PREPARATION OF PARAD MARIT YASHAD BHASMA AND HARTAL MARIT YASHAD BHASMA WITH THEIR COMPARATIVE ANALYTICAL STUDY

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ABSTRACT
Yashada (Zink) is one of the Dhatu mentioned under Loha varga in various Rasa shastra texts. It was separately mentioned with name Yashada along with its physical and pharmaceutical properties in 17th century by Madanpalaghatu; although it carries a classical reference as Kharpar satwa in Rasaratna samuccaya; which belongs to 13th century. Various authors had mentioned number of maran procedures of Yashada. As per the reference of Rasaratna samuccaya, the maran of Loha with Parada is considered as Shreshhita while maran with Ariloha is considered as Durganaprat. By applying this principle to maran of Yashada, here an evaluation is done on basis of its analytical study. Also the pharmaceutical aspect of maran with Parad and Hartala is been evaluated.

Keywords: Yashada, Loha varga, Maran, Parad, Hartala.

INTRODUCTION
Rasa shastra the Indian alchemy mainly deals with Lohavada and Dehavada. Primarily it was evolved as a metallurgical science in ancient India. Pre historic references show the use of metals like Gold, Silver, Copper, Brass etc. for various purposes. The metallurgical science was par developed in ancient period. As per the principle, “Yatha lohe tatha dehe,” the scientific principles were applied to make this metals useful for humans. Then the endeavour began to increase the metal bioavailability in number of human ailments. Experiments were carried out for generations and principles were laid down for making metals to be used as medicines. The procedures were named as ‘Marana’ and each metal were processed accordingly to get finished drug as ‘Bhasma’ of respective metal. The Bhasma altogether consisted of nano sized particles which were easily absorbed. They were also target oriented and hence used in specific disease. The maran procedures had a major role in utility of processes metal. Rasa Vagbhata had mentioned a principle regarding maran of Loha. It states that maran of Loha with Rasa is Shreshhita, maran with Kashtha Aushadhi is Madhyama, maran with Gandhakadi is Kanishtha and maran with Ariloha is Durgunaprat. Many maran procedures of Yashada were mentioned through various Rasa shastra texts. Out of which two procedures were selected for current study. Maran of Yashada with Parad and with Hartala was carried out. Evaluation of procedure and Bhasma was done on pharmaceutical and analytical grounds.

Aims and Objectives
- Pharmaceutical study of Parad marit Yashad Bhasma according to Rasatarangini 19/107
- Pharmaceutical study of Hartal marit Yashad Bhasma according to Rasatarangini 19/111
- Comparative study based on ancient and modern analytical parameters.

MATERIALS AND METHODS

Materials
It include raw Yashadah(Zn), Parada(Hg), Ghandhaka(S), Hartala(As) and associated drugs needed for Shodhana and Maran procedures. Various types of equipments along with fuel are included under this caption.

Methods
It included all the pharmaceutical study carried out in current context. Shodhana of raw Yashada², Parada³ and Ghandhaka was carried out. Then the Shodhit Yashada was subjected to maran procedure by two methods.

Method- 1 Marana of Yashada
The procedure was carried out in following steps
- Shodhit Yashada (200g) was melted in iron vessel by giving tivra agni.
- After melting it was poured in Khalwa Yantra containing Shuddha Parada (200g) and was triturated vigorously.
- Thus formed mixture was washed with Nimbu (Citrus limon) swarasa and dried.
- Shuddha Gandhaka (200g) was added to the mixture and triturated to obtain fine kajjali.
- This kajjali was then subjected for one Gaja puta. After giving one Gaja puta the formed Bhasma didn’t passed the Bhasma pariksha. Hence was subjected for second puta. After second Gaja puta the Bhasma obtained passed the Bhasma pariksha.³
Method- II Marana of Yashada
The procedure was carried out in following steps
- Shodhit Yashada was melted in iron vessel by giving tivra agni.
- After melting it was rubbed with freshly collected Nimba Kashta (Fresh sticks of *Azadirictina indica*) by jarana method.
- After jarana procedure the mixture was triturated with Shuddha Hartala (1/4th of Jarit Yashada)
- Then one Gaja puta was given to it. After giving 1st puta, the obtained bhasma had metallic consistency and also didn’t pass Bhasma pariksha. Further putas were given till it passed Bhasma parikshas. After fourth puta the Bhasma passed all parikshas.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Colour</th>
<th>Constancy</th>
<th>Touch</th>
<th>Smell</th>
<th>Sound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Yashada</td>
<td>Silvery white</td>
<td>Solid</td>
<td>Smooth</td>
<td>No</td>
<td>Metallic</td>
</tr>
<tr>
<td>Parad marit Yashada Bhasma</td>
<td>Bright yellowish white</td>
<td>Powdery</td>
<td>Soft (as of talc powder)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hartal marit Yashada Bhasma</td>
<td>Dark yellow</td>
<td>Powdery</td>
<td>Soft (as of talc powder)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 1: showing organoleptic characters of yashada

