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RASA SHASTRA: EXPLORING THE THERAPEUTIC POTENTIAL AND PHARMACEUTICAL EXCELLENCE OF CLASSICAL AYURVEDIC FORMULATIONS

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Abstract

Ayurveda as ancient practice of Indian medicine system offers many holistic approaches for the well being of mankind. Ayurveda rely not only on herbs or animal products but also utilizes metals and minerals for the therapeutic purposes. *Rasa Shastra* is specific branch of Ayurveda which utilizes mineral and metal based formulation for various therapeutic purposes. In *Rasa Shastra* special pharmaceutical techniques are utilizes to transforms minerals and metals into medicines. These medicines offer enormous therapeutic benefits including antioxidant effects, rejuvenating, aphrodisiac and anti-ageing properties. Various methods such as *Mardana, Murchana, Jarana, Niyamana* and *Samkramana* are involved in the *Rasa Shastra* for preparing herbo-mineral formulations. These formulations possess specific pharmaceutical properties to acquire optimal absorption, tissue penetration, bioavailability and targeted action. The pharmacological diversity of *Rasaushadhis* provides options for treating many health ailments including chronic pathological condition. Considering importance of these all facts, present article explores therapeutic potential and pharmaceutical excellence of *Rasaushadhis*.

Key-Words: ***Ayurveda, Rasaushadhis, Parad, Mineral, Metal, Bhasma***

Introduction

Rasa shastra is branch of *Ayruveda* mainly focuses on medicinal uses of mercury, minerals and metals in association with other herbal ingredients or animal products. The formulations such as *Kupipakva Rasa, Pishti, Parpati, Pottali* and *Bhasma* are prepared from the principles of *Rasa shastra.* These formulations are prepared using different metals or precious elements including gold, silver, copper, tin and iron, etc [1, 2].

Types:

Ayurveda described two types of *Rasa dravyas*; *Maharasa* and *Uparasa*. Additionally *Rasa Dravyas* can be classified into three categories, namely *Rasa*, *Dhatu* and *Ratna*.

- *Rasa* refers to the substances which exhibit *Parad*, *Maharasa*, *Uparasa* and *Sadharana Rasa*.

- *Dhatu* refers to metals which are *Suvarna*, *Tamra*, *Loha*, *Naga*, *Vanga* and *Yashada* along with the related *Upadhatus*.
- *Ratna* includes precious stones like pearl, ruby, coral, diamond and sapphire whereas *Uparatna* consists of sunstone, tourmaline, moonstone and garnet.

In addition, the terms *Visa* and *Upavisa* imply the poisonous and poisonous nature of the substance mineral or plants in nature. The substances collected under this classification include those containing aconite, arsenic, *Datura* and *Snuhi* [2-4].

Mercury-based formulations:

Khalvi Rasa, Parpati Rasa, Kupipakva Rasa and *Pottali Rasa* are four types of mercury-based formulations being prepared by the principles of *Rasa Shastra* and classified according to their processing methods and dosage forms [3-5].

- *Khalvi Rasa* is prepared by grinding together the purified mercury and sulphur with other plant material, minerals and metal ingredients in a mortar using *Khalva Yantra*. The end product is fine and homogeneous called *Kajjali* that is used as a raw material in higher level of processes.
- In other types, *Parpati Rasa* involves grinding of purified mercury and sulphur together to produce the homogeneous *Kajjali* that undergoes further heating.
- *Kupipakva Rasa* involves the procedure of preparing *Kajjali* and then putting it in a *Kupi* (narrow necked glass flask) for heating which is carried out under the *Valuka Yantra*. Heating process involves going through various steps to achieve the desired chemical change and produce the final product.
- *Pottali Rasa* is prepared through tightly wrapping the *Kajjali* in silk cloth to form a compact bundle which is then heated in molten sulphur.

Importance of Preparative Method

Preparative techniques like *Shodhana*, *Jarana*, *Marana*, *Murchana* and *Mardana* play crucial role in *Rasa Shastra* for converting raw metals and substances into safe and potent Ayurvedic medications. The importance of *Rasa Shastra* preparative techniques are mentioned in **Table 1**.

Table 1: Therapeutic Importance of Preparatory Techniques in *Rasa Shastra*

S. No.	Preparatory significance	Description
1.	Purification and Detoxification	*Shodhana* eliminate impurities from raw materials to reduce toxicity.
2.	Enhanced Bioavailability	*Mardana*, *Bhavana* and *Marana* reduce particle-size and facilitate physicochemical transformation to improve absorption and effectiveness even at lower doses.
3.	Improved Drug Delivery	Processed and purified *Parada* traditionally enhances delivery and effectiveness of other herbal and mineral components.
4.	Stability and Shelf Life	Processing converts unstable materials into stable to ensure better preservation and storage.
5.	Patient Compliance	Low dosing frequency, smaller administration quantities and improved palatability promote patient compliance.

