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ISSN: 2581-785X:<https://irjay.com/>DOI: [10.47223/IRJAY.2023.6201](https://doi.org/10.47223/IRJAY.2023.6201)Pharmaceutical Analytical Study of *Yashada Bhasma* through SEM & EDXVeda SM¹, Surekha S Medikeri², Vidya Sagar GV³

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ABSTRACT:

Yashada is a *dhatu* (metal) comes under *pootiloha* (metals with low melting point and burns with characteristic odor) its usage in *bhasma* (fine particles) form is prominently seen in the diseases like *Prameha* (Diabetes) *Netrarogas* (eye diseases) *Vrana* (wound) *Kushta* (skin diseases) etc. Raw *Yashada* (Metallic ore) was subjected to *samanyashodhana* (common purification process for metals), *Visheshashodhana* (special purification), *Jarana* (intermittent process of calcinations for *pootilohas*), *Marana* (incineration) followed by *bhasmaparekshas* (tests for proper calx) were done as mentioned in classical texts of Rasashastra and in each stage the product was subjected to SEM (Scanning Electron microscopy) & EDX (Energy dispersive X-Ray) studies. Results showed *Yashada bhasma* was predominantly Zinc oxide with particle size reduction to about nano particle size and making the *bhasma* more bio-absorbable.

Key words: *Yashada*, *bhasma*, Zinc, SEM and EDAX.

INTRODUCTION

In the present scenario there have been findings that have shown Ayurveda is a highly scientific and perfect life science; in the meanwhile there are also reports of toxicity related to the *bhasmas* in recent literatures¹. So the scientific evidence based research is necessary which can be achieved by multidisciplinary manner so that it helps in establishing the facts which reaches everywhere, so that acceptance of Ayurveda medicines is achieved globally. *Yashada* is a metal (*dhatu*)², comes under *pootilohas* group like *Naga* (Pb), *Vanga* (Sn), *Yashada* (Zn). These metals which have low melting points when compared to other metals in Ayurveda and burns with characteristic odor. It is widely used in chronic & acute diseases like diabetes, eye disorders and urinary diseases etc³.

As the metals are the inorganic compounds which cannot

be absorbed by the human body, hence there is need of transformation of inorganic metals (*nireendriya*) in to organo metallic form (*sendriya*) which is the absorbable form for human body. This is achieved by the *bhasmeekarana* (incineration). The ayurvedic *bhasmas* are non-toxic because during the process of *bhasmeekarana* its toxicity will be reduced by different liquid media used in *samanyashodhana* process⁴. To enhance the required property in the drug particular liquid media is opted for *visheshashodhana*. *Yashadabhasma* is a zinc based herbo metallic compound which is prepared from Zn metal and other herbal media drugs via purification, roasting and incineration. To prove its proper formation it is tested with the modern techniques like the SEM, EDAX, XRD etc, which provides authenticated proof for the traditional



bhasmas.

MATERIALS AND METHODS

The study was conducted at Dept of PG studies in Rasashashtra and bhyshajyakalpana, Government Ayurvedic Medical College, Bengaluru, The major drug Zn and the associated drugs are purchased from the authenticated source. Associated drugs for *samanyashodhana* like *tila taila* (oil of sesamum indicum) *takra* (butter milk), *kanji* (sour gruel), *kulatthakwatha* (decoction of *Dolichus biflorus*) were freshly prepared and used. *Gomutra* (cows urine) was freshly collected.

Visheshashodhan: Godugdha (cows milk) was used⁵.

For Jarana: Dried Apamargapanchanga yavakutachoorana (coarse powder of *Achyranthus aspera*) was used⁶.

For Marana: Kumariswarasa (juice of Aloe vera) was used to prepare pellets.

Methods adopted for preparation of *yashadabhasma*:

The 4 steps were adopted as per classical literature^{6,7}.

Samanyashodhana; Common purification process of dhatus, *dhalana* (melted and poured) method was adopted here.

