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PHARMACEUTICAL STUDY OF YASADA BHASMA

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ABSTRACT

Rasa Shastra is the pharmaceutical branch of Ayurveda. As like any other medical system, success of Ayurvedic treatment also depends upon quality of medicine prescribed to the patient. The integral part of Rasa Shastra lies in the successful pharmaceutical process. Bhasma are the potent Ayurvedic preparations prepared by metals and minerals. These Bhasma possess wide range of therapeutic efficacy and are considered superior because of their qualities like small dose, quick action, palatability and longer shelf life. Yashada bhasma is important formulation mentioned in Rasa shastra texts obtained from the incineration of Raw Yashada. The pharmaceutical procedures adopted in this study are Shodhana, Jarana, Marana. The present study has been planned to standardize the method of preparation of Yashada bhasma according to the method explained in the classical literature.

KEYWORDS: *Yashada bhasma, Shodhana, Jarana, Standardization.*

INTRODUCTION

The nature possesses immensely valuable and powerful medicines in the form of metals, minerals and plants. However, most of the drugs as such are not absorbable into the biological system, until and unless they undergo certain modifications. Some specialized techniques are adopted to make these drugs absorbable and therapeutically viable. The drug manufacturing processes of Ayurveda are included in discipline of Rasa Shastra Bhaishajya and Kalpana. Heating, boiling, quenching, dipping, trituration, distillation, washing, filtering etc., are the important (Diabetes), Pandu (anemia), Vatavyadhi (neuro muscular disorders) and Netravikaras (eye disorders), which are routinely seen in our clinical practice. In the present study, Yashada was subjected to Samanya Shodhana (general purification method for all procedures involved in drug manufacturing. 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. Yashada bhasma has to be prepared accordingly, without any deviation from the classical preparation method in order to assure its safety and efficacy and also to get the desired effects in the diseases in which it is indicated like Prameha , Vishesha Shodhana (specific purification method for Zinc) and Jarana (roasting) as per Rasatarangini. Yashada Marana (incineration) was done as per Rasaamrutham. 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 present study an effort has been made to highlight the significance of these pharmaceutical procedures and to standardize the method of preparation of Yashada bhasma.

AIM OF THE PRESENT STUDY

The aim and objectives of the study is to prepare a Yasada Bhasma adopting the standard operating procedure(SOP) in respect of Sodhan, Jarana and Marana as described in Rasatarangini.

MATERIALS AND METHODS

References: Rasatarangini (Shodhana, Jarana), Rasaamrutham (Marana).

Collection of Raw Material: Yashada was obtained from local market of Bhubaneswar.

PROCEDURE

The Pharmaceutical study is carried out in following steps:

STEP1: YASADA SAMANYA SODHANA [GENERAL PURIFICATION]

A. Modified Pithara Yantra

- The assembly is detachable and hence easy to clean.

B.KANJI PREPARATION

- Raktasali 2.5kg was taken, washed and cooked in 10 litres water.
- Rice was macerated with the liquid and then Liquid was taken in a mud pot.
- The mouth of the pot was closed with its lid.
- Pot was kept undisturbed for 14 days. After 14 days the liquid was filtered and stored in a container.
- The Kanji was checked intermittently,three days prior to the completion date.
- The pot lid was not packed with MSCP[Mud Smeared Cloth Pack] to check and ensure that the Kanji remained free from fungal growth.
- The mouth of the pot and lid were cleaned with cotton swab dabbed in spirit, after every 2 - 3 days.

C.TAKRA PREPARATION

- Curd was churned, then added water again churned properly till the butter separated completely.
- The butter was removed and prepared Takra was used for Shodhana.
- The procedure was repeated for each batch.

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D.KULATTHA KWATHA PREPARATION

- Kulattha seeds were ground and soaked overnight in water (7 lit.).
- On next morning, remaining water was added and Kwatha was prepared by reducing water upto 1/8th of the initial quantity..

STEP 2: VISESA SODHANA

A.Churnodaka

- Powdered Churna was placed in S.S. vessel.
- Water was added to it, stirred and the mixture was left undisturbed for 9 hrs. then supernatant liquid (Churnodaka) was separated and stored in another S.S. vessel. The procedure was repeated for each batch.

STEP 3: JARANA OF THE SHODHITA YASADA

Jarana process was done in two stages i.e. Jarana and Prakshalana.

A: YASADA JARANA

- The specified amount of Sodhita Yasada was taken in the Lauha Kadhai and allowed to melt over the gas stove.
- Weighed quantity of Apamarga ranging from 10g to 15g was added to the molten Yasada and stirring was done continues with good amount of pressure.
- When all the metal converted in to powder form and none of the metal remained in a visibly metallic form, the powder was collected in the centre and covered with an earthen saucer and heat was increased up to maximum; the bottom of the vessel became red hot.
- Intermittently Saucer was slightly lifted to check the colour of the powder. When the colour changes to red hot the heating was stopped and left for self cooling. Next day, Jarita Yasada was collected and weighed.

B: Prakshalana of Jarita Yasada

- The Jarita Yasada was mixed in distilled water properly and allowed the mixture for sedimentation.
- After 3 hrs when the entire Yasada particle was sediment at the bottom, then the upper part was decanted carefully.
- Procedure was repeated until pH of the water became neutral i.e. around 7.Then allowed Jarita Yasada for drying.

STEP 4- YASADA MARANA

A. EXTRACTION OF KUMARI SWARASA

- Leaves of Kumari were washed in tap water; thorny ridges and apex were cut by knife
- Mucilaginous pulp was separated from the leaves with the help of knife and pulp was churned in mixer, then strained and used for lavigation.

B.LEVIGATION (BHAVANA) AND CAKING (CAKRIKA PREPARATION) :

- A weighed and measured amount of Kumari Swarasa is added to the jarita yasada from the side, simultaneously mixing it with a pestle. A volume necessary to make the solid powder in a loose paste is added.
- The mixture is levigated with proper and constant pressure and frequency.
- As the paste tightens due to loss of moisture, it is transferred to an already weighed plate and spread uniformly on it in the shape of chakrika having 2.5 cm diameter and 0.8 to 0.5 cm thickness, with the help of ss spoon and dry it in the sun.
- Before transferring the levigated material into the Mutually Opposed Shallow Earthen Plates[MOSEP]- i.e Sarava kept for this particular calcination batch is weighed and kept aside.
- It is covered with another sarava to form the calcination apparatus, the MOSEP which is kept on a shelf for complete drying.
- Just before exposing it to Puta (Calcination) the MOSEP is weighed, only the sarava with dried cakes is weighed and the weight of empty sarava is deducted from it to give the weight of dried levigated materials.
- the Jarita Yasada, slight irritating odour and effervescence are released.
- While levigating in the earlier cycles, a grating sensation is felt beneath the pestle, which gradually vanishes by the fifth cycle.

C. CALCINATION (PUTAPAKA)

- The temperature of the electric muffle furnace is recorded and the MOSEP introduced in the EMF for calcination.
- The EMF set at the desired temperature.
- Per minute progression of temperature is recorded.
- The melting point of Yasada is 419º C hence the lowest temperature to start the calcinations with, cannot be lower than that.
- Hence it was decided to start the calcinations at 500º C for the first cycle, gradually increasing it per cycle by 50ºC, reaching 800º C by the 7th cycle.
- The furnace surroundings and the door of the furnace were watched closely and intently for any changes during calcinations.
- The furnace was shut off the moment the temperature reached the desired limit for that cycle. The maximum temperature for cycle was not maintained for any duration of time. The furnace was left for self-cooling.
- A periodical drop in temperature during the period of self-cooling was noted.

D.REMOVAL OF CALCINED MATERIAL

- Temperature below 100º C as shown by the display of the furnace was considered acceptable for opening the furnace door.
- The MOSEP on cooling was weighed and recorded.
- The MOSEP was carefully and completely scrapped off, weighed, recorded and then discarded.
- The MOSEP with calcined cakes and without was weighed and recorded.
- The cakes were directly emptied into the cleaned mortar kept ready for levigation for next cycle.
- The cakes emptied in the mortar were triturated dry very homogenously to extract the calcined material for sampling. The weight extracted was recorded.

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- Deducting the sample weight from the weight of calcined material produced the actual material going into the next batch.
- The sample extracted was placed in butter paper and then stored in self-seal bag.
- The whole procedure was uniformly and thoroughly repeated through all the cycles.

OBSERVATION

Kanji Preparation

Weight of Raw Rice (Kg)	Volume of Water Added for Cooking (L)	Weight of Cooked Rice (Kg)	Volume of Water added for Kanji Preparation (L)	Final Yield of Kanji (L)	pH of Kanji	Colour of Kanji
2.5	10	12	36	30	2.0	Translucent like coconut water

Takra Preparation

- Prepared Takra was white, moderately thick liquid and slightly sour in taste with pH of 3.5.

Kulattha kwatha preparation

Wt of kulattha	Volume of Water	Reduce to volume	pH Of Kwatha	Colour	Taste	Smell
5 kg	80 L	11 L	6.5	Reddish brown	Astringent	Specific

Churnodaka preparation

- After Shodhana, Yasada became more silvery white in colour.
- Slight bumping was observed.
- Churnodaka turned blackish brown in colour after Shodhana.
- Prepared Churnodaka was colourless, liquid with pH 10.7.

Table showing weight of Yasada before and after Vishesha Shodhana

Wt [gm]	YS-1	YS-2	YS-3
Initial	457	421	413
Final	449	405	404
% change	1.7%↓	3.8%↓	2.1%↓

↓: Decrease

Yasada Jarana

- When Apamarga was added into melted Yasada, it burnt and emitted smoke, which was ceased after sometime.
- At the subsequent processes of mixing of Apamarga, gradually Yasada was converted to ash colored powder.

No of Batch	Wt of sodhita Yasada [gm]	Wt of apamarga[gm] ¼ part	Duration	Wt of Jarita Yasada[gm]	Wt increase in %
YS-1	449	112.25	6hr 30 min	515	14.69%
YS-2	405	101.25	7hr 00 min	439	8.39%
YS-3	404	101	7hr 15 min	427	5.69%

Prakshalana of Jarita Yasada

- During first and second wash white colour mixture was floating, which was separated, dried and kept for analysis.
- The Jarita Yasada was sediment at the bottom.
- Approx three wash was sufficient to obtain neutral pH.
- pH of the water of Jarita Yasada and wt. of Yasada after Kshalana

No of Batch	1st Wash pH	2nd Wash Ph	3rd Wash pH	Initial wt [gm]	Wt of Yasada After Kshalana	Loss[g]	Loss %
YS-1	12	9.1	7.60	515	414	101	19.6%
YS-2	11	8.89	7.35	439	395	44	10.02%
YS-3	12	9	7	427	378	49	11.47%

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Extraction Of Kumari Swarasa

Weight of Kumari leaves (g)	Kumari Swarasa (ml)	Yield (%) vol.
1500	800	53.33%
1750	1100	63.42%
2210	1350	59.27%

Levigation (Bhavana) And Caking (Cakrika Preparation)

- The Jarita (incinerated) Yasada is dull, blackish gray in colour and quite coarse in nature.
- For the first two cycles the Kumari Swarasa was added as per the definition of Bhavana, i.e. till complete submergence of the matter to be calcined.
- But this is found to be in excess.
- Hence for all the rest of the cycles, it is added with simultaneous levigation only till loosened dough is prepared.
- On adding Kumari Swarasa to the Jarita Yasada, slight irritating odour and effervescence are released.
- While levigating in the earlier cycles, a grating sensation is felt beneath the pestle, which gradually vanishes by the fifth cycle.

Calcination (Putapaka)

- No specific observation could actually be recorded during the calcinations.
- Minute wise temperature progression for every calcination was recorded and a chart maintained.

Removal Of Calcined Material

- The cakes are very soft and gray coloured in the beginning but gradually go on hardening a bit.
- The colour changes from gray to light gray, ultimately giving a buff or a light yellow colour to the final product.
- The cake when broken longitudinally, in the initial cycles shows colour variation from the surface to the centre, where the surface is lighter in colour than the centre which remains gray for 3 - 4 cycle. But towards the last two cycles, the colour seen is uniformly light yellow in colour.
- During every cycle, the MOSEP, which is kept on the inner side of the interior of the furnace, manifests 'over-cooking' of the cakes than that which is kept on the outerside. This is evident as the cakes in the former are decrepitated and slightly harder than the outer cakes.
- The Samyak Marita features of a properly prepared Bhasma are perceivable right from the sixth cycle onwards. In this reference the Rekhapurnatva and Varitaratva are satisfied after the sixth Puta itself.
- Similarly, the Bhasma is odourless, tasteless and Slaksna from after the sixth Puta itself.
- In Yasada Marana maximum temperature attained was 975 C after 180 minutes.

Table Showing Percentage Change in Yasada Bhasma

Weight	Y1JM	Y2JM
Initial[gm]	595	592
Final[gm]	415	399
Change[gm]	180	193
% change	30.2%↓	32.6%↓

↓ :Decrease

RESULT

Bhasma colour -pale yellow
Consistency -fine powder

Table Showing the changes in weight of Yasada bhasma in various procedures

Name of the procedures	Initial weight[g]	Final weight[g]	Loss in weight[g]	% Loss
Samanya sodhana	1500	1291	209	13.93%
Visesha sodhana	1291	1258	33	2.55%
Jarana	1258	1187	71	5.6%
Marana	1187	814	373	31.4%

CONCLUSION

Pharmaceutical standardization is the first step towards standardization of any drug. It is an important requisite for the establishment of their safety, efficacy and consistent biological activity. All the pharmaceutical procedures adopted in the preparation of Yashada Bhasma like Shodhana, Bhavana, Marana etc, plays a vital role by removing the toxic nature and improving the therapeutic efficacy, thereby rendering a safe and effective Bhasma.

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PREPARATION OF KANJI



PREPARATION OF TAKRA



PREPARATION OF KULATTHA KWATHA



YASADA SAMANYA SODHANA



YASADA VISHESHA SODHANA



YASADA JARANA



PREPARATION OF YASADA BHASMA






BHSMA PAREEKSHA