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STANDARDIZATION OF PREPARED YASHADA BHASMA

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Abstract:

Yashada Bhasma has been found to be useful for the treatment of diabetes, eye disorder, urinary disorder, wound healing etc. Bhasma preparation always required to prove its non-toxicity so standardization of the prepared sample is very important. In the present study Marana of Yashada of all the three batches was carried out by following the fourth method mentioned in Rasatarangini. Further, Pharmaceutical Standardization of various steps involved in the preparation of Yashada bhasma carried out. Comparative study of 3 batches of Yashada Bhasma and their chemical as well as physical properties through some quality control tests, physico-chemical tests and modern tests like XRF, particle size were carried out. An effort has been made to characterize the preparation of Yashada bhasma as per Rasatarangini using sophisticated analytical tools as a step towards standardization of the bhasma. The results help in scientifically establishing the findings according to the principle of Ayurveda.

Key Words: Yashada bhasma, XRF, Particle size.

Introduction:

Metallic preparations have become an integral part of Ayurvedic therapeutics due to their additional advantages like smaller doses, quick action etc.(1) Yashada (Zinc) is one such metal, which is being advocated in different forms in the management of various diseases.(2) Yashada is a metallic chemical element. It is bluish white, lustrous, diamagnetic metal. It is the 24th most abundant element in the earth's crust.(3) It is indicated in all types of Prameha (DM), Pandu (∼anaemia), KasaSwasa (∼respiratory disorders), Nisha sweda (∼Night sweating) Rajasrava (∼menorrhagia), vrana (∼wounds) and Kampavata (∼Parkinsonism).(4)

Yashada Bhasma is a zinc-based herbo metallic preparation which is prepared from zinc metal and some herbal ingredients through purification and calcination processes that changes zinc metal into its oxide form as mentioned in the literature.(5) The drug manufacturing processes of Ayurveda are included in discipline of Rasa Shastra and Bhaishajya Kalpana. Heating, boiling, quenching, dipping, trituration, distillation, washing, filtering etc. are the important procedures involved in drug manufacturing.(6) During Shodhana, Jarana, Marana, bhavana classical processes, the above-mentioned procedures are adopted. All these procedures play a significant and vital role in the pharmaceutical processing of drug materials. To make it fit for therapeutic use, Yashada has to pass through a set of pharmaceutical processes known as Shodhana (Purification), Jarana and Marana(incineration). Standardization of Ayurvedic drugs at various levels starting from the selection and collection of raw material to the final product is essential to produce a safe and efficacious drug. Therefore, in the resent study an effort has been made to highlight the significance of these pharmaceutical procedures and to standardize the method of preparation of Yashada bhasma.

Classical texts have enumerated certain tests which ensure the proper transformation of basic metal in to bio-absorbable bhasma form.(7) But today due to questions arose about the safety of Rasoushadhis, it is

advised to use the advanced modern technology to ensure the proper formation of bhasmas. A number of modern analytical techniques are available to know the material characterization of bhasmas. Among them, XRF (X Ray Fluroscense) is one of the important techniques by which compounds of the material and free metals in it can be detected.

Aim and objectives:

Pharmaceutical Standardization of Yashada bhasma according to Rasatarangini(Chaturtha Marana Prakara)

Materials and Methods:

References: Rasatarangini (Shodhana, Marana)

Pharmaceutical Method:

Purification of *Yashada*

Purification of *Yashada* was done as per the reference mentioned in *Rasatarangini*. **Materials Used in Yashada Shodhana:**

Sr. No.	Contents	Quantity
1	Yashada	300 gm
2	Churnodaka	11 L

Preparation of Churnodaka for Purification:

As per the reference of *Rasatarangini* & API[8] Ingredients

1. Lime powder – 44 gm
2. Distilled water – 11 liters

Procedure:

- Mentioned quantity of lime powder was made into fine powder. This powder was taken in a vessel and mentioned quantity of water was added to it.
- It was stirred well and kept still for 9 hrs.
- Afterwards it was filtered through filter paper and used for *Vishesha Shodhana.*

Procedure followed for Purification of Yashada.