Raw *yashada* was taken in a long handled iron ladle (*lohadarvi*) and melted after complete melting the molten *yashada* was poured or quenched in *tilataila*, *takra*, *gomutra*, *kanji*, *kulatthakwatha* respectively. Every time same amount of fresh liquid media was taken and the entire process is repeated for 7 times in each liquid medias.

Visheshashodhana: Samanyashodhitayashada was taken and the same process of quenching was done for 21 times in *godugdha* (cows milk). Each time fresh milk with same amount was taken.

Jarana: Visheshashodhitayashada was taken in a large iron pan and heated till red hot and added *apamargapanchanga yavakutachoorana* (Coarse powder of *Achyranthes aspera*) $1/4^{\text{th}}$ of *visheshashodhita yashad* was added bit by bit and stirred with pressure continuously, till even the small granular metallic fragments became powdered. This was collected in the center of the pan and covered with earthen saucer and *teevragni* (maximum heat) was given for 3 hours, then heating was stopped and allowed for *swangasheeta* (self cooling) then collected and washed till neutral pH is attained and dried.

Marana: Jarita yashada was triturated with *kumariswarasa* for 6 hours and pellets of size 1 re coin was prepared on butter paper and dried. Dried pellets were weighed and arranged in *sharava* (casserole) and another *sharava* is kept on it. *Sandhibandhana* (*sealing*) was made

with mud smeared cloth and dried. Like this, 7 layers were done each after drying one by one. This *sharavasamputa* was subjected to *puta* (heat pattern for incineration) in electrical muffle furnace. Maximum temperature was raised till 700C gradually and maintained the same for 15 min and switched off. After *swangasheeta sharava* is opened and *chakrikas* (pellets) are collected and powdered. The entire procedure was repeated till all the *bhasma siddhi lakshanas* passes. Every time fresh aloe vera juice was used altering the temp based on the color and consistency of pellets each time until all *bhasma siddhi lakshanas* were attained. It was attained in 9th *puta*. Where in the color of the *bhasma* is grayish white in color.

Table 1 showing temperature vs time of *Yashada 1st Puta*
Table 2 showing temperature vs time of *Yashada 2nd and 3rd Puta*

Table 3 showing temperature vs time of *Yashada Bhasma 4th, 5th and 6th Puta*

Table 4 showing temperature vs time of *Yashada Bhasma 9th Puta*

Table 5 for classical *bhasmapareeksha*, which helps in qualitative analysis.

Results:

The results of organoleptic characters like colour, odour, taste, touch, and pH, Ash value of *Yashada Bhasma*, Acid insoluble ash, Loss on drying at 105^oC, and Loss on ignition were as follows^{8,9,10}:

Organoleptic characters of *Yashada Bhasma*

Colour Grayish white
Odour Odourless
Taste Tasteless
Touch Smooth, fine and amorphous

1. pH of *Yashada Bhasma* = 8.93
2. Ash value of *Yashada Bhasma* = 99.17 %
3. Acid insoluble ash: 2.68 % w/w
4. Loss on drying at 105^oC: 0.5%
5. Loss on ignition: 0.76 % w/w

Modern techniques^{11,12}:

Table 6 showing EDAX Table 7 Showing SEM Reports:

DISCUSSION:

Yashada bhasma was prepared in accordance with classical references. To get the *Rasayana* property in the drug milk has been used. The final product was subjected to analytical parameters like SEM and EDAX. The carbon

content was more in *shodhitayashada*. Aluminum (Al) is seen in *shodhita and jarita yashada* but not found in *marita* may be because in incineration chemical transformation might have lost Al. Silicon (Si) is seen in *jarita* sample where absent in final product, the Si and Al comes just in the above block of Zn in the periodic table and the reason has to be elicited. The Zn content in EDX report of *shodhita* sample was 43%, where in *jarita* Zinc content increased to 48% and in the end product that is after *marana* the Zn content increased to 78%. The SEM analysis shows that in each and every stage particle size is reducing and which makes the drug more absorbable.

