A REVIEW ON SARPAGANDHA - WHOLE HERB V/S RESERPINE – ITS
ALKALOID IN THE MANAGEMENT OF HYPERTENSION

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ABSTRACT
The root of Sarpagandha (Rauvolfia serpentina (L.) Benth. ex Kurz) - is a species of
flowering plant in the family Apocynaceae, has been traditionally used in Ayurveda in the
management of hypertension and other CNS diseases. In the 50th decades, the root gained
popularity for its effect on hypertension. The alkaloid found in its root is attributed to anti-
hypertensive pharmacological action. Thus, initially Rauvolfia was extracted and later on Re-
serpine was isolated with an objective of predictable and better efficacy in the management
of hypertension.

Ayurveda believes in use of whole herb because of apparent benefits over the extract. The
whole herb has many components which can: (1) Help in biotransformation into pharmacoac-
tive forms (2) Enhance bioavailability (3) Reduce the possible side effects (4) Help in smooth
excretion and (5) Prevent development of possible drug resistance. These hypothesis is
proved to be true in case of Sarpagandha as Reserpine has reported many ADRs and also
human population have developed drug resistance resulting in discontinuation of Reserpine
in hypertension management whereas Sarpagandha root is still in wide use. The article will
review the concepts of whole herb and its extracts, published information in this regard in
order to draw a possible suggestive conclusion for safe and effective use of sarpagandha in
place of reserpine.

Key Words: Sarpagandha, Reserpine, Isolation, Alkaloid, whole plant.

INTRODUCTION
Sophisticated advancements in chemistry combined with changing pattern of consumer preference have revoluto-
nized the chemical maneuvering of medicinal herbs. Semi purified / purified chemical
derivatives of herbs like extracts, fractionates, isolates are being preferred over the whole herb for therapeutic uses. As a
logical spin off, this also has thrown up a debate, if these chemical derivatives are medicinally better than the herb. In addi-
tion to the classical support for the use of whole herb, many recent research findings also indicate that extracts are always not
necessarily better medicinal substance than the whole herb as in case of root of Sarpagandha (Rauvolfia serpentina) - whole
herb and its alkaloid reserpine in the management of hypertension and other CNS diseases.

About the drug sarpagandha-
Sarpagandha (Rauvolfia serpentina) is a species of flowering plant in the family Apocynaceae. About 80 alkaloids are isolated from Rauvolfia species among them reserpine is most important principal active constituent [1].


Therapeutic uses [3] - The drug Sarpagandha is cardiodepressant, hypnotic and sedative. It is used in hypertension, insomnia, sexual aggression and vertigo. The drug is much used in schizophrenia and conditions involving influence of evil spirits (bhutawadha). The classical text of Indian medicine mention about drug, Sarpagandha is included in Aparajit Gana which is indicated in mental disorder (susruta uttaratrantra 60/47). Sarpgandha is also included in Ekasar Gana (susruta kalpa 5/84) useful against visha and for treatment of musaka visha (susruta kalpa 7/29). Also use in treatment of Visuchika (vrindamadhava 6/26). In modern era Sarpagandha is used as an effective Antihypertensive and it is WORLD'S FRIST ANTIHYPERTENSIVE DRUG.

OBJECTIVES OF CHEMICAL MANEUVERING

Chemical manipulation of any herb primarily aims to

i. Potentiate, expedite the supposed therapeutic effects of the starting herbal material

ii. Render consistency to these effects

iii. Reduce the volume of the dosage

iv. Standardize the substance chemically

Thus, it is imperative to question, if the above objectives are achieved by chemical processing of the herbs, particularly in the context of their Ayurvedic uses. The stress here is the Ayurvedic use of the herbs, since Ayurveda has its own theoretical underpinnings to use herbs for altering its unique physio-pathological framework of health conditions. The ultimate aim of Ayurveda is to improve the health condition of its subjects (living systems) without any other unwanted effects. Therefore, special care was exercised while formulating any Ayurvedic formulation to ensure relief to the individual under therapeutic intervention in a holistic manner, rather than alleviating a component-oriented symptom.

CHEMIST & AYURVEDIST PERSPECTIVE –

When a chemist picks up an herb, his default reductionist approach makes him to assume that the active ingredient(s) is/are responsible for the pharmacological effects of the herb. Therefore, a chemist tries to identify the active ingredient(s) and endeavours to bring the identified ingredient(s) to an optimum concentration with a tenet to pronounce the effects in a consistent manner. But, an Ayurvedic expert sees both the herb and the individual as whole systems comprising up of many components, which produce the ultimate effects in an interactive mode rather than summation mode. The fundamental assumption is that “whole is not equal to the sum of the component.

