauwolfia serpentina*.

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