<table>
<thead>
<tr>
<th>Samples</th>
<th>X-ray diffraction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Major phase</td>
</tr>
<tr>
<td>Parad marit Yashad.Bhasma</td>
<td>Sphalerite (ZnS)</td>
</tr>
<tr>
<td>Hartala marit Yashad.Bhasma</td>
<td>Zincite (ZnO), Zinc Oxide</td>
</tr>
</tbody>
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<td>Zincite (ZnO)</td>
</tr>
</tbody>
</table>

Table 2: X-Ray Diffraction Study

<table>
<thead>
<tr>
<th>Sample</th>
<th>Particle size</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td>Ht.- 3.575nm</td>
</tr>
<tr>
<td></td>
<td>Area- 125.885nm²</td>
</tr>
<tr>
<td></td>
<td>Diameter- 12.660nm</td>
</tr>
<tr>
<td>Parad marit Yashad. Bhasma</td>
<td>Ht.- 1.065 to 12.900nm</td>
</tr>
<tr>
<td></td>
<td>Area- 118.256 to 5172.729nm²</td>
</tr>
<tr>
<td></td>
<td>Diameter- 12.271 to 81.155nm</td>
</tr>
<tr>
<td>Hartala marit Yashad. Bhasma</td>
<td>Ht.- 5.978nm</td>
</tr>
<tr>
<td></td>
<td>Area- 2141.317nm²</td>
</tr>
<tr>
<td></td>
<td>Diameter- 43.802nm</td>
</tr>
</tbody>
</table>

Table 3: AFM of Yashada Bhasma

Parad marit Yashad.Bhasma after 2nd Puta
Hartala marit Yashad.Bhasma after 4th Puta
Puta

XRD- Parad marit Yashad Bhasma
XRD- Hartala marit Yashad Bhasma
RESULT

Analytical study
This can be divided into two parts
1. Ancient methods
2. Modern methods

Ancient Method
Raw materials required for the study were standardized and collected according to grahya agrahya lakshanas as mentioned in text. The final produce - Yashada Bhasma prepared by two methods was also subjected for examinations like Rekhatpuratva, Varitaratva etc. for organoleptic characters of Yashada (Table 1).

Modern Method
Yashada Bhasma prepared by two methods was subjected for XRD phase identification and AFM particle size analysis.

X-Ray Diffraction Study
XRD is based on scattering of X-rays by crystalline structure. This is a qualitative as well as quantitative test (Table 2).

Atomic Force Microscopy
It is an advance imaging technique for getting 3 dimensional images of given sample with particle size evaluation (Table 3).

DISCUSSION AND CONCLUSION
Colour of Parad marit Yashada Bhasma was bright yellowish white and that of Hartala marit Yashada Bhasma was deep yellow. X-ray diffraction of Parad marit Yashada Bhasma showed major phase of zinc sulphide and minor phase of zinc oxide. While Hartala marit Yashada Bhasma showed major phase of zinc oxide and minor phase of zinc sulphide. AFM of Parad marit Yashada Bhasma showed even particle size and were found to be smaller than that of Hartala marit Yashada Bhasma. On pharmaceutical grounds and on the basis of quality of final product, Parad marit Yashada Bhasma was found to better as compared with Hartala marit Yashada Bhasma.

REFERENCES

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