



Research Article

PHARMACEUTICO-ANALYTICAL STUDY OF VANASPATI JARITA MARITA YASHADA BHASMA

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ABSTRACT

Yashada is one of the *Sapta dhatu*, which is chemically Zn, Yashada bhasma is used therapeutically in many diseases like *Prameha*, *Pandu*, *Vatavyadi* etc., in the form of *Bhasma* (ZnO). **Objectives:** To prepare Yashada bhasma and its physico-chemical analysis of Yashada bhasma. **Materials and Methods:** Yashada was subjected *Samanya Shodhana*, *Vishesha Shodhana* and *Jarana* as per *Rasatarangini*. Yashada marana was done as per *Rasayana sara*. Bhasma was subjected to physico-chemical analysis which mainly included classical *Bhasma parikshas* like *Rekhapurnata*, *Varitara*, *Unama*, *Nischandrata* etc and modern parameters like Acid Insoluble Ash, pH, Total Ash value etc and advanced analytical techniques like XRD, SEM and AAS. **Results:** After 1<sup>st</sup> *Puta* pale yellow colored Yashada bhasma passed classical *Bhasma parikshas*. In classical reference two *Putas* are mentioned so, the 2<sup>nd</sup> *Putas* was given. XRD reports shows major peaks which were identified as Zinc oxide (ZnO) compound. Hence indicates complete transformation of metal to *Bhasma* form. Scanning electron microscopy in Yashada Bhasma after 2<sup>nd</sup> *Putas* the particle size ranging from 5-10µm. AAS reports shows zinc percentage of 77.08% after 2<sup>nd</sup> *Putas*. **Conclusion:** Pale yellow coloured Yashada bhasma was prepared after two *Gaja putas* which passed the classical *Bhasma parikshas*.

INTRODUCTION

Rasashastra is the branch of Ayurveda which deals mainly with the pharmaceuticals of *Rasaushadies* (metals and mineral preparations). In Ayurveda, *Sapta dhatu* (seven metals) such as gold, silver, copper iron, tin, lead and zinc are described as essential elements for the body. Yashada is one of the *Dhatu* (metal) among the *Sapta dhatu varga* and mainly in *Putiloha varga* in *Rasashastra*<sup>[1]</sup>. Yashada is chemically nothing but zinc, which is known to ancient Indians since 14<sup>th</sup> century A.D<sup>[2]</sup>. These metals are present in human body in different concentration and combination at various sites and their deficiencies leads to various ailments. So *Bhasmas* are such unique Ayurvedic metallic preparations with herbal juices/fruits, used since the seventh century BC and widely recommended for treatment of a variety of chronic ailments<sup>[3]</sup>.

According to classical texts of *Rasashastra*, it is believed to be *Vrishya*, *balya* and indicated *Swasa*, *Kasa*, and *Pandu*<sup>[4]</sup>. So the present study is carried to prepare Yashada bhasma (*Vanaspati jarana* and *Marana*) and its physico-chemical analysis according to both ancient and modern parameters.

MATERIALS AND METHOD

**Major Drugs:** Yashada (Zinc) was the major raw materials used in this study. This was collected according to the *Grahya Lakshanas* mentioned in *Rasa* classics and also depending upon the percentage of purity and authenticated by Institutional Ayush Certified Central Research Facility.

**Associated Drugs:** *Kanji*<sup>[5]</sup> (Sour gruel), *Takra*<sup>[6]</sup> (butter milk), *Kulattha Kwatha*<sup>[7]</sup> (decoction of *Dolichus biflorus*), *Gomutra* (cow's urine) and *Tila taila* (oil of *Sesamum indicum*) were used for *Samanya shodhana* of Yashada<sup>[8]</sup>. *Kanji* was prepared in the GMP Certified K.L.E. Society's Ayurveda Pharmacy, Belgaum and *Takra*, *Kulattha kwatha* were prepared freshly in the department. *Gomutra* was freshly collected from the local cow shed. *Tila taila* was procured from the GMP Certified K.L.E. Society's Ayurveda Pharmacy, Belgaum. *Churnodaka* (lime water) was used for *Vishesha*

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*shodhana* of *Yashada*<sup>[9]</sup> and it was prepared freshly in the department<sup>[10]</sup>.