Sarpagandha - whole herb V/s Reserpine: REVIEW OF OBSERVATIONS –

After the isolation of the alkaloid, reserpine, a strong controversy has been raging between opposing schools of thought about the relative merits or superiority of the one form of serpentine preparation over the other. The following arguments have been put forward in favour of the alkaloid: (1) Being a pure crystalline single alkaloid, it cannot produce undesirable effects from unknown alkaloids in the whole root. (2) Being a single known entity, results are likely to be more predictable. (3)
Much smaller doses are required to obtain the same results. (4) According to some observers, it is a much more potent hypotensive agent. Those who report favourably on the whole extract in preference to alkaloids support their claims with the following arguments: (1) the whole extract of *R. serpentina* contains not one but several proved alkaloids with hypotensive properties, ajmalinie, serpentine and ajmalinine. According to those of this school of thought, the only pressure-raising alkaloid in the whole extract is serpentinine, which is more than neutralized by the hypotensive alkaloids. (2) Alkaloids are not the only active constituents of *R. serpentina* root, the yellow resin fraction being also a highly active, sedative agent, as first noted by Dymock [4] in 1891, and subsequently confirmed by Gupta, Kahali and Dutta [5] (1941). (3) Numerous authorities in the past have reported the therapeutic superiority of the crude extract [6], [7], [8]. (4) The synergistic action of the total alkaloids eliminates danger of hypersensitivity likely to develop from the use of single alkaloids. Dhanukar S. et al also have noted that unwanted effects encountered with Reserpine is not seen with the powder of the roots. [9]

**DISCUSSION**

With such research findings, let us ponder upon some relevant classical and contemporary points in context of whole herb vs. extracts.

1. **ROLE OF AGNI** – Ayurveda has been using the substances as whole, without chemically purifying it, with a theory that the herb will interact with various Agnis of the living system and the concerned Agnis would transform the substances to pharmaco-active forms. Therefore, the Agnis play a very important role in ensuring the required bio-availability of the herb for its purported actions. But, when we alter the structure composition of the herb by chemically purifying it, then the Agnis will now work upon a different material and it is obvious to encounter changed pharmacological profile. Secondly, the herb is comprised of many substances other than the perceived chief active ingredient, some of which might be helping the Agni factor to optimally ensure bio-availability.

2. **ADVERSE EFFECT** – The other substances besides the perceived chief active ingredient could actually balance the therapeutic effects of the herb to ensure that there are no unwanted and adverse effects. This was seen that reserpine has got reported side effects, whereas Sarpagandha has none.

3. **TONIC EFFECT** – Some constituents of the herb can actually behave like tonics and improve the strength and feelings of well-being of the patient.

4. **COST** – Extraction or chemical purification of the substance means adding more cost to the substance. Thus, any such effort must be diligently and critically evaluated for the cost benefit outcome.

5. **DOSE** – Extraction, of course, reduces the volume of the dosage significantly and often improves the dose delivery systems, but this is far from desirable, if that comes at the expense of desired effects.

6. **REGULATION** – Since extracts are considered new substances, rightly so, the regulations are more stringent for extracts and purified chemical derivatives of herbs in many countries.

**THUS SAID THE SAGES OF YORE** –

All the current chemical maneuvering are made in light of reducing the herbs to its
components level, but Ayurveda uses the herb as a single entity, a system comprising up of various components. These components are present in specific interactive phases with a critical balance. These specific intra & interactive phases determine the ultimate properties and effects of the herb. Therefore, Ayurveda does not subscribe to the theory that “whole is the arithmetic sum of the components” rather it states “whole is greater than the sum of components”.

Ayurveda explains drug action by 5 fundamental pharmacological concepts known as Rasa Panchaka i.e. Rasa, Guna, Veerya, Vipaka & Prabhava. These are manifestations of various components of the drug existing in certain intra- & interactive phases and are specific to individual drug. Ayurveda believes with rigorous logic that each of these concepts are important and indispensable for the desired drug action, as evident from the following sayings of both fundamental treatises of Ayurveda, Charak\cite{10} & Sushrut\cite{11} –

“Kinchidrasena kurute karma, veeryena chaparam, Dravyam Gunena pakena, prabhavena cha kinchana” – Charak. Sutra: 26/71-72

“Tad dravyam atmana kinchid kinchid veeryena sevitam, Kinchid rasavipkabhyam dosham hanti karoti va” – Sushrut. Sutra: 40/17

In light of a debate from reductionism approach and relative importance point of view, dravya / rasa / vipaka / veerya could be considered to be contextually important than others, but in therapeutic application all of them combinedly bring about the desired effects.

CONCLUSION

Ayurveda believes in use of whole herb because of apparent benefits over the extract. The whole herb has many components which can
(1) Help in biotransformation into pharmacoactive forms
(2) Enhance bioavailability
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(5) Prevent development of possible drug resistance.

These hypothesis is proved to be true in case of Sarpagandha as Reserpine has reported many ADRs and also human population have developed drug resistance resulting in discontinuation of Reserpine in hypertension management whereas Sarpagandha root is still in wide use. The authors suggest, it is prudent to use the whole herb for therapeutic applications, until and unless any chemical derivative is proved to be better than the whole herb. The authors do recognize the importance of chemical standardization of
the herbs for quality assurance and strongly advocates for it. Finally, the objective of this article is not to show the extracts in a poorer light, but to critically evaluate the trend of chemically purifying herbs. Unfortunately, owing to lack of such assessments, extraction has become a fashion in herbal industry rather than a justified requirement.

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