



Review Article

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IMPORTANCE OF RASOUSHADHIS IN AYURVEDA: A REVIEW

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ABSTRACT

If used wisely, science is a boon to humanity and, if misused, can be hazardous. Ayurveda is one of the primordial systems of medical science that has elaborated the causes and methods of drug-induced consequences and preventive measures. Every system has some flaws, which need to be noted and rectified no matter how excellent the system is. In rasoushadhis (herbomineral formulations) preparation, specific techniques like shodhana, jarana and marana etc., have been developed to prepare more bio-assimilable forms of rasaushadha dravya. The indications, dose, vehicle, period of drug administration, interval or duration of treatment, diagnosis of the disease, nature or prakriti of the patient, pathya-apathya (favourable-unfavourable regimen) etc., are significant factors that the physician should always consider before they recommend these rasoushadhis to the patients. This review compiles the standard procedures which are adopted during the preparation of rasoushadhis like Shodhana, and Marana, the utility of rasoushadhis in Ashtanga Ayurveda, skin diseases, lifestyle disorders etc. and the rational use of rasoushadhis to understand and highlight the importance and uniqueness of rasoushadhis.

Keywords: Rasoushadhis, Herbomineral formulations, Shodhana, Marana, Mercury.

INTRODUCTION

Ayurveda is a well-documented Traditional system of Indian Medicine (TIM), and Rasa Shastra, an offshoot of Ayurveda that has been popular since the medieval period, primarily deals with the therapeutic utilization of metals (e.g., Gold, Silver), minerals (e.g., Manganese), animals (e.g. deer horn) and some herbal products (e.g. *Mallotus philippensis*).^{1,2}

All living creatures require minerals & metals in trace amounts. On the one hand, metals serve as essential components of normal health physiology (e.g., iron- oxygen transportation, zinc-metabolism, various enzymatic activities etc.) yet, on the other hand, can cause severe toxic manifestations if not used properly. rasoushadhis are used for chronic and degenerative disorders in different combinations, dosage forms and at various levels of purities. Hence it is essential to prepare it properly.

As per the reported data, there are various herbomineral medicines available in the market that are recommended for anaemia, diabetes, cancer, liver diseases, skin diseases etc.³ The innate qualities of rasoushadhis, like quick action, lesser dose, tastelessness, prolonged shelf life, and better palatability, have helped conquer the demand of patients as well as pharmaceutical proprietors⁴ and its wide therapeutic range shows the importance of rasoushadhis.

Commonly employed procedures in the preparation of rasoushadhis

Rasa Shastra includes not only rasa (mercury) but also maharasa, uparasa, sadharana rasa, dhatu varga, ratna, upratna, kshara varga, sikta varga, visha, upvisha etc. Therefore, any formulations containing aforesaid as one of the constituents can be termed rasoushadhis⁵, but these could not be consumed in their natural state. Intensive and elaborate processing is required to make material compatible and facilitate its easy assimilation for therapeutic utilization. The first obstacle people encounter in consuming mineral material in raw form is its hard consistency, making it non-edible. Therefore, mineral products are used to make soft, edible and absorbable. Apart from this, the material is also processed to make it non-toxic to the body. To achieve this goal, the commonly adopted methods in preparing rasoushadhis are shodhana, bhavana and marana.

Concept of Shodhana: Shodhana is a purification and detoxification process by which physical and chemical impurities and toxins are removed, and substances are further processed^{6,7}. It is not only a physical or chemical purification; shodhana is a samskara vishesha (unique purification process). It is the process of addition and separation, i.e., removing dravyagata doshas (impurities from the drug) and also helps in guna vriddhi (augments the qualities) of the drug.⁸ The shodhana process prepares the material to be used as medicine or ready the raw material for further processes such as marana. It is essentially

focused on making the material suitable for pharmaceutical utility rather than the physical and chemical purity of the material under process.⁹ The various methods involved in the process of shodhana as per physicochemical characteristics of substances are - abhisheka (sprinkling), achushana (absorption), atapa/agni shoshana (drying), bharjana (frying or roasting), bhavana (levigation), dhalana (melting and quenching), galana (melting and straining), mardana (trituration), nimajjana (dipping), nirjalikarana (evaporation of water), nirvapa (heating and quenching), parishravana (straining), patan (sublimation), prakshalana (washing), prithakikarana (separation), swedana (boiling under a liquid bath), vilayana (elutriation).¹⁰ In the processes of shodhana, explained in Ayurvedic classics, an exact approach is employed at each step in terms of equipment, herbal juices/decoction, and animal products used in the procedures to fulfil the objectives of purification. These methods not only detoxify the material but also helps in the reduction of hardness and particle size, making the material homogenous and potentiating therapeutic efficacy.^{9,11}