*Apamarga panchanga* (*Achyranthes aspera* whole plant) *Churna* was used for the *Jarana* of *Yashada*<sup>[11]</sup>. *Apamarga panchanga churna* was procured from market and authenticated in the CRF Shri B.M.K. Ayurveda Mahavidyalaya, Belgaum. *Ghrita kumari swarasa* (fresh juice of *Aloe vera* Tourn) was used for *Bhavana* during *Marana*<sup>[12]</sup>. *Kumari* was procured from the local garden.

**Equipments:** *Pithara yantra* was used for *Shodhana* of *Yashada*. *Khalvayantra*, gas stove, iron ladle, iron pan steel vessels, spoons, cow dung cakes, *Gajaputa* pit, *Sharavas* etc., were used.

**Pharmaceutical processing:** All the pharmaceuticals processes were carried out in Dept. of *Rasashastra*, K.L.E. Shri B.M.K. Ayurveda Mahavidyalaya, Shahapur, Belagavi, Karnataka, India.

***Samanya shodhana Yashada:*** *Dhalana* method was adopted, where in raw *Yashada* was heated in an Iron ladle till it melts completely and then immediately poured into *Kanji*, *Takra*, *Kulattha kwatha*, *Gomutra* and *Tila taila* through *Pitara yantra*. The process was repeated for 7 times each in five different liquid media, in the successive order and for every *Dhalana* fresh liquid media was taken<sup>[8]</sup>.

***Vishesha shodhana of Yashada:*** *Dhalana* method was adopted with the liquid media being *Churnodaka* and

the procedure was repeated for 7 times each with using fresh *Churnodaka* each time<sup>[9]</sup>.

***Jarana of Yashada***<sup>[11]</sup>: *Yashada* was melted in an iron pan, little by little quantity of coarse powder of *Apamarga panchanga* was added and stirring was done continuously with iron ladle. This process was continued till the *Yashada* converted into powder form. After 65 min of continuous *Dhruda mardana* the whole of *Yashada* was converted into ash/powder form. This powder was collected at the centre of the pan and an earthen *Sharava* was covered on it. Then the intensity of the fire was made maximum. This was maintained for one hour, after which the bottom and the inner visible surface of the iron pan became red hot. This was maintained for four hours till all powder in the pan became full red hot. At this stage, the fire was put off and the pan was left for *Swangasheeta*. Next day morning the *Sharava* was removed and the grey powder was collected and weighed. Then *Jarita Yashada* was repeatedly washed with water to remove the alkaline part of *Apamarga Panchanga*.

***Marana***<sup>[12]</sup>: *Jarita Yashada* was subjected to *Bhavana* with *Kumari swarasa* and when the mixture attained proper consistency, *Chakrikas* were made and dried in shade. They were then placed in *Sharavasamputa* and subjected *Gajaputa*. The procedure was repeated for two times till *Bhasma siddhi lakshana's* were obtained. After second *Putra*, the *Bhasma* passed all the tests.

**Table 1: Showing the results of *Samanya Shodhana* of *Yashada***

| Liquid Media           | Quantity (ml) | pH   | Initial weight of <i>Yashada</i> (gm) | Final weight of <i>Yashada</i> (gm) | Loss (gm) |
|------------------------|---------------|------|---------------------------------------|-------------------------------------|-----------|
| <i>Kanji</i>           | 3000          | 2.71 | 500                                   | 500                                 | --        |
| <i>Takra</i>           | 2100          | 4.34 | 500                                   | 496                                 | 04        |
| <i>Kulattha Kwatha</i> | 2000          | 5.69 | 492                                   | 488.2                               | 08        |
| <i>Gomutra</i>         | 2400          | 7.96 | 488                                   | 476                                 | 12        |
| <i>Tila taila</i>      | 2400          | 5.84 | 476                                   | 475                                 | 02        |

**Table 2: Showing the results of *Yashada vishesha Shodhana* in *churnodaka***

| Liquid Media      | Quantity (ml) | pH     |       | Initial weight of <i>Yashada</i> (gm) | Final weight of <i>Yashada</i> (gm) | Loss (gm) |
|-------------------|---------------|--------|-------|---------------------------------------|-------------------------------------|-----------|
|                   |               | Before | After |                                       |                                     |           |
| <i>Churnodaka</i> | 7000          | 11.34  | 11.01 | 474                                   | 443                                 | 31        |