- For all the three batches the same process of purification of Yashada was performed and changes observed after purification were noted.
- 300 gm of *Ashudha Yashada* was taken in a bigger size *Palika Yantra.*
- It was held over fire and heated.
- On complete melting molten Yashada was immediately quenched through Pithara Yantra into a vessel containing Churnodaka.
- The solidified *Yashada* was collected back, melted again and poured in fresh *Churnodaka*. This process of melting and pouring *Yashada* in fresh *Churnodaka* was repeated for seven times to obtain *Shudha Yashada*.
- Before and after every *Dhalana*, weight of *Yashada* was recorded. Initial and final volume of *Churnodaka* in each *Dhalana* was recorded.

Churnodaka Preparation:

Limestone

Converted to Lime Powder

Lime Water Kept Aside for 9Hrs

Filtration of Lime Water After 9Hrs

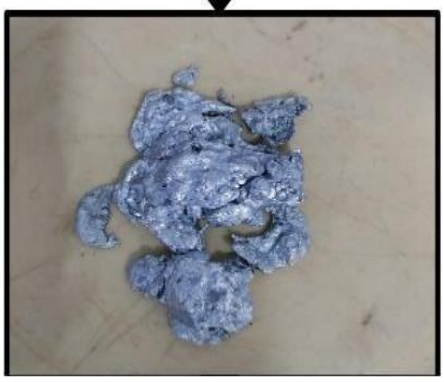
Obtained *Churnodaka*

Purification of Yashada:

Melting of Yashada using Palika Yantra

Melted Yashada quenched through Pithara Yantra in vessel containing Churnodaka for 7 times

