



Deep study of Herbal Antihypertensive drug Rauwolfia Serpentina

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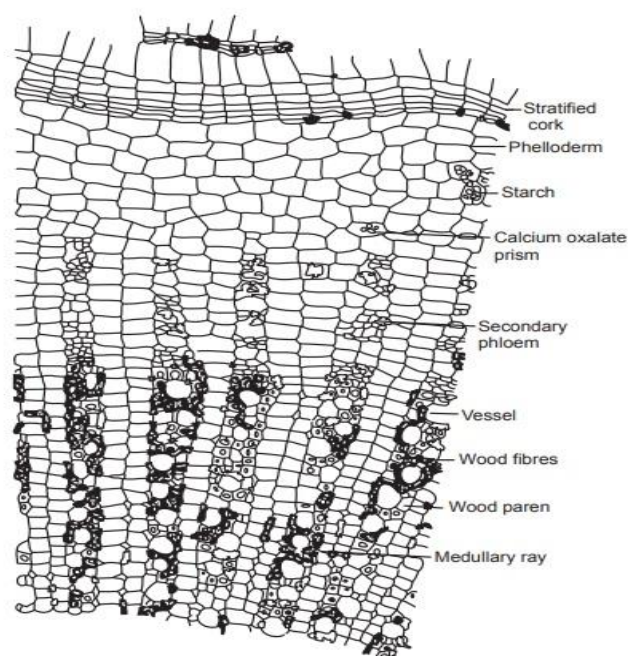
Abstract:

Rauwolfia Serpentina is an Indian Medicinal plant and it is a effective treatment for poisonous reptiles. The root of Sarpagandha is species of flowering plant in family Apocynaceae has been traditionally used in Ayurveda for many years to treat variety's of various diseases which including insanity, epilepsy, insomnia and hyperyension. Sarpagandha root is still in wide use. The present review focuses mainly on Mechanism of Action, Side effects, Chemical composition, Pharmacology and Toxicity and Antihypertensive effect of Rauwolfia Serpentina. The plant is provide safe and effective effect on Blood Pressure.

Keywords: Rauwolfia Serpentina, Reserpine Sarpagandha Root, Chhotachand, Indian Snakeroot, Devil Peeper.

Introduction :- Rauwolfia Serpentina

The plant has many shiny, purple or blank and Greenish fruits. That approximately 0.5 to 0.6 cm in diameter. It also has been small red and white flowers. The plant has also tap root that reaches a length between 1.2 and 2.5 cm. It is an erect shrub that grows 1 meter in it's height. It has cylindrical stem. Rauwolfia Serpentina belongs to family Apocynaceae.



The family Apocynaceae occurs in habitats of tropical and subtropical region. The family include 50 species distributed worldwide in region of Himalaya, Burma, Shrilanka, Bangladesh and other region of Asia. The plant is commonly known as Sarpagandha, Snake root plant, ChhotaChand, Chandrika, etc. It is used as anthelmintic and antihypertensive drug. In diarrhea, dysentery, cholera, fever and central epilepsy the drug R.Serpentina is known to cure various circulatory disorders due to presence of Alkaloids. Nearly 300 species of medicinal and aromatic plant are used in worldwide in pharmaceutical, food and cosmetics. In one of the medicinal imported plant used for purpose of obtaining drug is Rauwolfia Serpentina. In Ayurveda R.Serpentina roots are used for curing hypertension associated headache, dizziness, etc.

Chemical Composition :-

Rauwolfia Serpentina contain many different phytochemical including alcohol, sugars and glycosides, fatty acids, flavonoids, phytosterol, steroid, tannins and alkaloids. The most important alkaloid found in plant are indole alkaloid with more than 50 of those alkaloid having isolated in plant. Indole alkaloid are group of nitrogenous compound that are derived from amino acid tryptophan.

All parts of plant including stem and leaves contain indole alkaloid but they are found in highest concentration in bark of root. The identified indole and indole alkaloid include ajmalidine, ajmaline, ajmalinine, deserpedine, aracine, canescine, papaverine, raubasine, rauhimbine, rauwolfinine, reserpiline, reserpine, reserpinine, sarpagine, serpentine, yohimbine and yohimbine. The exact concentration of alkaloid varies. The study found that yield of total alkaloid ranges from 0.8% to 1.3% of dry weight of plant. Another study put the total yield of alkaloid between 0.7% to 0.3% of root content. The maximum alkaloid content detected in regenerated roots was 3.3%. Other species in rauwolfia genus have been used in place of R.Serpentina including Rauwolfia vomitoria and Rauwolfia caffra from Africa and Rauwolfia heterophylla from Central and South America.