**Table 3: Showing the results of *Yashada Jarana***

| <i>Shuddha yashada</i> | <i>Apamarga Panchanga churna</i> | <i>Jarita Yashada</i> | Weight Gain |
|------------------------|----------------------------------|-----------------------|-------------|
| 443gms                 | 125 gms                          | 459 gms               | 16 gms      |

**Table 4: Showing the results of *Yashada marana* – 1<sup>st</sup> *Putra***

| <i>Jarita Yashada</i> | <i>Kumari swarasa</i> | <i>Marita Yashada</i> | Weight Loss |
|-----------------------|-----------------------|-----------------------|-------------|
| 459 gms               | 150 ml                | 436 gm                | 8 gm        |

**Table 5: Showing the results of Yashada marana – 2<sup>nd</sup> Puta**

| Marita Yashada | Kumari swarasa | Marita Yashada | Weight Loss |
|----------------|----------------|----------------|-------------|
| 386 gms        | 150 ml         | 374 gm         | 12 gm       |

**Analytical Results****Table 6: Showing the results of Bhasma Pariksha of Yashada Bhasma<sup>[13]</sup>**

| Name of test  | Results |
|---------------|---------|
| Rekhapurnatva | Passed  |
| Varitara      | Passed  |
| Unama         | Passed  |
| Niswadu       | Passed  |
| Nischandratva | Passed  |
| Nirdhumatva   | Passed  |
| Apunarbhava   | Passed  |

**Table 7: Showing solubility test of Yashada bhasma<sup>[14]</sup>**

| Chemical      | Soluble | Partially soluble | Not soluble |
|---------------|---------|-------------------|-------------|
| Ethyl alcohol | -       | -                 | +           |
| Ether         | -       | -                 | +           |
| Acetone       | -       | -                 | +           |
| Benzene       | -       | -                 | +           |
| Toluene       | -       | -                 | +           |
| Methanol      | -       | -                 | +           |
| Chloroform    | -       | +                 | -           |
| HCl           | +       | -                 | -           |

**Table 8: Showing Physico chemical analysis of Yashada bhasma<sup>[14]</sup>**

| Test               | Result |
|--------------------|--------|
| Loss on drying     | 0.8 %  |
| Total ash value    | 99.2 % |
| Acid insoluble ash | 6.1 %  |
| pH                 | 8.01   |

**Table 9: Analytical Details Yashada bhasma**

| S.No. | Parameters   | Sample- Y <sub>1-a</sub> | Sample- Y <sub>1-b</sub> | Test methods   |
|-------|--------------|--------------------------|--------------------------|--|
| 1.    | Assay for Zn | 76.32%                   | 77.08%                   | By AAS Method<br>Instrument<br>Used:<br>Chemito- 301 |
| 2.    | Iron         | 2.08 ppm                 | 2.17 ppm                 |  |
| 3.    | Calcium      | 2.28 ppm                 | 2.31 ppm                 |  |
| 4.    | Tin          | 0.3240 ppm               | 0.3168 ppm               |  |
| 5.    | Lead         | 0.12 ppm                 | 0.118 ppm                |  |

**Namburi Phased Spot Test (NPST)<sup>[15]</sup>**

**1<sup>st</sup> phase: (0 to 5 min):** After putting a drop of Yashada bhasma solution on the prepared potassium iodide paper, a wet central spot spread outside with immediate formation of bright white glittering surface over the spot.

**2<sup>nd</sup> phase: (05 min to 20 min):** Spreading of the drop stopped. Thin yellowish outer ring around the white spot was seen. The white spot was very bright in this stage.

**3<sup>rd</sup> phase: (after 8 hours):** The brightness of the white spot was more in this stage. There was a thin yellowish periphery around the centre spot.