CONCLUSION

The present study concentrated on classical preparation of *yashadabhasma* as mentioned in Rasa shastra text books and effort has been made to characterize based on SEM and EDAX analysis, where SEM revealed the reduction in particle size from *yashada* to *yashadabhasma* transformation which is suitable for therapeutic utility. The *shodhana and marana* is validated by the study⁶. The chemical bond changing resulted in particle size reduction and the usage of herbal media makes the *bhasma nirendriya to sendriya* results in bio acceptability.

Where in the elemental analysis was done through EDAX. Hence the association of both classical and characterization techniques are needed to standardize *bhasma* to achieve both qualitative and quantitative analysis.

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Conflicts Of Interest- Nil

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REFERENCES

1. Philips CA, et al. Ayurveda metallic-mineral ‘Bhasma’-associated severe liver injury – case report BMJ 2018. doi:10.1136/bcr-2018-225590

2. Dutt A, Sri madhava, dhatu upadhatu nirnaya 1st shloka, ayurvedaparakasha, choukahambhabhartati academy Varanasi 2016 pp.342.
3. Sharma S, Seesakaadi vignanya, Chapter 19, Rasatarangini, published by motilal banarasidas, Varanasi, 8th edition,2014.pp.479
4. Sharma S, Chapter 2, Rasa Tarangini, Edited by Kashinath Shastri, Verse no. 40, Varanasi, Motilal Banarasidas Das, 11th Edition, Reprint 2000.pp.18.
5. Sharma S, Chapter 19, Rasa Tarangini, Edited by Kashinath Shastri, Version 102 Varanasi, Motilal Banarasidas Das, 11th Edition, Reprint 2000.pp.18.
6. API, Section 18: 12 Yasada Bhasma, The Ayurvedic Pharmacopoeia of India 2003, Part 1, second edition. P 618-621.
7. Sharma S, Ayurveda Prakasha Varanasi, Motilal Banarasidas Das,2006.pp.109
8. Santhosh et al: Analytical Study of YashadaBhasma. IAMJ: Volume 1; Issue 2; March – April 2013; p1-5.
9. Rinku D. Umarani and Kishore M. Paknikar. Jasadabhasma, a Zinc based ayurvedic preparation: Contemporary evidence of antidiabetic activity inspires development of a nanomedicine. Evidence-based complementary and alternative medicine. 2014; Vol 2015: 1-9.
10. Santhosh B. RaghuvveerJadarPrashanth. Analytical study of Yashadabhasma with Ayurvedic and modern parameters. IAMJ 2013;1(2):1-7.
11. Babita Kale and NilimaRajurkar. Yashadbhasma: Synthesis and characterization. The Pharma Innovation Journal 2018;7(1):119-122
12. Gupta L.N. XRD and XRF Screening of YasadBhasma. International Journal of Pharmaceutical & Biological Archives 2014; 5(3):74-78.