Solidified Yashada in Churnodaka

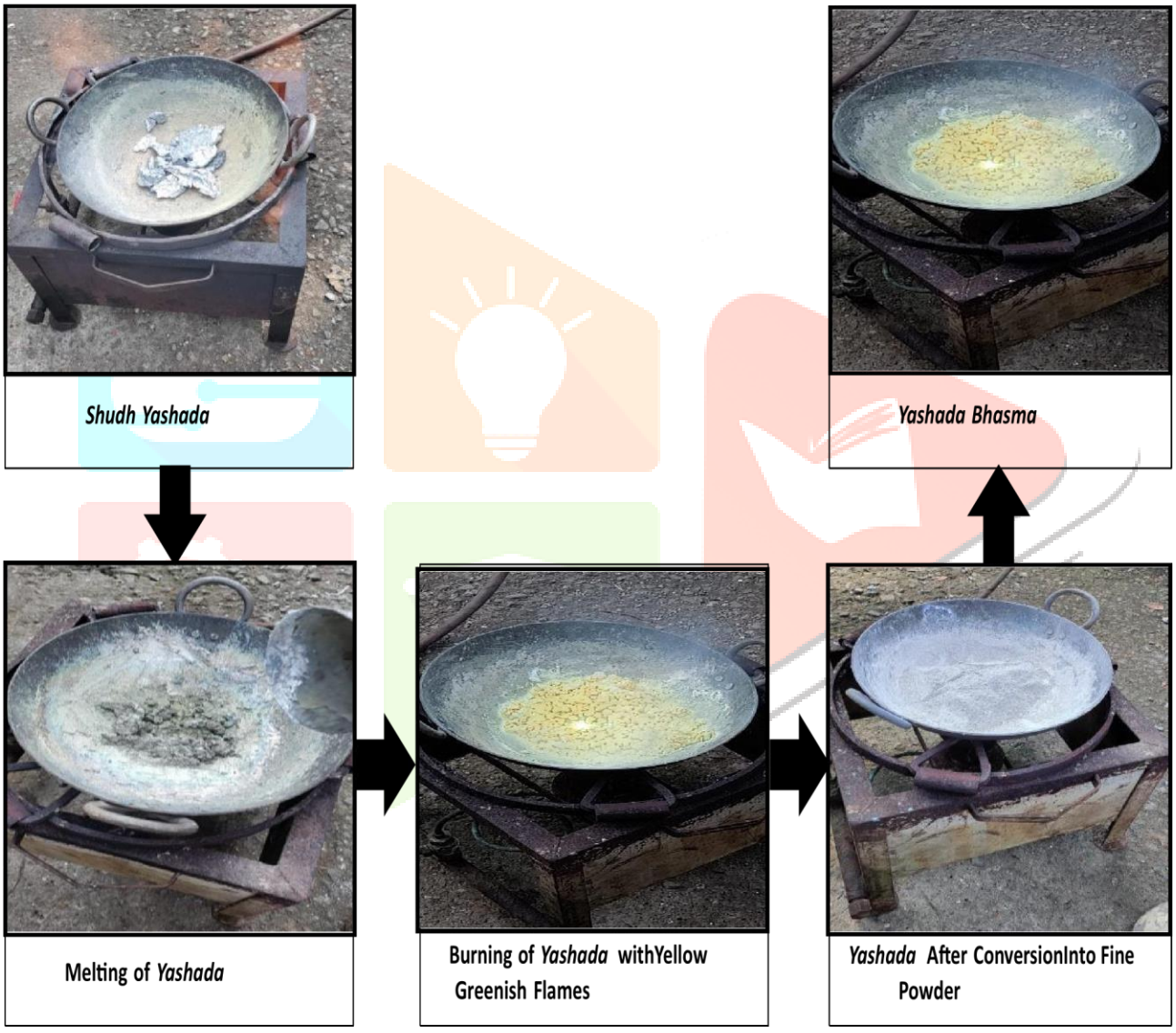


Shodhita Yashada

Preparation of *Yashada Bhasma (Yashada Marana)* [10]

- All the three batches of *Yashada Bhasma* were prepared following the same procedure as mentioned in *Rasatarangini (Chaturtha Marana Prakara)*
- Mentioned quantity of *Shudha Yashada* was taken in an iron pan and melted with intermittent stirring.
- *Yashada* was melted and stirred intermittently till it was converted into powder form.
- When the *Yashada* was completely converted to powder form it was allowed to self-cool and later on this powder was filtered through clean cotton cloth.
- Remaining powder was again taken in iron pan and above procedure was repeated.

Preparation of *Yashada Bhasma*



Organoleptic and Physicochemical Analysis of Yashada Bhasma:

Sr. No.	Parameters	Results of *Yashada Bhasma*				
		Batch 1	**Batch 2**	**Batch 3**	**Average**	**Standard Deviation (SD)**
Organoleptic						
1	Appearance	Fine powder	Fine powder	Fine powder	Fine powder	-
2	Colour	Whitish grey	Whitish grey	Whitish grey	Whitish grey	-
3	Odour	Odour- less	Odour-less	Odour-less	Odour-less	-
4	Taste	Taste-less	Taste-less	Taste-less	Taste-less	-
Physicochemical						
1	LOD %	0.06	0.01	0.02	0.03	0.021
2	Total Ash %	99.89	99.95	99.92	99.92	0.024
3	Acid Insoluble Ash % (AIA)	98.82	98.90	98.86	98.86	0.032
4	Water Soluble Ash % (WSA)	2.80	2.90	2.88	2.86	0.043

XRF Analysis of Raw Yashada

Sr. No.	Element	Mass %
1	Cu Copper	0.00
2	Zn Zinc	99.94
3	Fe Iron	0.06
4	Sn Tin	0.00
5	Pb Lead	0.00
6	Ni Nickel	0.00

XRF Analysis of Yashada Bhasma

Sr. No.	Element	Mass %		
		Batch 1	Batch 2	Batch 3
1	CuO	<0.0001	<0.0001	<0.0001
2	ZnO	97.7	97.9	97.8
3	Fe2O3	1.24	1.27	1.19
4	Al2O3	0.188	0.181	0.191
5	CaO	-	0.0171	-
6	SiO2	0.412	0.294	0.612
7	SO3	0.187	0.192	0.137
8	PbO	0.0282	0.0552	0.262
9	SnO2	0.0819	0.0789	0.0319
10	HgO	-	0.0297	-

Particle Size of *Yashada Bhasma:*

Particle Size	Batch 1	Batch 2	Batch 3	Mean	Standard Deviation
10% of Particles were less than (μ)	0.767	0.786	0.613	0.722	0.077
50% of Particles were less than (μ)	3.55	3.47	3.33	3.45	0.090
90% of Particles were less than (μ)	16.4	17.4	16.0	16.6	0.588

1. Ayurvedic Parameters As per Rasaratnasamucchaya [(11)]

a. Rekhapurnatwa:- When batch 1, batch 2 and batch 3 Yashada bhasma were rubbed in between the thumb and index finger, they entered into the minute lines of the fingers.

b. Varitara:- Batch 1 , batch 2 and batch 3 Yashada bhasma were sprinkled on the surface of water taken in a glass and allowed to stand still. It was observed that most of the sample floated on the surface of water.

c. Nischandratwa There were no shining particles in all the samples when it was observed under bright sunlight.