Concept of Bhavana: Bhavana is a wet grinding process in which the material is completely soaked with a prescribed liquid medium until the liquid has completely evaporated and is dried. Sometimes materials are soaked in a special liquid and left to dry independently without grinding.⁹ It transforms the coarse powder to a finer state by size reduction. The bhavana process potentiates the material's therapeutic efficacy by impregnating the media's properties to the material, which leads to unique and suitable physicochemical changes, i.e., induction of trace elements from herbal juices to the material. The organic components of the liquid medium are transferred to the material, making it a useful organometallic or organo-mineral compound for the body.⁸ Also; facilitate the material for further processing of marana.¹²

Concept of Marana: It is the process of incineration or calcination or the process which converts the purified metals and minerals into bhasma (fine powder) after subjecting them to levigation and incineration.¹³

The procedure of Marana: Purified and detoxified material is mixed with drugs for incineration (maraka dravya) and is levigated with specific liquid media for a particular period till the material converts into a dough form. Pellets are made from the doughy mass after bhavana and allowed to dry. The obtained dried pellets are kept in one earthen saucer and covered by another, and the junction is sealed by mud-smeared cloth (kappadmitti). This sarava samputa (sealed earthen saucer) is subjected to puta (quantum of heat applied for incineration). After self-cooling, the incinerated material is collected and ground to powder form. The same process is repeated for specified times till the bhasma of the required quality is obtained, e.g., Lauha marana (incineration of treated iron), Abhraka marana (incineration of treated Biotite), and Shankha marana (incineration of a treated conch shell). Changes that take place due to the process of marana are, reduction in particle size, conjugation of trace elements, eradication of unwanted elements and formation of desirable compounds.¹⁰

DISCUSSION

Importance of Mercury in Ayurvedic Pharmaceutics

The importance of mercury in the Rasa Shastra is evident since the names of medicines associated with minerals and metals are derived from the name rasa (mercury). Mercury's unique properties known as "yogavaahitva" (with its "yogavaahi" property, it can accommodate the properties of other substances with which it comes into contact without losing its attributes) play

an essential role in this. As a result, the amount of the drug and the duration of action is reduced. It can be said that mercury, which can be considered a bio-enhancer in Ayurvedic medicine, increases the bioavailability of the drug, making the medication more effective for therapeutic purposes. Also, bhasma, prepared by treating metals with mercury, is supposed to be the best in all aspects. It should also be noted that mercury is often used as mercury sulfide (HgS) in Ayurvedic medicine.⁹

Importance of bhasma Preparations in Ayurvedic Therapeutics

Metals/minerals are subjected to various processes of purification and incineration (bhasmikarana) before internal administration, aimed to reduce the particle size (for instance, the particle size of Swarna bhasma [gold calx] was found between 1 and 2 μ)¹⁵ and thus, converting them into bio-assimilable, biocompatible, absorbable, and appropriate for the use of the human body. A study on Jasada bhasma (in the nano range) reported that in bhasma-treated DNA/ RNA molecules or protein molecules, vibrational peaks are increased, which leads to the delay in DNA degradation and enables the retention of higher amounts of protein molecules in the cell.¹⁶ Bhasma nanoparticles are organo-metallic/organo-mineral complexes as they are integrated with organic molecules (of organic liquid media), improving stability, functionality, absorption, assimilation, bioavailability, biocompatibility, targeted delivery of ingredients, and effectiveness.¹⁷⁻²⁴ It is also notable that Ayurvedic bhasma is considered safe and economical in comparison to contemporary metal-based nanomedicines.²⁴

Rasoushadhis in Ashtanga Ayurveda

Ayurveda is categorized into eight branches and collectively is known as Ashtanga Ayurveda. Ashtanga means eight parts or limbs.²⁵

“Kaaya baala graham Urdhvaanga shalya damshttra jara vrishan Ashtau angaani tasyaahuh chikitsa yeshu samsthritaaH” (Ashtanga Hridaya Sutar Sthana 1/5)

The eight branches of Ayurveda are Kaya chikitsa (Medicine), Bala chikitsa (Paediatrics), Graha chikitsa or bhoot vidya (Psychiatry), Urdhvanga chikitsa (Treatment of eyes, nose, throat, head related diseases), Shalya roga chikitsa (surgery), Damshttra chikitsa (toxicology), Jara chikitsa rasayana (geriatrics), Vrishya chikitsa or Vajjikarana (aphrodisiac therapy).

Kaya Chikitsa: Kaya means 'Agni' - the digestive fire in the body, and acc. to Acharya Vagbhata - all diseases arise from the mandagni²⁶. So, it is the holistic approach of medicine that is mainly helpful in the treatment of the whole body. Jwara (fever), Kasa (cough), Shwasa (asthma), Grahni (IBD) etc., are the diseases that arise from the mandagni and can be treated by rasoushadhis effectively. There are various herbomineral formulations like Sanjivani vati,²⁷ Hinguleshwara rasa,²⁸ Tribhuvankirti rasa²⁹ for fever, Shwasakasachintamani rasa³⁰ for cough and asthma, rasa parpati for IBD³¹ etc. which cure diseases effectively.

Bala Chikitsa: It is also called as “Kaumara Bhritya”. This branch is mainly concerned with treating and caring for children and mothers. The best example of metallic preparation used in Bala is “Swarnaprashana” (Garbhnirogatahbaalksya Kanaswarna Prdapyeta)³². The other examples are gudpaka rasanjan in gudpaka, Shankhnabhyaadi varti (containing Shankhnabhi and Rasanjana) in netra roga etc., likewise, Sutikaroganashan rasa (containing Swarna bhasma, Rajat bhasma, Abhraka bhasma,

Tamra bhasma, and Teekshana bhasma) for all kinds of sutika roga shows the importance of rasoushadhis in bala roga chikitsa.³³

Graha Chikitsa or Bhoot Vidya (Psychiatry): The branch of Ayurvedic science deals with treating mental illnesses. Management of psychiatric diseases like Unmada (insanity) and Apasmara (epilepsy) also comes under this branch. Besides herbs, diet charts, Yoga therapy, deep breathing, and mantra chikitsa, rasoushadhis are also useful in treating psychiatric diseases. For example – Navang vatika (containing Trilauha, Shudha Stroto anjana, Abhrak bhasma, shudha Gandhak, shudha Manahshila), Sarveshwar rasa (containing Parada bhasma/Rasa sindoor) for Apasmara and Chandabhairav rasa (containing Swarna bhasma, shudha Parada, shudha Vatsnabha, Stroto Anjana, Gandhak) for Unmada, use of Gunja (*Abrus precatorious*) in Parpati rasa sewan vidhi for Unmada, Apasmara depicts the use of Rasoushadhis in graha chikitsa.³⁴

Urdhvanga Chikitsa (ENT and Ophthalmology) is also called Shalakya Tantra. It mainly deals with the upper part or supraclavicular region of the body like the ears, nose, throat and eyes. The role of rasoushadhis in this branch can be seen in the treatment of eye disorders. Various types of varti contain the rasa dravyas like Tamra bhasma, Parada bhasma, Kasis bhasma, Shankh bhasma, e.g. Shambukadi varti, Naktandya panchang gutika etc.³⁵; Maniparpati rasa for all kinds of nasagata roga (nose diseases) containing- Heerak bhasma, Markat bhasma, Pukhraj bhasma, Inderneel bhasma, Shudha Parada, Shudha Gandhak, Shudha Hingula.³⁶ Tapyaaadi vati for mukh roga containing Swarna bhasma, Abhraka bhasma, Shudha Tutha, Shudha Manhashila, Rajavarta bhasma.³⁷ Inderlupta (alopecia) is treated using Bhallatakadi taila, Gunjadi paryaog in a lepa form.³⁸

Shalya Chikitsa (Surgery): Of course, this branch mainly deals with surgical procedures, yet there are many rasoushadhis that help treat various anorectal disorders. For example - Arshakuthar rasa (containing Shudha Parada, Shudha Gandhaka, Tamra bhasma, Lauha bhasma), Pittaarshohara rasa (containing Parada bhasma, Tamra bhasma, Swarna bhasma, Abhraka bhasma, Tikshana bhasma, Shudha Gandhaka, Mandur bhasma, Swarna Makshika bhasma), Arshoghana vati (containing Shudha Gandhaka, Rajata bhasma, Tamra bhasma, Abhraka bhasma, Teekshana Lauha bhasma, Shudha Vatsnabha, Shudha Parada) for Arsha (Haemorrhoids). Kanaksundar rasa, Arkesh rasa, Teekshanmukh rasa, Trilokayatilak rasa, ArshaKuthara Lepa (Shankh bhasma, Manahshila) etc., are the many herbomineral formulations used in the Shalaya roga chikitsa.³⁹