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Flow chart 1

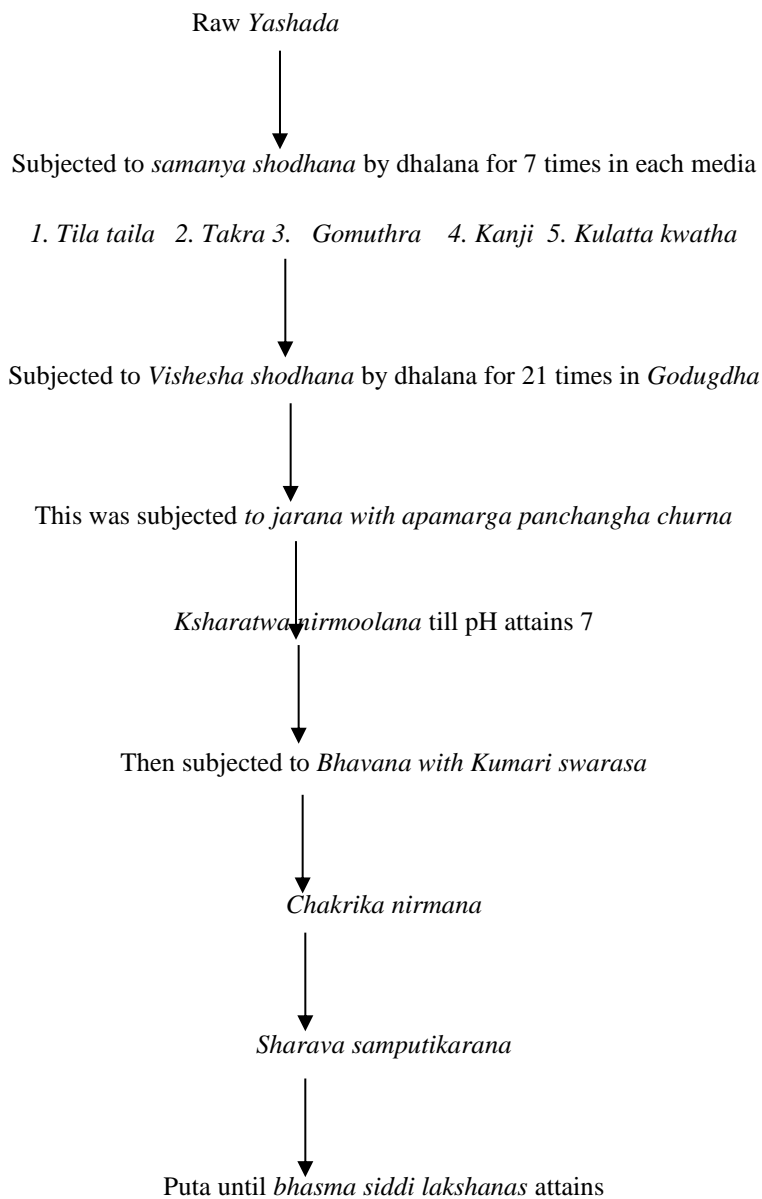


Fig. 1: Raw yashada



Fig. 2: Molten Yashada



Fig. 3: Pouring melted yashada in Pitara yantra with oil



Fig. 4: Tila taila



Fig. 5: After 1st dipping in tila taila



Fig. 6: After processing 7 times with tila taila



Fig. 7: Takra



Fig. 8: After processing 7 times with Takra



Fig. 9: Gomuthra



Fig. 10: After processing 7 times with Gomuthra



Fig. 11: Kanji



Fig. 12: After processing 7 times with Kanji



Fig. 13: Kulattaha kwatha



Fig. 14: After processing 7 times with Kulattaha kwatha



Fig. 15: Milk



Fig. 16: Final product after vishesha shodhana in godugdha for 21 times.



Fig. 17: Jarana



Fig. 18: Jaritha Yashada



Fig. 19: Ph is 9.5 to 10 Prakshalana of jarita yashada



Fig. 20: 4th time washing of jarita yashada Ph is 7



Fig. 21: Kumari swarasa 1st bhavita jarita yashda



Fig. 22: Chakrika nirmana for 1st putta



Fig. 23: Chakrikas placed in sharava



Fig. 24: Sharava samputaikaarana



Fig. 25: Yashada bhasma final product

Table 1 showing temperature vs time of Yashada 1st Puta

	Temp
0	24
10 mins	100
20 mins	200
30 mins	300
40 mins	400
50 mins	500
60 mins	500
70 mins	500
2 hrs	400
3 hrs	300
4 hrs	250
6 hrs	200
8 hrs	150
24 hrs	100
36 hrs	50

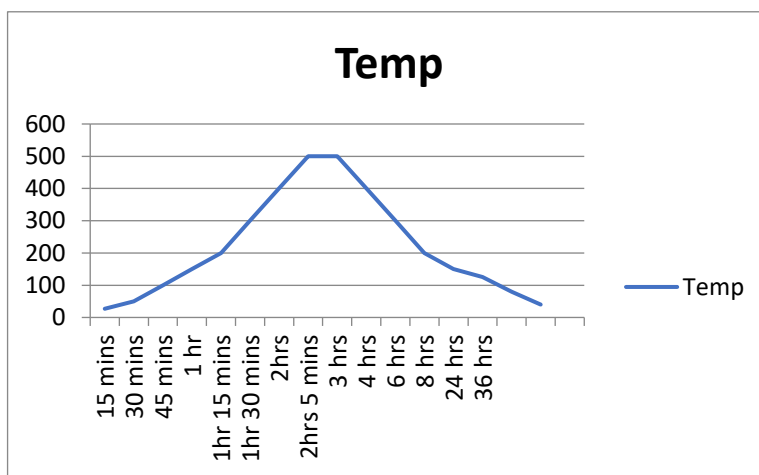


Table 2 showing temperature vs time of Yashada 2nd and 3rd Puta

0	27
15 mins	100
30 mins	200
45 mins	300
1 hr	400
1hr 15 mins	500
1hr 30 mins	600
2hrs	600
3 hrs	450
4 hrs	325
6 hrs	200
8 hrs	150
24 hrs	100
36 hrs	50

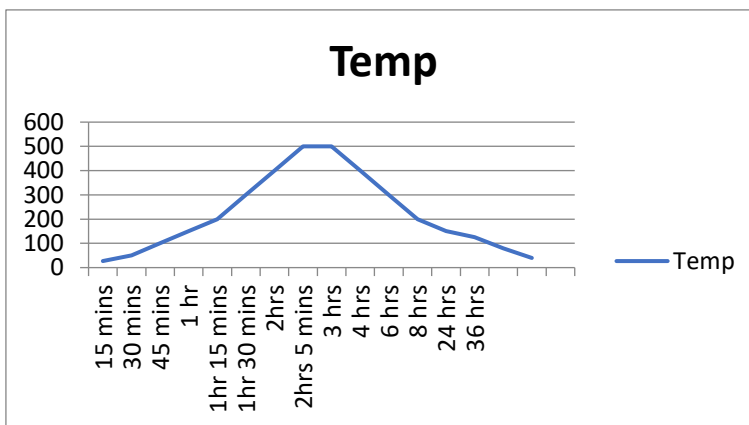


Table 3 showing temperature vs time of *Yashada Bhasma* 4th, 5th and 6th Puta

	Temp
0	26
15 mins	100
30 mins	200
45 mins	300
1 hr	400
1hr 15 mins	500
1hr 30 mins	600
2hrs	700
2hrs 30 mins	700
4 hrs	600
6 hrs	400
8 hrs	200
24 hrs	150
36 hrs	100
48 hrs	40

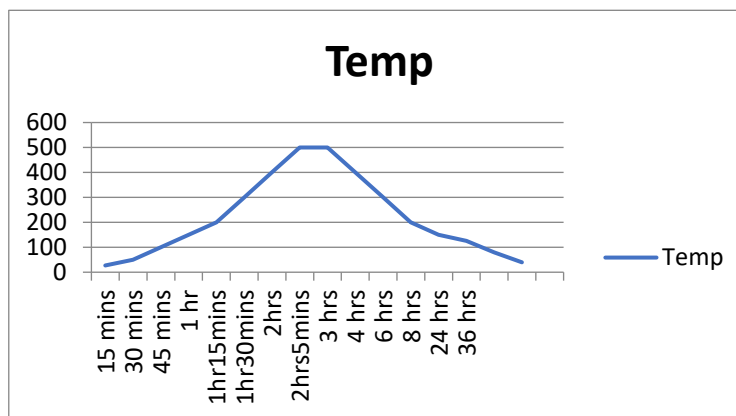


Table 4 showing temperature vs time of *Yashada Bhasma* 9th Puta

	Temp
0	27
15 mins	50
30 mins	100
45 mins	150
1 hr	200
1hr 15 mins	300
1hr 30 mins	400
2hrs	500
2hrs 30 mins	500
3 hrs	400
4 hrs	300
6 hrs	200
8 hrs	150
24 hrs	125
36 hrs	80
48 hrs	40

