Validation and quality assessment of Rasamanikya- A classical herbo-mineral preparation

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This study presents validation and quality assessment of Rasamanikya, a light, micro fine powder, prepared by processing Patra Haratala, in which powder of Shodhita Haratala (Orpiment- As₂S₃), sandwiched between two Abhraka (white mica) sheets, is heated for a while to obtain a specific pharmaceutical preparation. Analysis of Rasamanikya was performed through qualitative and quantitative analyses, besides some physico-chemical analysis and other tests such as IR spectroscopy, Raman spectroscopy, EDAX and X-ray diffraction (XRD) to ensure the quality of drug.

Keywords: Rasamanikya, Rasashastra, Standardization

Introduction

Rasashastra includes use of drugs originating mainly from metals and minerals. In Ayurveda, metals are subjected to Sodhna (purification) and Bhasmikarana (sodhit metal is repeatedly triturated with herbs and calcined by burning in different methods called Puta). The process is repeated many times to prepare bhasma. It is either used alone or in combinations with other herbs i.e. herbo-metallic preparations. During preparative processes, entire metal is converted into nanoparticles, which enhances bioavailability and reduces toxicity. Standardization of any material is to obtain / manufacture the same kind of product of same specification for any number of times. A number of metals/minerals (iron, copper, gold, silver, mercury, sulphur, arsenic, tin etc.) in Ayurveda are reported for therapeutic purposes. Ayurvedic preparations are repeatedly being targeted for their levels of lead, mercury, arsenic and copper as these are highly toxic in biological systems.

Arsenic has got wide use in Rasashastra/Ayurveda and has attracted controversies owing to its highly toxic nature. Three arsenious compounds [Somala (Arsenious oxide, As₂O₃), Haratala (Orpiment, As₂S₃) and Manahshila (Realgar, As₂S₂)] are used as drugs in Rasashastra/Ayurveda. Haratala is widely used in various forms [Shodhita Haratala (purified), Haratala Bhasma (calcined) and Rasamanikya]. Rasamanikya is a light, micro fine powder, prepared by processing Patra Haratala. Preparation of Rasamanikya is a characteristic procedure of Rasa Shastra, in which powder of Shodhita Haratala (As₂S₃), sandwiched between two Abhraka (white mica) sheets, is heated for a while to obtain a specific pharmaceutical preparation. Rasamanikya is useful for treatment of Kasa (cough), Jirna Jvara (chronic fever), Nadivrana (sinus/fistula), Twak Roga (skin disorders), Vatakaphaja Vyadhi (diseases due to aggravated Vata & Kapha) etc.

This study deals with standard operative procedures and analytical aspects on Rasamanikya as per the Ayurvedic parameters and chemical analysis.

Experimental Section

Classics of Rasashastra describe two types of Haratala (Patra & Pinda). Patra, being superior in physico-chemical and therapeutic aspects, is used for preparation of Rasamanikya. Procurement of source material and preparation of Rasamanikya has been carried out at Department of Rasa Shashastra, Government Ayurvedic College, Nanded. Standard operating procedure (SOP) for Rasamanikya preparation involves Haratala Shodhana and Rasamanikya Nirmana.

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Haratala Shodhana (Preparation and Swedana of Churnodaka)

a) Preparation of Churnodaka

Churna (calcium oxide - CaO, 12.5 g) was mixed in water (3 l). Mixture was kept overnight for 9 h. It was then filtered through filter paper after decantation. Filtrate is Churnodaka.

b) Swedana (Boiling) in Churnodaka

Small pieces of Haratala were bundled in a muslin cloth (Pottali), suspended in a Dolayantra immersed in Churnodaka. Dolayantra is contravene consisting of a pot, half filled with liquid with a horizontal rod put on the rim, from which is suspended the bundle of material to be heated. Dolayantra was subjected to 50-90°C for 3 h. Care was taken to fill Dolayantra every time to make up the quantity of Churnodaka evaporated so that Pottali remained immersed in Churnodaka. After 3 h, Haratala was taken out from Pottali, dried in open air and collected as Churnodaka Shodhit Haratala.

Preparation of Rasamanikya (Preparation and Heating of Abhraka samputa)

a) Preparation of Abhraka samputa

Two thin sheets of Abhraka (33 × 33) were taken. A pinch (2 g) of Churnodaka Shodhita Haratala powder was sandwiched between two Abhraka sheets to prepare Abhraka samputa. Edges of samputa were clipped with the help of stainless steel U pins.

b) Heating of Abhraka samputa

Using a pair of tongs, Samputa was heated at 450-650°C, and then removed from fire as soon as Haratala melts and turns to Manikya (Ruby red). Samputa was opened after cooling (up to room temp.) and the contents were collected. The procedure was repeated till all Haratala was converted in Rasamanikya. Product was grinded manually by Mortar & pestle, sifted through sieve no. 200 and then stored in food grade air tight Jar protected from light & moisture.

Classical and Chemical Analysis

Ayurvedic specifications for analysis of Rasamanikya were performed through qualitative and quantitative analyses, Rekhapoorna, a common parameter to be applied for any product/formulation, which contains drugs of mineral /metal origin. Material is said to be Rekhapoorna if it enters ridges on fingers when rubbed between two fingers. Also, it should not come out easily and should remain stuck in ridges. The test is performed to ensure fineness of particles. Rasamanikya sample passed this test.

Results and Discussion

Physico-chemical analysis of Rasamanikya revealed that after conversion of Haratala into Rasamanikya, it becomes slightly yellowish brown and contained in it some shining particles. It had characteristic odor and gave positive test for the presence of arsenic and sulphur. Particle size was so fine that 81.19% of powder could pass through 120 mesh and 82.69% of powder passed through 85 mesh. A mere 0.32% of moisture was recorded while measuring loss on drying at 105°C. Out of total ash content (3.84%) of Rasamanikya, 2.11% was acid insoluble. Assay of elements revealed: As, 56.80%; S, 35.17%; Pb, 89.20 µg/g; Cd, <5.00 µg/g; Mn, 9.60 µg/g; Co, 92.50 µg/g; Cr, 28.80 µg/g; and Ni, 29.70 µg/g. Relative proportion of As and S indicates that it is a mixture of As₂O₃ and As₂S₃. Total ash content is less because both As₂S₃ and As₂O₃ are volatile.

EDAX (Fig. 1) indicated considerable amount of sulphur and oxygen along with arsenic. IR Spectra (Fig. 2) indicated the presence of organic matter due to
C-H and CH$_2$ vibrations. Absorption peak for organic matter$^{21,22}$ were observed between 3000-2500 cm$^{-1}$. Broad peak at 3436 cm$^{-1}$ is due to OH$^{-1}$ (due to moisture)$^{23}$. As-O or As-S stretching was observed at 391 cm$^{-1}$ in Raman Spectrum (Fig. 3). In addition to this, powder XRD (Fig. 4) indicated the phases of As$_2$O$_4$ and mixture of oxide and As$_2$S$_3$.

Conclusions

Rasmanikya has been standardized by modern scientific methods. The results could be used to lay down a new set of pharmacopoeial standards for preparation of Rasmanikya for getting optimal efficacy of medicine. This study will help to build comprehensive standards, to screen the compounds responsible for different

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Fig. 2—IR spectra of Rasamanikya
Fig. 3—Raman spectra of Rasamanikya
Fig. 4—X-ray diffraction of Rasamanikya
bioactivities, and to elucidate molecular mechanism of action.

References: