Research Article

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PHARMACEUTICAL STUDY OF VANG BHASMA

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ABSTRACT

Drugs are the most valuable gift of nature to ailing mankind and drug control is the only tool to ensure highest quality and purity of drugs. Success of treatment depends upon proper raw drug selection, proper manufacturing method and proper way of dose administration. Potency and stability of a formulation depends majorly upon the manufacturing process. Ayurvedic processing techniques have the uniqueness of enriching sendriyatva in an otherwise nirindriya inorganic draya thereby making it most absorbable and assimiable form. Shodhana involves the conversion of metals and minerals into their respective potent dosage form. Quenching is indicated in samanya and vishesha shodhana of dhatu whereby dipping in different liquids with different pH, different specific heats, and different chemical composition would invariably affect the characteristic features of final outcome physically, chemically and pharmacologically. Present study is aimed to lay standard manufacturing procedures in manufacture of Vang bhasma as per the conventional methods prescribed in Rastarangini and Rasratna samuchhaya.The study was carried out in the Department of Rasashastra and Bhaishajya kalpana and gajaputa was used to measure quantum of heat.Vang was subjected to samanya as well as vishesh shodhan. Bhasma was prepared using parad media for it's the best method to prepare. It was subjected to ten calcinations cycles to get completely vaaritar and rekhapurna vang bhasma.

Keywords: Aavap, dhalan, gajputa, calcinations cycle

INTRODUCTION

Bhasmas are the unique metallo–herbal preparations of metals or minerals derived from herbal extracts by alchemic process making these biologically absorbable. Shodhana is a combination of processes, which removes unwanted parts from the drug and enhances the properties of drug, which makes the drug suitable for desired action Shodhana is a combination of processes, which removes unwanted parts from the drug and also adds certain minerals to enhance the properties of drug, which makes the drug suitable for desired action. Shodhana involves the conversion of metals and minerals into their respective potent dosage form.The basic aim behind the incineration of metals is their conversion into nonmetallic form by the role of bhavna dravya and duration of heat they are subjected in putas. That is why though nowadays inspite of the availability of 99.9% pure metals from the market; they cannot be utilized without shodhana. After marana metals and minerals get converted into ionic radicular form due to unique heat processing and specific herbal treatment.

MATERIAL AND METHODS

Pharmaceutical apparatus required

Gajaputa- Gaja puta was selected to make Vang Bhasma because it requires higher and consistent temperature for large duration

Table 1: Dimensions of Gaja puta[1]

Length	22.5inch
Width	22.5inch
Depth	22.5inch

Saraav (Earthen plates): Used to keep cakes of triturated bhasma and is placed in Gajaputa.

Table 2: Dimensions of earthen plates

Diameter	20.0cm
Thickness	0.8cm
Depth	3.0cm

Pestle and Mortar

Table 3: Inner dimensions of Pestle and Mortar used for Vang trituration

Mortar	Pestle
Length: 35 cm	Length: 30 cm
Width: 23 cm	Weight: 3.740 kg
Depth: 17cm	

Other Equipments used

Black stone Pestle and Mortar, Knife, Weighing machine, Earthen plates, Clothes, Cow dung Cakes, Match Box, Gachani Mitti, Stainless Steel Tray. End Runner, Steel spatula, measuring cylinder, cotton, Lemon Juice Squeezer (Manual), Stainless Steel Jar, Stainless Steel Bucket, Stainless Steel Knife and Measuring Cylinder.

PHARMACEUTICAL PROCESSING

The Complete cascade of pharmaceutical processing is as follows

Table 4: Pharmaceutical steps

1.	Preparation of Takra
2.	Preparation of Kanji
3.	Preparation of Kulathha Kwath
4.	Preparation of nirgundi kwath
5.	Neembu swaras extraction
6.	Hingul Shodhana
7.	Vang shodhana
8.	Vang Jaran
9.	Vang maran

Takra preparation

5 kg curd was taken in Stainless Steel Vessel and half the quantity of curd i.e. 2.5 l water was added and was properly churned resulting in formation of 7.5l Takra[2].

Kanji preparation[3]

5 L water was added in1 kg Shaali chawal and cooked for 15 min. to make anna,which was transferred to an Earthen pot.Thereafter 3 L of Water was further added to Anna to undergo Sandhana(Fermentation).The lid was Sealed with Gaachani mitti.It was opened after 2 weeks and general tests of Fermentation were carried out and 7 l whitish,sour and pungent Kanji was filtered.

Test for Completion of Fermentation

Burning candle will keep on burning when brought above the container after removing the lid (Due to liberation of Oxygen).

Kulathha (*Dolichos biflorus*) kwath preparation

Method
2 kg of *Dolichos biflorus* seeds were dipped in 32 L of water in stainless steel container and kept overnight. Next day the decoction was prepared by heating and reducing the material to 1/4th of its volume i.e 8 l and filtered[4].

Nirgundi (*Vitex negundo*) kwath preparation

Method
2 kg of *Vitex negundo* leaves were crushed and dipped in 32 L of water in stainless steel container and kept overnight. Next day the decoction was prepared by heating and reducing the material to 1/4th of its volume.i.8l and was filtered[5].

Observations

Neembu swaras extraction

Method
6kg Lemons were washed, cut into two halves and juice extracted with the help of Lemon Juice Extractor. The juice was sieved through a Cotton Cloth and measured for Weight and Volume. It was then stored in a glass vessel at a cool place.Total yield was approx.2.4 l Average volume of juice extracted from Per Kg Lemon was 400ml[6].

Hingula shodhana

Ingredients: Asudh Hingula- 1250 g
Lemon juice-2.4L

Procedure

Lemon juice was added to unpurified hingul and was triturated in End-runner for 6-8 hours.,till hingul was dried. The process was repeated for 7 times and at the end Hingul was washed with water for 3 times and was allowed to be settled before draining the water by capillary action using cotton wick and as a result 1240 g soft, non-lustrous, fine powdered hingul was obtained[7].

Observations

Table 5: Changes observed during Hingula shodhana

No. of trituration	Quantity of Lemon juice added	Duration of Trituration	Changes Observed	Days for Trituration
1	400ml	8hrs	Mercedes Red colored, Rough, mass with lusture changed to deep orange paste	2days
2	380ml	7hrs	Deep orange mixture	3days
3	375ml	8hrs	Deep orange, Semisolid paste	2days
4	380ml	9hrs	Deep Orange, Sticky paste	2days
5	390ml	8hrs	Deep orange paste	2days
6	380ml	8Hrs	Thick, viscous, deep orange colored paste	2days
7	375ml	8hrs	Deep orange, Semisolid, thick, sticky mixture	2days

VANG SHODHANA

Samanya Shodhana of Dhatu

Table 6: Ingredients of samanya shodhana with quantity

Ashudh vang	600g
Til tail (Sesame Oil)	3.5L
Takra (Buttermilk)	7L
Gomutra (Cow urine)	7L
Aarnaal (kanji)	7L
Kulattha Kwath (Decoction of *Dolichos biflorus*)	7L

Method of Shodhan: Dhalana

General Procedure

Metal Vang was taken, weighed and melted in iron ladle over LPG Stove. Molten metal was poured into the bucket containing til tail 1 L and was immediately covered with lid so that Vang may not spill out of the bucket. It got solidified immediately and was taken out and the process was repeated seven times in each media i.e. 7 times in Til tail, takra, gomutra, kaanji and kulattha kwath respectively, thereby was subjected to dhalana process for 35 times. Finally, the weight and other observations were recorded[8].

Figure 1: Melting of vang upon heating during shodhan

Vishesh Shodhan of Vang

Table: Ingredients with quantity

Samanya shodhit vang	535 g
Nirgundi Kwath	7 l
Haridra Churna	70 g

Procedure

Samanya shodhit vang was taken, weighed and melted in iron ladle over LPG Stove. One-tenth i.e. 70 g Haridra powder was added to 7 L of nirgundi kwath. Molten metal was poured into the bucket containing 1 L of Haridra containing kwath and was immediately covered with lid so that vang may not spill out of the Bucket. It got solidified immediately and was taken out and the process was repeated seven times[9].

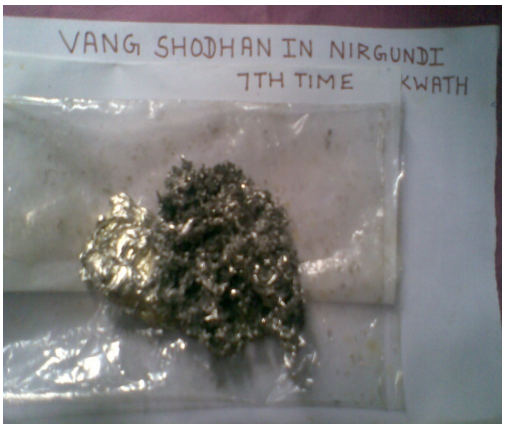

Figure 2: Dhalan of vang in Nirgundiswaras 7th calcination cycle

OBSERVATIONS

Table 7: Observation after dhalan in each shodhana dravya

Characteristic	Ashudh vang	After dhalan in til tail	After dhalan in takra	After dhalan gomutra	After dhalan in kanji	After dhalan in kulthi kwath	After dhalan in nirdundi swaras
Weight	600g	580g	565g	560g	540g	535g	530g
Color, appearance	Silvery white, Shiny	Silvery white, Less shiny	Silvery white, Less shiny	Silvery white, Less shiny	Silvery white, Less shiny	Silvery white, Less shiny	Silvery white, shiny with more grayish powder
Shape	long ribbon like	Circular mass	Distorted with angulations	Distorted with angulations	Distorted with angulations	Distorted with angulations	Irregular, powdery mass
Brittleness	Not brittle	present	Present	Increased	Increased	Increased	Increased
Form	Very flexible, Not hard, tin cry present	Hard,tincry absent	8-10%blackish grayish powder present	12 -15% blackish grayish powder present	Approx.15-20%powder present	Approx.20-25%powder present	Approx.30% blackish grayish powder present

VANG JARANA

Jarana is intermediary step between Shodhana and Marana, causing the conversion of metal into its oxide form. It is a process wherein the molten metal after shodhana is converted into powder form or reduced into ashes upon vigorous rubbing with wooden log or Iron ladle in open air. Stirring of this molten metal using green branches/fresh log of wood, can be equated to pollen.

Table 8: Ingredients with quantity

Peepal Vriksh Twak (*Ficus religiosa*)	530 g
Shudh Vang:	530 g

Procedure

Shudh Vang was melted in iron karaahe over LPG Stove and peepal twak was added gradually and constantly rubbed with amaltaas stick till it reduced to ashes[10].

Observations

In two hours 50% of shudh vang was reduced to powder and in total five hours whole 530 g was powdered with same quantity of peepal vriksh twak.

Table 9: Result

Final product obtained	Jarita Vang Powder
Weight of product	550g
Color	Grayish coarse powder
Water floating properties	Absent
Rekhapurnta	Absent

VANG MAARAN

Though the reference of making Vang Bhasma using hingula is not quoted anywhere but as per the reference of Rasratnasamuchhaya mercury or compounds of mercury are best

for incineration of metals, hence Hingula was selected as raw material and aloe vera pulp was used in sufficient quantity for trituration.

Table 10: Ingredients with quantity

Jaarit Vang	550g
Aloe vera pulp	220-240g per Cycle
Purified Hingul	132g per Cycle

Procedure

Shudh hingul was added to jaarit powdered vang and was triturated with ghritkumari swarasa (aloe vera pulp) in Pestle & Mortar for six hours, till it dried up. The semisolid paste was spreaded over ghee smeared tray and cut into cubes using knife and kept for drying. Then it was placed uniformly in earthen plate which was covered with another inverted plate and the margins were sealed with the help of wet cloth smeared with Gachani mitti. They were dried again and subjected to heat in Gajaputa having an average of 30 kg cowdungs. Later after cooling the Putas along with the material were carefully removed. This cycle was repeated for 10 times till nishchandra, vaaritar, and rekhapuran bhasma was prepared[11].

Observation

After third puta vang bhasma became free from chandrika and became rekhapurna but it took five putas to become approx 50% vaaritar,became 98% varitar after 9th puta and attained 100%vaaritaratva after 10 calcinations cycle.

Result

Nickel grey colored Vang bhasma with weight: 550g

Figure 3: Incinerated vang bhasma after 10th puta

Table 11: Observations in calcinations cycles of vang

Total Time duration (Hours)		14.00	16.00	16.00	15.00	16.00	17.00	17.00	18.00	17.00	16.00
Temperature during puta in ^{0}C	**Max**	900	850	885	890	875	840	900	890	900	890
	Min	35	34	35	30	36	34	32	34	32	34
Quantity of Cow dung cakes consumed(Kg)		30	30	30	30	30	30	30	30	30	30
Change in Wt. after Puta (g)		15g increased	80g increased	50g increased	45g increased	45g increased	30g increased	25g increased	25g increased	No increase	No increase
Wt. of cakes after Puta(g)		565	630	600	595	595	580	575	575	550	550
Duration of Trituration(Hrs.)		6	6	6	6	6	6	6	6	6	6
Quantity of Aloe vera juice added(ml)		180	255	230	220	220	220	220	220	220	220
Wt. of Hingul added		130g	130g	130g	130g	130g	130g	130g	130g	130g	130g
No. of Puta		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

DISCUSSION

Each liquid Dravya has vishesha guna in exerting a new guna to the Dhatu and also helps removal of Visha. It prepares the metal to become brittle so that the process of particle size reduction is assisted. S-adenosyl-1-methionine is one of the many Important substrates which can be found in all the 5 dravyas of Samanya Shodhana, which act substrate in numerous enzyme-catalyzed reactions. Further enhancement of thiol content as a result of SAM administration facilitates the detoxification process.[12] the variability in Melting time of Vanga may be attributed to presence of oxidized particles each time which took extra time to melt, thus raised the Melting time.

The weight of oxidized particles increased, because with each Dhalana brittleness increased, so the minute particles get separated and oxidized into powder. Though, after every cycle organic particle/matter of the dhalana dravya added to Vanga but the weight decreased because due to its extremely small particle size it attained and thus wastage occurred due to spilling of Vang out of bucket. The volume of the media affects the rate of transformation, kind of transformation as well as quality of content of the matter. Trace elements are being contributed by the Sodhana media.

Jarana – Conversion of molten tin into powder form might be due to forced friction created by rubbing wooden log with liquid tin. The organic macromolecules liberated from wood might have reacted with tin and due to vigorous rubbing reduced it to ash form.

The increased weight may be due to admixture of ash of Peepal vriksh twak with Vang and 20g weight increased from 530-550g and when tasted gave burning sensation to the tongue due to the increased alkalinity of bhasma.

CONCLUSION

Metals and minerals should be subjected to samanya shodhan as well as vishesh shodhan for facilitating easy and early incineration Samanya and vishisht shodhit vang was subjected to jaarna. This jaarit vang underwent 10 calcination cycle to get transformed into completely vaaritara and rekhapurna nickel grey colored bhasma using hingula and aloe-vera media.

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