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## TRANSFORMING METALS INTO MEDICINE: A REVIEW ON THE SAFETY AND EFFICACY OF *RASA SHASTRA*

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### Abstract

The *Rasashastra* is basically considered science of mercury which works around *Rasa dravya*. These *Rasa dravya* plays important role in Ayurvedic therapeutics. The processing of metal and mineral products is very crucial for their conversion in medicines with maximum efficacy and minimal toxicity. Processing methods and quality of raw materials affects safety and efficacy of *Rasa dravya*. There are various methods which involves in the process of metals and minerals. Conduction of standardized while preparing these drugs is very crucial to maximize efficacy and minimize adverse effects. *Shodhana*, *Marana* and *Jarana* are major approaches utilizes during the preparation of *Rasa dravya*. These methods remove toxicity from metal and make them suitable for human use as medicine. The potency of these drugs merely affects by their ingredients as well as success of preparatory methods, thus selection of good quality raw materials and appropriate methods of preparation are very important to achieve desired therapeutic profile of *Rasa dravya*. This article summarizes concept of transforming metals into medicine with special emphasis to safety and efficacy of *Rasa dravya*.

**Key-Words:** *Ayurveda, Rasa dravya, Shodhana, Metal, Mineral Formulation*

## Introduction

Ayurvedic formulary of India encompasses information about several ancient formulations including herbo-mineral and/or herbo-metallic formulations. These types of formulations mainly described in the field of *Rasashastra* which utilizes mineral & metal based formulations for therapeutic purposes. The various processing approaches of *Rasashastra* utilize key methods of Ayurveda for transforming metal & mineral into drugs. These approaches include exposing of drugs to liquids and application of control heat, etc [1-3].

The *Rasa* category includes *Paarada*, while *Mahaarasa* group features substances like *Abhraka*, *Vaikraanta* and *Maakshika*. The *Uparasa* category comprises *Sulphur*, *Gairika* and *Kaasis*. The *Sadharana Rasa* group includes ingredients like *Somala* and *Agnijaara*. The *Dhatu* class includes metals such as *Suvarna*, *Raupya* and *Loha*, while *Upadhatu* contains *Suvarna Maakshika* and *Mandura*. Precious stones in the *Ratna* category include *Maanikya*, *Muktaa* and *Heeraka*, while the *Uparatna* group consists of *Vaikraanta*, *Raajaawarta* and *Laala*. The *Visa* and *Upavisa* groups feature toxic substances like *Vatsanaabha*, *Arka* and *Datura*. These drugs imparts high potency and offers therapeutic advantages against many ailments, however their safety concern is prime focus area since improper manufacturing and overdosing may leads serious health complications. Therefore Ayurveda science put great emphasis towards the efficacy as well as safety of *Rasa dravya* [4-6].

## Transforming Metals into Medicine:

Metals and minerals in their natural form are incompatible with the human body, so they must be subjected to complex processing techniques. These substances are often treated with plant juices to facilitate purification process. This improves their compatibility with the body and facilitates better assimilation. In *Rasashastra*, formulations undergo specialized processes like *Shodhana* and *Marana* to transform raw materials into safe and potent medicines. These methods remove impurities, enhance bioavailability and amplifies therapeutic efficacy of final product. *Shodhana* eliminates toxic elements from metals and making them safe for human use while reducing the risk of adverse effects and increasing patient tolerance. The *Marana* process refines substances by reducing their particle size,

enhances their therapeutic effectiveness and bioavailability. Additionally, techniques like *Bhavana* convert coarse powders into finer states, infusing the qualities of the liquid medium into the material, which enhances its therapeutic value. These all preparative methods of *Rasashastra* plays crucial role in transforming non-compatible impure metals into the forms that body can safely absorb and utilize, thereby maximizing their medicinal potential [5-7].

### **Therapeutic efficacy of *Rasa dravya***

*Rasa* drugs are renowned for their rapid action, effectiveness and high bioavailability. These formulations offer rejuvenating and therapeutic properties, also imparts advantages of convenient dosage forms thus improves patient compliance. *Rasa Shastra* medicines have *Laghu Guna*, thereby improves blood flow and strengthening heart muscles. Their hot potency alleviates symptoms of wheezing and expelling mucus from respiratory tract. These drugs addresses skin issues such as acne, also enhance appetite to combat anorexia. *Rasa dravya* nourishes *Dhatu* to promote physical and mental well-being. *Rasa Dravyas* prevent early aging, improves skin elasticity and balances body fat. These drugs regulates metabolism, hormonal activities therefore prevent chances of metabolic disorders. They also relieve symptoms of heaviness and lethargy, their aphrodisiac properties aid in managing sexual dysfunction. These drugs support immunity and impart *Brimhana* properties which improve overall health and prevent infections. Their diverse actions help to manage stress and depression, thus prevent mental illness [3-6].