Discussion :

The current study was aimed to develop standard operating procedures of *Yashada Bhasma.* In the present study efforts are made to explain the observation and results obtained during the study .

Authentication of Raw Materials Organoleptic Analysis

Authentication of Ayurvedic drugs is necessary as there are many drugs which are available in the form of substitute or as adulterant. Hence the authentication of raw drugs was done from Alarsin pharmaceuticals, Mumbai.

The present study involved preparation of *Churnodaka* for *Yashada Shodhan. Yashada* procured from was identified and authenticated as zinc metal and was used here as main ingredient.

Physicochemical analysis of raw materials was done for standardization. It was done as per the methods of analytical tests mentioned in API. Each raw material was subjected to organoleptic examination and all the details have been mentioned.The *Ashudha Yashada* was subjected to XRF analysis, it was found the sample consisted of 99.94 % of zinc element and 0.06 % of iron element. Thus, stating that Yashada was in its most authenticated form.

Need of *Shodhana* of *Yashada* & Its Observations After *Shodhana*

Yashada is a *dhatu varga dravya* i.e., of metal group, so it contains external impurities and also being an element, it is not completely safe for the medical purpose in its raw form. Therefore, in order to remove the external impurities and increase the quality as well as the therapeutic properties, *Shodhana* of *Yashada* was done. *Shodhana* was carried out in *Churnodaka*. After the process, loss in weight of each sample of *Yashada* was observed and average weight loss of all the 3 groups was 23.33 gm. Colour of *Yashada* was changed from shiny silver to dull silver grey and on completion some portion *Yashada* was converted to coarse granules. It was observed that after *shodhana, Yashada* became little brittle.

Organoleptic & Physicochemical Analysis of *Yashada Bhasma*

Marana is an essential process required for the drugs of mineral origin as it helps in the conversion of mineral form of *Dravyas* to the form that can be easily absorbed and assimilated in the body. In the present study *Marana of Yashada* of all the three batches was carried out by following the fourth method mentioned in *Rasatarangini*. During the *Marana* process *Yashada* started burning with greenish white flames which is one of the described properties of *Yashada*. After complete burning *Yashada* was converted from solid mass to fine powder. Colour was changed from dull silver grey to whitish grey. *Yashada* started melting at 419°C which is the range of its melting point and maximum temperature attended was found to be 994.6°C. There was some loss in the yield after the completion of the process which can be attributed to the change in form and composition of *Yashada* and also due to the handling during the preparation. The solid mass of *Shudha Yashada* was converted into fine whitish grey powder. All the three batches were subjected to organoleptic and Physicochemical tests along with XRF analysis and Particle size analysis of the *Bhasma*.

On XRF analysis it was confirmed that *Yashada* was converted into its oxide form i.e. zinc oxide (ZnO) after the completion of *Marana* process. There was presence of other compounds also along with zinc oxide (ZnO).

The other compounds present were copper oxide (CuO), ferric oxide (Fe203), and aluminium oxide (Al2O3) in all the three batches. Also, there was presence of calcium oxide (CaO) in batch 2 of *Yashada Bhasma*.

The particle size results showed that average size of 10 % particles was 0.722µ, whereas average size of 50 % particles was 3.45µ, and that 90 % particle was 16.6µ.

Physicochemical tests like LOD%, total ash %, AIA% and WSA% were done for all the three batches. The average LOD% of all the three batches was 0.03%. Average total ash % was 99.92% whereas AIA% and WSA of all the three batches was 98.86% and 2.86% respectively.

Conclusion :

Yashada bhasma passed all Bhasma pariksha viz. Varitaratwa, Rekhapurnata, Nischandrata which proves that drug has attained its Bhasma form properly which proves that neither less nor more heat is desirable and Supaka is essential for making a drug safe and efficacious. The results help in scientifically establishing the findings in line with the principle of Ayurveda. Thus, these characterization techniques can help us to correlate the toxicity related issues and is a step towards establishing the scientific reasons behind the safety and efficacy of our ancient system of medicine.

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