**Namburi Phased Spot Test (NPST)**



**1<sup>st</sup> Phase**



**2<sup>nd</sup> Phase**



**3<sup>rd</sup> Phase**

**Bhasma Pareeksha**



**Rekha poornata**

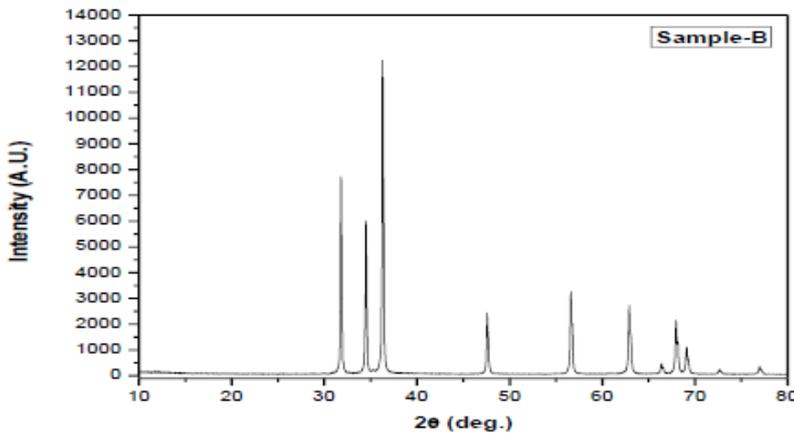


**Varitara and Unama**



**Nirdhuma**

**XRD Interpretation for the X-Rd Graphs**

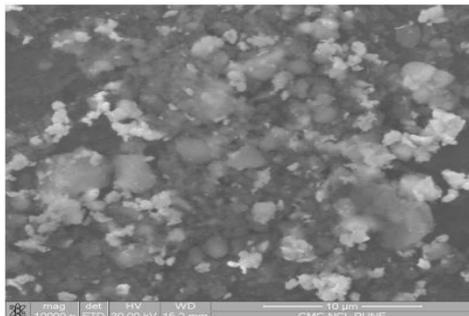


The XRD spectra of *Bhasma* after first *Puti* showed peaks of Zinc oxide which indicates the complete transformation of metal to its oxide form. And in second *Puti* the XRD spectra of *Yashada Bhasma* shows major peaks which were identified as Zinc oxide (ZnO) compound. Hence the sample indicates complete transformation of metal to *Bhasma* form. So there is no difference in the pattern. The x-rd pattern for the samples A & B were compared with the standard X-rd cards.

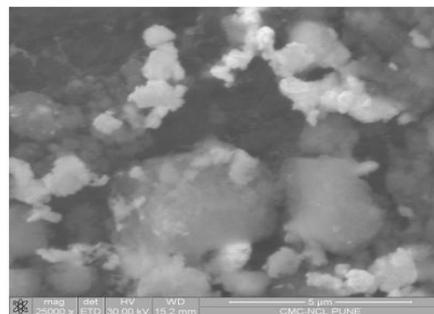
**Reference: J1997-JCPDS international centre for diffraction data. Card No: 21-1486**

**SEM**

**Sample 1:**



**Sample 2:**



**Interpretation:** Scanning electron microscopy in *Yashada Bhasma* after 1<sup>st</sup> Puta shows Amorphous in nature with particles in the range of 1-100µm but still some polyhedral particles in the range of 10-30µm were seen. But in the *Yashada Bhasma* after 2<sup>nd</sup> Puta the particle size was ranging from 5-10µm.

## DISCUSSION

Though in our *Rasashastra* texts it is explained as *Parada marita Bhasma* are *Shrestha*, there are references of *Vanaspati marita bhasma* preparation methods in our classical which are equally effective as that of *Parada marita Bhasma* and can be prepared in less number of *Putas* in *Marana*. So in the above study the *Vanaspati marita Yashada Bhasma* was prepared so as to assess the similar parameters in both the modern and classical *Bhasma pareekshas* as similar to *Parada marita bhasma* in which result was as similar as that of *Parada marita Bhasma*. The preparation method followed for *Vanaspati marita Yashada Bhasma* in this study is *Rasayanasara* in which there is mention of two *Gaja putas* for *Yashada Bhasma* preparation.

## CONCLUSION

The process of preparation of *Bhasmas* is a unique contribution in the field of *Rasashastra*. As the main aim of *Maran* is structural and chemical transformation of metal into metal compounds to make more bioabsorbable. Though our *Rasashastra* texts consider *Parada marita Bhasma* are *Shrestha*, the prepared *Vanaspati marita Yashada Bhasma* equally passed both the classical and modern analytical parameters of *Bhasma pareeksha* after subjecting to two *Gaja putas*.

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