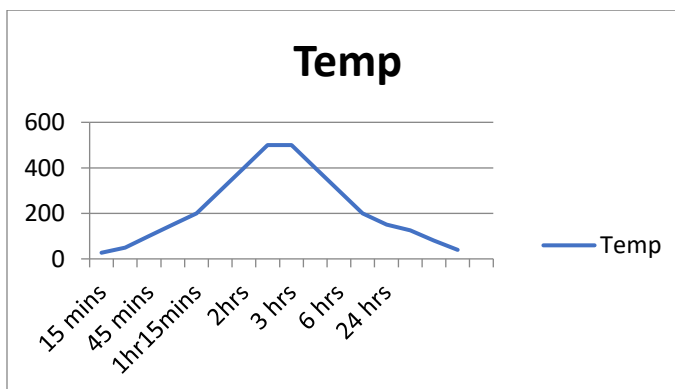


Table 5 for classical bhasmapareeksha, which helps in qualitative analysis.

Sl.no	Name of <i>bhasmapareeksha</i>	Result
1.	<i>Rekhapoorna</i> When <i>Yashada Bhasma</i> was rubbed between two fingers it entered into the furrows of the fingers.	Positive after 4 th puta
2.	<i>Varitara</i> When finely powdered <i>Yashada bhasma</i> was carefully sprinkled into a glass containing water, <i>Bhasma</i> floats on water	Positive after 6 th puta
3	<i>Nischandra</i> <i>the metallic lusture vanished</i>	Positive after 3 rd puta
4	<i>Niswadu</i> <i>tasteless</i>	Positive after 8 th puta
5	<i>Apunarbhava</i> <i>Bhasma</i> +(equal quantity of seeds of abrous pricatorious, honey, ghee, borax and jaggery)	Positive after 9 th puta
6	<i>Nitutta</i> <i>Bhasma</i> was mixed with definite quantity of Silver. It was kept in a <i>Sharava Samputa</i> and subjected to <i>Putra</i> and after self cooling, weight of Silver was taken. No change in the weight and form of silver was observed. No change in it confirms <i>bhasma</i> is proper.	Positive after 9 th puta

Shodhita		Jarita		Marita	
Element	Wt%	Element	Wt %	Element	Wt%
C	28	C	23.3	C	4.1
O	22.8	O	27.5	O	15.0
Al	1.1	Al	0.8	Ca	1.2
P	1.8	Si	0.3	Zn	78.5
Ca	2.9	Zn	48	W	1.2
Zn	43.3	-	-	-	-

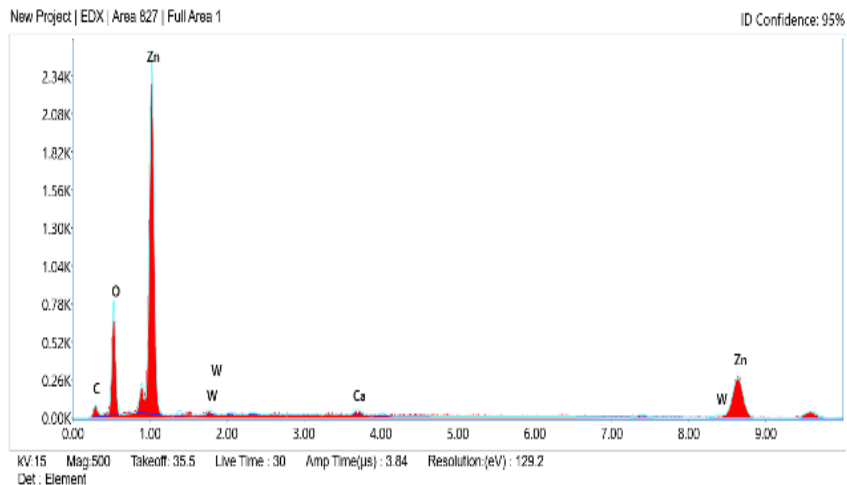


Table 7 Showing SEM Reports:

Sl no.	Shodhita	Jarita	Marita
1.	175.8 – 197.1 nm	103.6 -135.1 nm	171.5 – 106.6 nm