Damshtra Chikitsa (Toxicology): This branch studies and treats toxins or poisons caused by plants, animals and minerals. Parada bhasma is used in various kinds of visha (poisonous condition) with our herbal drugs in the form of lepa or internal intake, e.g., Suta Somaraji yoga, Suta stavari yoga, Abhrakaadi pralepa. Suta bhasma is also used in loota visha. Tankan and Mritsanjivan are use in Sarpavisha and Kanakadi vati in Gharvisha.⁴⁰

Jara Chikitsa- rasayana (Geriatrics): Jara means old age. It is also known as rasayana means rejuvenating property. It deals with various diseases associated with the ageing process. Its main aim is to achieve a long and healthy life. It includes different aspects like longevity, memory, complexion, glow and strength of senses. Various rasoushadhis are used as a rasayana like Hemaadi rasayana (containing Swarna bhasma), Maasik rasayana (containing Rasasindoor, Shudha Gandhak, madhu, ghrita, Shilajeet, Amlavetas churna), Paakshik rasayana (containing Shudha Shilajeeta, Lauha bhasma, Parada bhasma, Swarnamakshik bhasma), Kanta rasayana (Kantalauha bhasma, Abhraka bhasma, Swarna bhasma, Tamra bhasma, Vaikrant

bhasma, Swarna Makshik bhasma), Laxmivilas rasa (Lauha bhasma, Abhraka bhasma, Shudha Gandhaka, Shudha Parada, Swarna bhasma, Heerak bhasma) etc.⁴¹

Vrishya Chikitsa or Vajjekarana (Aphrodisiac therapy): This branch mainly deals with sexual dysfunction and infertility problems in both men and women. Kamadeva rasa (containing Swarna bhasma, Rasa Sindoor), Madansundar rasa (containing Shudha Parada, Shudha Gandhaka), Kamadhenu rasa (containing Swarna bhasma, Abhraka satva bhasma, Kanta Lauha bhasma, Tamra bhasma, Bhunaga satva), Pushpadhanva rasa (containing Swarna bhasma, Rajat bhasma, Tamra bhasma) are the various herbomineral formulations are mentioned in the texts for vrishya chikitsa.⁴²

Role of rasoushadhis in the Management of skin diseases

Skin disease (SD) became a burning issue day by day due to changes in lifestyle and environment. These are difficult to cure and require long-term treatment, but due to the lack of patience, patients stop treatment when symptoms subside and the disease gets relapsed, as the basic pathology of the disease is not entirely cured due to incomplete treatment. The chronic nature of the disease makes further treatment more difficult and prolonged, which leads to depression and anxiety. So, it is imperative to treat the skin disease quickly, and patients must keep patience while taking medicine and following a diet. As skin diseases are challenging to treat and require long-term treatment, medications that give rapid effects in small dosage forms should be used. Rasoushadhis fulfil the above criteria due to their vyavayi and yogvahi properties, so using them to treat skin diseases is promising.⁴³ There are various herbomineral formulations mentioned in the texts to treat the skin diseases like Shwetakushthari rasa⁴⁴, Taleshwar rasa⁴⁵, Vajra vati⁴⁶, Vijay vati⁴⁷, Tamraparpati rasa⁴⁸, Chandrakanti rasa⁴⁹ etc. These preparations generally contain mercury, sulphur, green and blue vitriol, arsenic compounds (disulphide, trisulphide), incinerated metals (gold, silver, copper, iron, tin etc.) which have the rasayana property, capacity to improve dhatupariposhan krama, raktaprasadan and raktavrudhikar property that helps in the treatment of skin diseases.⁴³ Most formulations contain kajjali, in which the free sulphur is present. As per modern science, sulphur has antifungal and antibacterial activity⁵⁰.

Role of rasoushadhis in the Management of Lifestyle Disorders

Lifestyle diseases (LSD) characterize those diseases whose occurrence is primarily based on people's everyday habits and are a result of an inappropriate relationship of people with their environment. The chief contributing factors of lifestyle diseases include bad food habits, physical inactivity, wrong body posture, and a disturbed biological clock.⁵¹ Some include atherosclerosis, type 2 diabetes, asthma, chronic liver disease or cirrhosis, cardiac disorders, metabolic syndrome, osteoporosis, depression, obesity and cancer. Although various herbal drugs are available in the market for managing these lifestyle diseases, we can use the Rasoushadhis to treat LSD because their speedy action and less dosage are enough for therapeutic action. For example- Tarakeshwara rasa in Prameha (Diabetes mellitus); Hridayarnava rasa in Hridroga (Heart diseases); Smritisagara rasa in manodaihika vikara (Psychiatric disorders); Shilajit in obesity and dyslipidaemia; Shankha vati and Kamadhudha rasa in Amlapitta, shula (peptic acid disorders); Lauha bhasma in anaemias, liver disorders, chronic fevers, obesity, dyslipidaemia, diabetes; Tamra bhasma in Hridroga, obesity, dyslipidaemia, liver disorders; Rajata bhasma, for rejuvenation, aphrodisiac etc.⁵²

Shelf life of 'Rasoushadhis'

It has been described in the classics that the 'Rasoushadhis' retain their shelf life for an infinite period.²³ but acc. to Rule 161B of Drug Rules 1945 Subs. By GSR 789, dt. 12-8-2016 – the shelf life of rasa yoga containing rasa/uprasa/bhasma except for Naga, Vanga and Tamra bhasma is 10 years, and rasa yoga having rasa/uprasa/bhasma along with kasthaushadhi/ Guggulu is 5 years.⁵³

Biological activity some of the classic metal and mineral-based preparations

Gold preparation- Ayurvedic Swarna bhasma has been shown to reduce stress-induced elevation in the brain biogenic amines level and restore most of the stress-altered parameters to an average level indicating the presence of anti-stress and anti-depressant activity.⁵⁴ Studies on Swarna bhasma and Raupya bhasma (calcined preparations of gold and silver) used in Ayurveda showed that both have analgesic and anxiolytic effects. In addition, anti-cataleptic, analgesic, immunomodulation, and antioxidant effects in gold preparations and the anti-aggressive effect in silver-based preparations have also been reported.⁵⁸ Tamra bhasma (copper-based) has been recorded to possess hepatoprotective, anti-oxidant and anti-ulcer (gastroprotective) effects.⁵⁵ Abhrak bhasma (mica based) is reported to possess hepatoprotective, anabolic, and immunomodulation effects.⁵⁸ Herbomineral formulation containing Shankha bhasma (conch based) is described to have produced an excellent anti-duodenal ulcer effect in rats.⁵⁵ Jasad bhasma (zinc based) has been reported for possible myopia-arresting effect.²⁶ Mukta Shukti bhasma has been reported to possess good anti-inflammatory activity in different models.⁵⁶ Hepatoprotective activity has been announced with Mandura bhasma (iron-based). This bhasma has been shown to include various important activities, especially cytoprotective effects- against different types of experimental ulcers.⁵⁶ Shatavari mandur is noted to produce a good effect in cases of non-ulcer dyspepsia.⁵⁷ Shilajit (a type of rock exudate) is reported to have anti-inflammatory and anti-depressant effects.⁵⁸ Siddha makardhwaj containing formulation and Swarana bhasma are recorded to possess a nootropic effect.⁵⁹ Lauha bhasma's efficacy in the treatment of anaemia is well known, and it is experimentally established.⁶⁰ Some herbomineral preparations like Ayush-82; MA-471 have been described as beneficial in treating diabetes mellitus.⁶¹ Karpura Shilajit bhasma, an Ayurvedic herbomineral formulation, was reported to possess a diuretic effect.⁶² Jasad bhasma (zinc based) is found to have produced potentiation of the hypoglycaemic effect of tolbutamide.⁶³

CONCLUSION

Rasashastra (science of mercury) is a branch of Ayurveda that mainly deals with materials known as "rasa dravyas". rasa (mercury) can be treated as a bio-enhancer due to yogavaahi properties that increase the bioavailability of the drug. With the concept of nanotechnology (marana), the size of the drug is reduced, and the drug's dose and duration of action are significantly reduced. The benefits of bhasmas (nano drugs) are indisputable and unstoppable because organometallic/organomineral complexes improve stability, functionality, absorption, assimilation, bioavailability, biocompatibility, purpose of administered ingredients, and efficacy. Therefore, Ayurvedic bhasma can positively impact the new era of nanomedicine and serve as a model for developing nanomedicine for effective therapy. In addition, Rasoushadhis have also been found beneficial in Ashtanga Ayurveda, skin diseases and unhealthy

lifestyles. Also, Rasoushadhis have a longer shelf life than herbal medicines because plant and animal-based medication should be discarded after their shelf life has expired, but mineral and metal medicines can be reprocessed and reused (like kajjali). All these qualities of Rasoushadhis prove their importance in therapeutic uses.

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