Ayurvedic & Pharmaceutical Significance of *Rasaaushadi*

Rasa Shastra involves various pharmaceutical processes like *Shodhana, Marana, Mardana, Bhavana* and *Putapaka*. All of these processes are responsible for altering the initial materials into final formulations having specific physicochemical characteristics and desired therapeutic potency. Some well-known formulations that represent the medicinal value of *Rasa Shastra* include *Bhasma, Kajjali, Rasa Sindura, Parpati, Khalviya Rasayana* and *Pottali Rasa*. Each of them is prepared differently to impart specific Ayurvedic and

pharmaceutical properties as mentioned in **Tables 2 and 3**. These formulations differ in preparation method, chemical composition, shelf life and quality of the finished product [4-7].

Table 2: Pharmaceutical Significance of *Rasaaushadi*

Formulation	Pharmaceutical significance
Bhasma	*Marana* involves repeated processing and controlled heating to transform raw materials into fine compounds with altered physicochemical properties.
Kajjali	Processing promotes chemical interaction between mercury and sulphur, potentially forming mercuric sulphide, depending on preparation conditions.
Rasa Sindura and *Kupipakwa Rasayana*	Prepared by controlled heating and sublimation in *Kachakupi*. Chemical characterization is essential to establish mercury speciation, purity and product consistency.
Parpati	Prepared by melting *Kajjali*, spreading it over a suitable surface and pressing it into thin flakes. Thermal processing influences its physical characteristics and dissolution behavior.
Khalviya Rasayana	Wet or dry trituration promotes mixing, particle-size reduction and uniformity, followed by conversion into suitable dosage forms.
Pottali Rasa	Specialized heating and compacting techniques produce a hardened, compact mass with distinct physical and handling characteristics.

Table 3: Ayurvedic Significance of *Rasaaushadi*

Formulation	Therapeutic Role
Bhasma	*Loha Bhasma* used in *Pandu* *Abhraka Bhasma* in respiratory disorders and general debility *Swarna Bhasma* used as a *Rasayana* *Yashada Bhasma* used in *Prameha*.
Kajjali	*Kajjali* used as ingredient of *Parpati*. *Rasasindura* based preparations used for chronic disorders.
Rasa Sindura and *Kupipakwa Rasayana*	*Rasa Sindura* indicated in *Prameha*. *Makaradhwaja Rasayana* used to improve strength and vitality. *Sameerapannaga Rasa* used in respiratory disorders.
Parpati	*Rasa Parpati* used in *Grahani* *Panchamrita Parpati* used in digestive disorders *Swarnamakshika Parpati* used in *Pandu Roga* and digestive disorders.
Khalviya Rasayana	*Arogyavardhini Vati* is indicated for *Kamala* and *Yakrit* disorders. *Chandraprabha Vati* is used for Prameha *Tribhuvankirti Rasa* is used for *Jwara*
Pottali Rasa	*Hemagarbha Pottali* is used for debilitating conditions. *Ratnagarbha Pottali* used as *Rasayana*.

Mode of Action:

Rasa Dravya has a variety of pharmacological effects because of the different cellular and biochemical mechanisms. In terms of antioxidant activity, the substance can work by decreasing reactive oxygen species and enhancing antioxidant enzymes. Its anti-inflammatory effects can be attributed to its ability to influence inflammatory pathways and mediators such as NF-κB and TNF-α. *Rasa* preparations may exert their effects on the immune system by influencing cytokines and on metabolism by improving insulin sensitivity and glucose homeostasis as depicted in **Figure 1**. Some formulations have hepato-protective properties, enhance digestion by improving *Agni* and promote rejuvenation through cell repair [6-8].

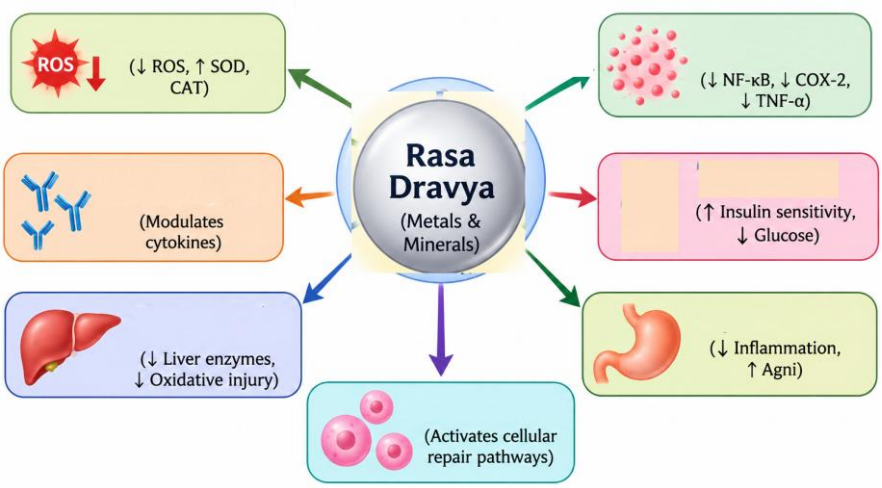


Figure 1: Mode of Action of *Rasa Dravya*

The most recent studies in *Rasa Shastra* have sought to scientifically authenticate these time honored Ayurvedic concepts and processes, so far focusing on their quality control and formulations in Ayurveda. Many research groups have used various sophisticated analytical methods, for example XRD, FTIR, SEM, ICP-OES and elemental analysis in their work. It has also been the case that pharmacological, clinical and toxicological studies have examined the possible applications of *Rasa Shastra* formulations in various diseases. The **Table 4** describes selected recent researches in *Rasa Shastra*, mentioning their therapeutic applications and main outcomes.

Table 4: Recent researches on *Rasaushadhis* and their therapeutic outcomes

Rasaushadhis	**Pathological Condition**	**Clinical Outcomes**	**Reference**
Dhatri Lauha	*Pandu Roga*	Study observed increase in hemoglobin levels, serum iron amounts and iron reserves was achieved.	Srikanth *et al.* (2021)
Punarnava Mandura	*Pandu Roga* in old age	Study witnessed stronger digestive power, higher stamina and better life quality.	Pandya & Dave (2014)
Punarnava Mandura vs. Dhatri Lauha	*Garbhini Pandu*	Both preparations were successful in improving hematological parameters in a safe way without adverse effects.	Donga et al. (2015)
Punarnavadi Mandura Vati	*Pandu*	Therapeutic pallor, fatigue, palpitation, and respiratory distress were decreased during study protocol.	Kori & Patel (2020)
Arogyavardhini Vati	Dyslipidemia & Cardiovascular Risk	The levels of atherogenic lipids, inflammatory factors and blood sugar were reduced after the treatment period.	Gupta et al. (2012)
Arogyavardhini Compound	Metabolic Syndrome	Study observed improvement in body weight, waist circumference and coronary heart disease risk in comparison to placebo treatment.	Padhar et al. (2019)
Shilajatu (Asphaltum punjabianum processed with Agnimantha)	*Sthaulya* & Dyslipidemia	Consistently decreases BMI and skinfold thickness as well as serum lipids profile.	Pattonder et al. (2011)
Chandraprabha Vati	*Prameha*	Exhibited anti-hyperglycemic effect, enhanced oral glucose tolerance and lipid-lowering potential.	Wanjari et al. (2016)
Shwaskuthar Rasa	*Tamaka Shwasa*	Study observed improvement in expiratory airflow and lung capacity.	Khobarkar & Nakanekar (2024)

Clinical trials showed the possible benefits of different *Rasaushadhis* in treating diseases such as *Pandu*, dyslipidemia, metabolic syndrome, *Prameha* and *Tamaka Shwasa*. Observed effects include improved blood parameters, lowered fat and blood sugar levels, improved metabolism and better breathing function. Research indicates the promise of *Rasaushdhis* in treating various diseases.

Discussion

Rasa Shastra focuses on processing and use of metals and mercury with herbs. Different categories of *Rasa Dravyas* include *Bhasma, Kajjali, Parpati, Kupipakva Rasa, Pishti* and *Pottali*. It is clear that different methods are very important in processing and changing their properties. The importance of raw materials of *Rasaaushadhi* lies in their types of ingredients and methods of preparation. *Abhraka Bhasma* is used in respiratory conditions, *Rasa Parpati* in *Grahani*, *Arogyavardhini Vati* in *Kamala* and *Chandraprabha Vati* in *Prameha* [5-7].

Rasa Shastra utilizes a range of pharmacological techniques, such as *Shodhana, Marana, Mardana, Bhavana,* and *Putapaka*, in transforming substances into products that possess distinct properties for different uses in the medicine field. *Bhasma* is treated more than once using controlled heating, while *Kajjali* involves mercury and sulfur grinding that serves to create mercury sulfide. Production processes of *Rasa Sindura* and *Kupipakwa Rasayana* are based on controlled heating and sublimation. *Parpati* is produced by melting or pressing *Kajjali* and obtaining thin flakes. *Khalviya Rasayana* is made by *Kajjali* through regular grinding to enhance mixing. *Pottali Rasa* is produced by implementation of special heating and compression technologies to enable the creation of a compact and solid pharmaceutical form. All processes utilized for the product manufacturing affect the character of the components, properties, safety, and quality of final products [8, 18, 19].

Conclusion

Rasa Shastra uses variety of raw materials like metals and minerals along with herbs to prepare several different medicines. In the preparation of medicines, several processes such as *Shodhana, Marana, Mardana, Bhavana, Jarana* and *Putapaka* are very important. Each formulation has its own way of preparation and unique properties and usage in various ailments such as *Pandu, Prameha, Grahani, Kamala, Jwara* and various respiratory diseases. These medicinal preparations possess medicinal properties like antioxidant, anti-inflammatory, immunomodulatory and rejuvenating activities. The specific preparatory methods of *Rasa Shastra* impart pharmaceutical and therapeutic properties in formulations; thus preparation methods play vital role in the therapeutic success of *Rasaaushadi*.

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