

## CONCEPT OF JARANA PROCEDURE IN PUTI LOHAS WITH SPECIAL REFERENCE TO VANGA DHATU

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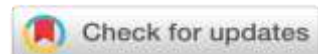
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### ABSTRACT

Rasashastra, a branch of Ayurveda, deals with organomineral and organometallic medicines such as *Bhasma*, *Kupipakwa rasayanas*, *Pottalis*, etc. Among them, bhasmas are the most important and popular form in therapy. Putilohas come under the dhatu varga. *Jarana* is an intermediate step between Shodhana and Marana in putilohas. In the present study, vanga jarana is done with *Apamarga Panchanga yavakuta choorna*. In the Jarana process, the low-melting-point parent metal is compounded with a material that can withstand comparatively higher heat, so the metal doesn't volatilise during the actual Marana process.

**Keywords:** Jarana, Vanga, Puti loha, Kinetic Chemistry

### INTRODUCTION

Rasashastra, a branch of Ayurveda, deals with organomineral and organometallic medicines such as *bhasma*, *kupipakwa rasayanas*, *pottalis*, etc. Among them, bhasmas are the most essential and popular form in therapy. Putilohas come under the dhatu varga: *naga*, *vanga*,<sup>1</sup> and *yashada*. They are widely used in practice for genitourinary cases.

The Sanskrit term jarana means to digest or to do paka of the material<sup>2</sup>. Jarana is a synonym for Murchana in the context of the *Kupipakwa Rasayana*. It is one of the *Ashtadasha samskaras*. It's said to be the intermediate step between Shodhana and Marana.

Recent researchers have adopted the term Jarana to refer to Puti Loha Marana.

.. For the jarana procedure, shodhita metal is first melted in an iron container. Vegetable or herbal drugs, *kshara* or herbal medicines, or inorganic compounds like *Haratala*, *Manahsila*, and *Gandhaka* are added to the molten metal. The whole mixture is stirred. The stirring is done with either fresh green branches, fresh roots of herbal drugs, or an iron spoon. The process is repeated until the whole metal is converted to ash or powder. This powder is heaved up in the centre of the container, covered with an earthen plate, and heated strongly till red-hot for one whole day. This apparatus is further allowed to self-cool; the ash so formed is washed with water and then subjected to puta.

#### **Aims and Objective**

- To study vanga dhatu jarana procedure
- Kinetic chemistry of jarana

#### **Materials and Methods**

In present study, Vanga jarana is done with Apamarga Panchanga yavakuta choorna<sup>3</sup>

#### **JARANA PROCEDURE**<sup>4</sup>

##### **.Materials:**

Vishesha shodhita Vanga –550 Gms,  
Apamarga panchanga yavakuta choorna – 250 Gms.

Red Litmus Paper,  
Water.

##### **Equipments:**

Big iron vessel,  
Big iron ladle (loha darvi)

.....Agni Chullika,

..... Steel vessels,

**Procedure:** A large iron vessel containing 550 grams of vishesha shodhita Vanga was taken. It was heated to a molten state. Then, the sides of the molten Vanga were continuously rubbed with a big iron spoon while a tiny amount of course Apamarga panchanga (*Achiranthus aspera*) powder was sprinkled on them. The smoke from charred choorna was visible for the first thirty minutes. Vanga gradually became powder when apamarga panchanga powder was added and rubbed with a big iron spoon. The process of turning Vishesha Shodhita Vanga into powder took nine hours. Next, all the powder was gathered in the centre, earthen sharava covered it, and half an hour of intense heat was given. When the powder became red hot, the heat was turned off and allowed to cool. The following day, after cooling, *Kshara Nirmulana* was done until the red litmus paper stopped turning blue to eliminate the surplus.

...For *Kshara Nirmulana*, jarita vanga was taken in a vessel, and water was added. Three to four litres of water were used to macerate the powdered jarita vanga, and the mixture was left undisturbed overnight. The following morning, the supernatant water was discarded after measuring the pH. The process was then repeated four more times, each involving a red litmus paper test. It took five days for *Kshara Nirmulana*.

**Table No. 1: Showing Observations During Jarana of Vanga:**

Time	Aprox. Conversion of Vanga to powder form	Apamarga. choorna used	Observations.
½ hr.	vanga in molten state, no conversion,	10 gms	Light smoke after adding apamarga choorna, rubbing.
1 hr.	5 %	10 – 15 gms.	During burning of choorna, smoke appeared, rubbing was smooth, Greyish black powder on sides of molten vanga.
2 hrs	15-20%	20 -30 gms	Thick black fumes, which were ceased after some time
3 hrs.	25-35%	45 - 60 gms.	Sluggishness increased; Blackish white ash was seen.

4 hrs.	50 %	80 – 100 gms.	More pressure was applied, colour whitish black.
5 hrs	60%	120-140gms	More pressure was applied, colour whitish black.
6hrs	70%	160-175gms	Colour of choorna whitish black, few globules of tin.
7hrs	80%	190-200gms	Colour of choorna whitish black, few globules of tin.
8hrs	90%	220-240gms	The quantity of vanga powder increased. colour grayish white.
9 Hrs	Almost all	250 gms	Even with pressure no tin globules seen, Eventually Vanga was converted to ash coloured powder.

**Table No.2: Showing pH during each wash of Jarita vanga.**

Wash no,	pH of water when mixed with Jarita vanga
1	12
2	12
3	10
4	8
5	7.5



. Vishesha Shodhita Vanga



Apamarga panchanga



Jarana with Apamarga



Jarita vanga

**UNDERSTANDING JARANA PROCEDURE**

Jarana process can be divided into four steps:

1. Phase of Dravana.
2. a) Phase of Jarana media- Apamarga panchanga choorna - prakshepana.  
b) Phase of Vighattana with Loha Darvi.