Reserpine :-

Reserpine is one of the major alkaloid of plant. The reserpine content has been found to be highest in root and lower in the stem and leaves. The concentration of reserpine in plant has been found to vary from 0.03% to 0.14% of dry weight of plant. In study of Rauwolfia root reserpine content was 0.955mg/g. Other alkaloid in the plant have also been identified to have biochemical medicinal action including canescine, deserpidine, recanescine and rescinnamine.

Mechanism of Action :-

The mechanism of action of reserpine is well researched and well documented. Reserpine binds to protein receptors called vesicular monoamine transporters (VMATs) in the organelle membrane of specialised secretory vesicle of presynaptic neurons. Reserpine prevent intracellular neurotransmitters from binding to VMAT protein and stop secretory vesicles from uptaking neurotransmitters.

Two isoforms of vesicular transport proteins are called VMAT1 and VMAT2. VMAT1 is mainly found in neuroendocrine cells and peripheral nervous system, particularly in the chromaffin granules in the adrenal medulla, sympathetic neurons and platelets. VMAT2 is mainly found in brain sympathetic nervous system, mast cells and cell containing histamine in the gut and pancreas. Reserpine has an affinity for VMAT2 that is a 3 times greater than its affinity for VMAT1. It has strong affinity and binds almost irreversibly to specific receptors on VMAT, particularly VMAT2.

Pharmacology :-

Reserpine is the most widely studied alkaloid found in R serpentina. The first modern paper on reserpine was published in 1931 in the Indian Medical Journal by Sen and Bose. Reserpine has been classified as an indole alkaloid. It is a white-to-yellow powder that becomes darker when exposed to light. It is odorless, insoluble in water, slightly soluble in alcohol, and freely soluble in acetic acid. Reserpine is widely distributed throughout the body to the brain liver, spleen, kidney, and adipose tissue. Other studies have shown that reserpine is also widely distributed to red blood cells and peripheral neurons. It has been found to be present in breast milk and to cross the placenta and blood-brain barrier.

Uses of Rauwolfia Serpentina (Sarpagandha) :-

Sarpagandha is a word first derived by Antihypertension drug. Sarpagandha drug is a hypertension use as a hypertension in insomnia sexual aggression. It is also cardiodepressant hypotonic and sedative Indian medicine mention about drug sarpagandha. It included is Aparajita Gana which is indicated in mental disorder. Sarpagandha has property to balance Vata and Pitta Dosha in the body. It is used in remedy in Schizophrenia. This herb is used in several parts for the treatment of snake (cobra), scorpion, reptile bite and stings of any poisonous insects.

Side effect :-

Adverse side effects of reserpine include lethargy, sedation, hypotension, nausea, vomiting, abdominal cramping, gastric ulceration, nightmares, bradycardia, angina like symptoms bronchospasm, skin rash, itching, galactorrhoea, breast enlargement, sexual dysfunction. The most common side effect is nasal congestion. No increased risk of birth defects has been shown in female humans who consumed reserpine at any time during their pregnancy. No mutagenic, genotoxic, or recombinogenic effect of reserpine.

Other Medicinal Use :-

Used in the treatment of Visuchika. Treatment of Hysteria Rauwolfia used in treating hysteria. 1gm of powder root can be administered thrice with milk is also used in the treatment of breast cancer. It is also used in the treatment of mental diseases including schizophrenia and bipolar disorder, epilepsy and seizures and of insomnia and sleep problems. It is effective in treatment of anxiety.

Conclusion :-

Based on a review of the literature, Rauwolfia appears to be a safe and effective treatment for hypertension when used in appropriate low doses. An equivalent dose of pure Rauwolfia alkaloids, also known as alseroxyton extract or pure reserpine, can also be used to treat hypertension. The author has found that LDR can be safely recommended to patients who have been screened to be of benefit from the treatment. The total daily dose of Rauwolfia should be lower than 500 mg of root and, in most cases, can be less than 250 mg per day. The dosage of purified alkaloid-alseroxyton extract should be lower than 5 mg per day and, in most cases, is less than 2.5 mg per day. The reserpine dose should be lower than 500 µg per day and, in most cases, lower than 250 µg per day.

Although commercially available pharmaceutical products are used for the treatment of wide range of clinical conditions are available in market but the medicinal plants always remained as primary choice due to their safety as well as high efficacy. Rauwolfia serpentina is one of the natural herbal medicines with wide spectrum of therapeutic effects. The results of current study also revealed the hypotensive and hypolipidemic effect of methanolic extract of R serpentina in albino rats without any damage to liver and kidney.

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