### **Desired Safety of *Rasa dravya***

*Rasa Shastra* medicines contain heavy metals, which can be toxic if not properly purified and processed. Improperly prepared medicines can cause adverse effects like organ damage, neurological issues, skin manifestation and gastrointestinal disturbances, etc. Thus Ayurvedic practitioners must adherence to strict quality control standards to ensure their safety and efficacy. The improper use of *Rasaushadhies* can lead to various toxic effects, *Paarada* may cause skin allergies, vomiting and burning sensations, etc. Improperly processed *Gandhaka* can result hyperthermia and skin irritation. *Hingula* if administered improperly it can leads to kidney problems. Improper use of *Suvarna* can cause vomiting, indigestion and nausea, etc. *Taamra* can lead mental irritation, *Vanga* may result cardiac

issues and breathing problem. Improperly processed *Loha* may lead to skin disorders and renal stones [6-8].

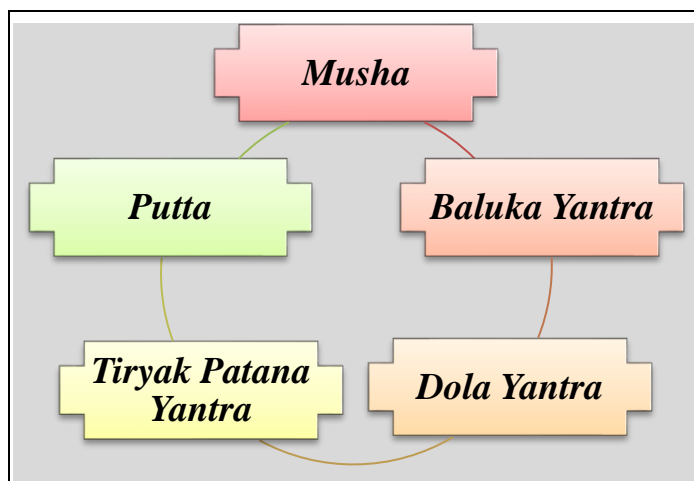
### Factor affecting efficacy and safety of *Rasa dravya*

The efficacy and safety of *Rasa dravya* majorly affected by raw materials such as mineral, metal, parts of plant and animal products, etc. significantly affects quality of final formulation. The purification techniques like *Sodhana* which also play significant role in *Rasashastra* to remove impurities. *Mardana* and *Bhavana* techniques enhance drug properties while *Desa*, *Kala*, container type (*Bhajana*) and processing intensity (*Kala Prakarsa*) also impacts safety and efficacy of *Rasa dravya*. **Table 1** depicted major factors contributing towards the therapeutic property and safety of *Rasa dravya*.

**Table 1: Factors affecting property of *Rasa dravya*:**

Factor	Description
<i>Parada</i>	The purity of mercury is essential for the effectiveness of medicine.
<i>Bhavana</i>	Repeated grinding with herbal juices enhances the therapeutic potency.
Purification & Incineration	Proper detoxification and conversion of metals into <i>Bhasma</i> make them bio-compatible.
<i>Putra</i>	Type and duration of heating impact quality of final formulation in case of <i>Bhasma</i> .
Herbo-Mineral synergy	Synergy between herbs and minerals alters their therapeutic potency.
<i>Aushadhi Matra</i>	Correct dosage is critical for achieving the desired therapeutic outcome.
<i>Anupana</i>	The medium (e.g., <i>ghee</i> & honey) also influences therapeutic efficacy and safety of drugs.
Storage condition	Proper storage conditions prevent degradation and preserve the potency of the medicines.

As mentioned above there are many factors which affect quality of *Rasa dravya*, additionally instruments used in *Rasa Shastra* also play vital role in the successful preparation of final products. *Rasa Shastra* dealt with the metallic and mineral drugs, various processes performed during *Rasa Kriya* which requiring special type of instruments some of them depicted in **Figure 1**.



**Figure 1: Example of some instruments used in Rasa Shastra**

As mentioned above there are various instrument or equipments which utilizes in *Rasa Shastra* and these equipments affects quality of formulation which being prepared using them. Thus, instrument of *Rasa Shastra* must possess quality of heat resistance, durability and non-reactivity, etc. Equipment should not react chemically with the ingredients being processed, as this can compromise the safety and therapeutic efficacy of the final product. Many processes in *Rasa Shastra* involve high temperatures, thus instruments must withstand these conditions without degradation. Instruments should be robust to handle rigorous processes such as grinding and heating. The proper selection and working of instrument or equipment affects success of manufacturing procedure of *Rasa Aushadhi* thus also impact their therapeutic quality and safety [7-10].

### Conclusion:

*Rasashastra* an alchemical science offers wide range of medicinal formulations for treating various diseases. *Rasashastra* uses minerals and metals, along with herbs, for diverse therapeutic benefits. Techniques such as *Shodhana*, *Bhavana*, *Marana* and *Jarana*,

etc. are employed to convert non-compatible metals or minerals substances into compatible forms. The quality and safety of *Rasa*-based medicines is prime concern of ancient practitioners. Contemporary research on validating traditional claims is prerequisite and this can be done through the pharmacological studies, toxicity assessments and clinical trials. These drugs possess potent therapeutic benefits for various ailments, but their safety remains a critical concern. Improper manufacturing can lead to serious health risks, therefore, Ayurveda places significant importance on both the efficacy and safety of *Rasa Dravya*.

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