Research Article

TO STUDY THE QUALITATIVE ANALYSIS AND IMAGES OF HINGUL DURING THE SHODHAN PROCESS

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ABSTRACT

Rasaacharya were well known about the toxic effect produce due to use of mineral in their impure form. For removing this toxic effect they mentioned various Shodhan (purification) processes in their books. Shodhan process plays a very significant role in purification of Rasa dravya like Hingul for internal administration. In this study Shodhan of Hingul by Kshalan process is performed which is mentioned in book of Rasatarangini. Because of the need of purification & standardization in Ayurveda we do ICP-AES for Elemental qualitative analysis and FEG-SEM for images.

After doing ICP-AES test there are elements like Yttrium (Y), Zirconium (Zr), Vanadium (V), Ytterbium (Yb), in the sample of first Kshalan water, which were done after completion of seven Bhavana. These elements were not found in the sample of Raw Hingul and sample of after seven Bhavana of Hingul. After doing repeated Kshalan process these elements were not found in any sample except the first Kshalan water sample. In the water sample of first Kshalan, found 23 elements and after the seven Kshalan, and got only 16 elements. Hence the impurities may be removed after the Kshalan process.

After doing a FEG-SEM test we found there are changes in the images and particle in each step of Shodhan process of different samples. Because of continuous Bhavana particle size were reduced.

KEYWORDS: Hingul, Shodhan, Purification Process, Qualitative Analysis, ICP-AES, FEG-SEM.

INTRODUCTION

Rasashastra is one of the important Branch of Ayurveda, more inclined towards pharmaceutical and pharmacological angles of different methods of collection, purification, preparations, preservation, standardization and therapeutically utilization of Mercury, Mercurial compounds, Metals, Minerals, Herbo-mineral and Metallo-mineral compounds. From Vedic period to Samhita period there was less use of Herbomineral drugs but, from the period of Nagarjuna, compounds of Herbo-mineral drugs are used profusely. [¹]

Ayurvedic compound formulations are divided into two groups i.e., Rasaausadhi (Mercurial, Metalo-mineral, Herbo-mineral) and Kastausadhi (Herbal). Rasaausadhis are appreciated for their smaller dosages, effectiveness and long durability. Since then this branch of Ayurveda has been playing an important and major role in curing the ailing human being.

Many types of drug preparatory methods on the basis of Murchit parad, Kharalyla kalp, Bhasma, Pisti, Parapati, Pottali, Kupipakva rasayana etc. are explained in Rasashastra. [²]

Shodhan (Purification) is one of the important procedure which is done before the preparation of any Rasa kalpa. [³] Improper Shodhan of Rasa Aushadhi have delirious toxic effects on the human body. It is essential to validate, standardize and study in details the various aspects of pharmaceutics with the structural changes taking place before, during and after the Shodhan procedure mentioned in our Rasashastra texts.

Hingul (Cinnabar) is one of the most widely used entities, used in preparation of various formulations. Just as it is highly efficacies similarly it is toxic as well. Hence, the need to standardize the process of Shodhan of Hingul. Kshalan (washing) is one of the unique procedures done after trituration of Hingul with lemon juice. This process is explained in Rasa Tarangini.[⁴] Hence, the need to validate the process. My study shall focus on the necessity of the Kshalan process, whether it makes the Shodhit Hingul more potent for internal use. This shall be done by analyzing the analytical aspects of Hingul before and after Kshalan (wash with water) procedure and note the difference between the two.

MATERIAL AND METHOD

Hingul shodhan by Kshalan process were carried out in Department of Rasashstra & Bhaishaja...
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Process of Hingul shodhan was done in two steps namely trituration of Ashudha Hingul with lemon juice and repeated Kshalan (washing) of triturated Hingul. [5]

The Hingul was procured from genuine dealer and Lemon for lemon juice was obtained from market.

Equipment: Mortar and pestle, glass jar, stirrer, DI water, Measuring Cylinder.

Process of Hingul shodhan

At first unpurified Hingul (cinnabar) was powdered in an mortar with an pestle. Then this Hingul powder was triturated with Lemon juice for seven times (seven Bhavana). After completion of seven times trituration, Hingul turns crysitalised to powder form and its pH was highly acidic. Then do seven times Kshalan (washing) with DI water of this triturated Hingul. after Kshalan, Hingul become a very smooth dark red in colour, lusterless and pH comes near the neutral. The process was completed in 14 days and the final product called Shudha Hingul obtained.

The raw Hingul, seven times triturated Hingul, Kshalan liquid and Shudha Hingul obtained from the above process was taken for analysis.

Modern parameters for analysis of Hingul

ICP-AES, FEGSEM was performed in IIT Bombay for obtaining the elemental qualitative analysis and images.

1) ICP-AES

Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) is an emission spectrophotometric technique, exploiting the fact that excited electrons emit energy at a given wavelength as they return to ground state after excitation by high temperature Argon Plasma. The fundamental characteristic of this process is that each element emits energy at specific wavelengths peculiar to its atomic character. The energy transfer for electrons when they fall back to ground state is unique to each element as it depends upon the electronic configuration of the orbital. The energy transfer is inversely proportional to the wavelength of electromagnetic radiation.

Result:

Although each element emits energy at multiple wavelengths, in the ICP-AES technique it is most common to select a single wavelength (or a very few) for a given element. The intensity of the energy emitted at the chosen wavelength is proportional to the amount (concentration) of that element in the sample being analyzed. Thus, by determining which wavelengths are emitted by a sample and by determining their intensities, the analyst can qualitatively and quantitatively find the elements from the given sample relative to a reference standard.

Method:

1) Take 0.1 gm of sample and nitric acid 3 to 4 ml.
2) Then prepared a mixture of sample and nitric acid
3) Then this mixture is put on hot plate for 5 to 10 min heating at 60° to 70°
4) Then cool the mixture.
5) Then this mixture put in volumetric flask and adds 25 ml of distilled water in it.
6) Then this prepared sample in ICP-AES machine for analysis.

Simultaneously make the blank solution also.

1) For preparation of blank solution, take 4 ml nitric acid and add distilled water in it till marking of volumetric flask.

Note: do this procedure for every sample.

Samples for ICP-AES

1) First sample (H): Raw cinnabar (Hingul)
2) Second sample (HB7): Seven times triturated sample of (Hingul).
3) Third sample (A): Hingul powder after first Kshalan
4) Fourth sample (A1): Water sample of first Kshalan
5) Ninth sample (G): Hingul powder after seventh Kshalan
6) Tenth sample (G1): Water sample of seventh Kshalan
7) Eleventh sample: Lemon juice

Table 1: Detected elements in given samples

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Name of the sample</th>
<th>Detected elements</th>
<th>No. of detected elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Raw Hingul</td>
<td>As, B, Ba, Ca, Cr, Fe, Hg, Mg, Mn, Na, Ni, P, S, Si, Zn</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Seven times triturated sample of Hingul</td>
<td>Al, As, B, Ba, Ca, Cr, Cu, Fe, Hg, K, Mg, MnMn, Na, Ni, S, Si, Sr, Ti, Zn</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Hingul powder after first Kshalan</td>
<td>Al, As, B, Ba, Ca, Cr, Cu, Fe, Hg, Mg, Mn, Na, Ni, S, Si, Ti, Zn</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Water sample of first Kshalan</td>
<td>Al, As, B, Ba, Ca, Co, Cr, Fe, Hg, K, Mg, Mn, Na, Ni, P, S, Si, Sr, V, Y, Yb, Zn, Zr</td>
<td>23</td>
</tr>
</tbody>
</table>
2) FEG-SEM is essentially a high magnification microscope, which uses a focused scanned electron beam to produce images of the sample, both top-down and, with the necessary sample preparation.

Ionized atoms can relax by electron shell-to-shell transitions, which lead to either X-ray emission. The X-rays emitted are characteristic of the elements in the top few μm of the sample and are measured by the EDX detector.

There are 8 samples for imaging
1) First sample: Raw Hingul (A)
2) Second sample: Seven times triturated sample of Hingul (B)
3) Third sample: Hingul powder after first Kshalan (C)
4) Fourth sample: Water sample of first Kshalan (D)
5) Fifth sample: Hingul powder after five Kshalan (E)
6) Ninth sample: Hingul powder after seven Kshalan (F)
7) Tenth sample: Water sample of seven Kshalan (G)

RESULTS
In this test we obtained different microscopical images of Hingul during purification (Shodhan) process.

Smaller particle size provide more specific surface and affect the therapeutic efficiency of drug having low solubility in body fluids and enhance the dissolution rate of soluble drugs. [8]

DISCUSSION
Shodhan is a process by which Minimisation or removal of toxic effect of the drug. Conversion of hard material into soft and brittle (Bhanguratwa) so as to proceed for further pharmaceutical techniques, Impregnation of organic qualities of Bhavana dravya in to the drug. It increase the therapeutic efficacy of the drug. The impurities of the substance cause several diseases and shows toxic effect. So it is advisable to administer the drug in pure form. The impure Hingul contains several impurities. The following diseases and symptoms will be caused if impure Hingul is used internally. Due to intake of Unpurified cinnabar (Hingul) produces blindness (Andhyatwa), impotency (Klaibya), skin diseases (Kustha), giddiness (Bhrama), heaviness (Gourav) and Prameha. [7]

Because of these diseases and symptoms, Hingul before used in medicine, purification of Hingul is very essential. After purification it becomes palatable. Regarding the cinnabar (Hingul), different purification methods have been described by different authors. The main aim is to have a prepared pure drug for human use.

ICP-AES: In ICP-AES study there are some elements which are present in sample of first Kshalan which are removed after washing (Kshalan) and are not found in next samples.

After doing study of those elements which were removed after first Kshalan i.e., Yttrium (Y), Zirconium (Zr), Vanadium (V), Ytterbium (Yb), it is proved that they are harmful for the body in higher concentration.

FEG-SEM: In this test the result obtained was different microscopical images and change in particle size of Hingul during purification (Shodhan) process. The changes in particles are observed after Bhavana and Kshalan process.

CONCLUSION
In the test like FEG-SEM we obtained different microscopical images of Hingul from the different samples which are collected during Shodhan process. Hence the FEG-SEM help to know the changes happening during the process.

Kshalan process helps to remove toxic substance or elements, which is seen in samples of ICP-AES study, which is the primary aim of Shodhan i.e., Dravya dosha nirvanam.

REFERENCES
1. Joshi D, Rasa shastra published by Ayurveda College, Trivandrum. Pg.no. 1, 2.


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FEG-SEM different microscopical images and particle size of Hingul

Fig. (A)  
Fig. (B)  
Fig. (C)  

Fig. (D)  
Fig. (E)  
Fig. (F)  

Fig. (G)