3. Phase of Sharava pidhapana & heating up to Angaravarna.
4. Phase of Swangasheeta.

**1. Phase of Dravana.**

. Here, the dhatu is heated until it melts in an iron pan. Following vishesha shodhana, the dhatu will be

partially powdered and partially solid. This step involves reaching the ideal temperature for melting the metal, but it is also the point at which the metal starts to oxidise.

**2. A) Phase of Jarana Media -Apamarga Panchanga Choorna Prakshepana. And.**

**B) Phase of Vighattana with Loha Darvi.**

...In this stage, Prakshepa of coarsely powdered Apamarga panchangas are added in small amounts. Stirring or rubbing is done with Lohadarvi. This phase provides the entire surface area for the reaction, facilitating the oxidation.

**3. Phase of Sharava Pidhapana & Heating Upto Angaravarna.**

...This is the stage of calcination, where the metal is once again not melted but may be decomposing. Several texts instruct us to pile up the ash, cover it with an earthen plate to make it completely airless, and then heat it to red hot for one day, 12 hours, or 24 hours.

**4.Phase of Swangasheeta.**

. Finally, the temperature drops when the entire device is self-cooling causes the crystals to recrystallise into a stable composition.

**Kinetic chemistry in jarana**

Steps in jarana	Physical changes	Chemical changes
1.Phase of Dravana.	<ul style="list-style-type: none"> <li>When the Shodhita metal melts, the remains from the Shodhana medium that initially settled the metal first burn, eventually melting the metal.</li> <li>Here, the molten metal offers a substantial surface area for the reaction.</li> </ul>	<ul style="list-style-type: none"> <li>A few volatile undesirable substances may have been left behind by the Shodhana process; however, chemical impurities such as arsenic are eliminated entirely.</li> <li>In addition, certain minerals and metals react with steam or atmospheric oxygen when they are liquefied, forming chemical compounds.</li> </ul>
2.A) Phase of Jarana Media- Apamarga Panchanga Choorna - Prakshepana.  B) Phase of Vighattana with Lohadarvi.	<p>As soon as the Kshara/Bhasma was placed over molten metal,</p> <ul style="list-style-type: none"> <li>fumes were seen.</li> <li>On the surface, the metals' interaction with dravya is visible.</li> </ul> <p>Following Danda Chalana:</p> <ul style="list-style-type: none"> <li>There is a significant quantity of fume present.</li> <li>Partially, metals are turned into powder.</li> </ul> <p>The metal will be completely powdered at the end of this procedure</p>	<ul style="list-style-type: none"> <li>With the aid of atmospheric oxygen, the heat produced by the burning of the herbal products helps oxidize metal into oxide form.</li> <li>However, because of the local heating caused by the burning material, only that portion of the sample that comes into contact with the herbal product oxidizes.</li> <li>Therefore, to ensure complete mixing, the sample must be stirred continuously.</li> <li>The metal is reduced to oxide form and is in a finely powdered state by the wood gases, which are produced during the burning of the wood, much like hydrocarbons.</li> <li>The easily oxidizable content is oxidized by the air that the molten metal absorbs during stirring, which causes the metal to absorb a lot of air.</li> <li>Here, apamarga panchanga is added to help the metal oxidize, and constant rubbing and stirring allow the metal's entire surface to react.</li> </ul>
3.Phase of Sharava pidhapana & heating upto.Angaravarna	<ul style="list-style-type: none"> <li>After the metal is reduced to a powder form that is nearly fine enough to be referred to as ash or bhasma, it is heated in a covered container until it reaches a red hot.</li> </ul>	<ul style="list-style-type: none"> <li>Due to this, an atmosphere devoid of air, particularly oxygen, is created, which causes the heating to reach a red-hot stage. The process may be compared with calcination, where the metal is permitted to undergo decomposition without melting and reactions may occur to</li> </ul>

	<ul style="list-style-type: none"> <li>The drugs, which are both inside the Sharava and at the bottom of the vessel, will appear red-hot.</li> </ul>	<ul style="list-style-type: none"> <li>form a stable compound.</li> <li>Even though the last stage's product may not be entirely transformed, it offers sufficient time and temperature to finish the reaction and form the compound.</li> </ul>
4.Phase of Swangasheeta.	<ul style="list-style-type: none"> <li>The temperature of the dravyas is going to gradually fall.</li> <li>Metals are in fine powder form.</li> </ul>	<ul style="list-style-type: none"> <li>During this phase, the compounds formed will be in the exited stage of the previous phase, and the compound will gradually lose its temperature. The compound is recrystallized and stabilized during this phase.</li> </ul>

## Results

**Table. No. 3: Showing the result of the Weight of the Vanga Before and After jarana :**

Sl.No	Weight before jarana	Weight after jarana	Weight loss
01.	550 gms	545 gms	5 gm

**Table. No. 4: Showing the result of the Weight of Vanga Before and After ksharanirmulana :**

Sl.No	Weight before process	Weight after process	Weight Loss
01.	545gms	535 gms	10gm

## DISCUSSION

...In most instances, the sodhana process converts metal into powder. In cases where it doesn't, like in Puti-Lohas, an intermediary step called jarana is designed to prepare the metal for the Marana procedure.

### Purpose of the intermediate process of Jarana

In the Jarana process, the low-melting-point parent metal is compounded with a material that can withstand comparatively higher heat, so the metal doesn't volatilise during the actual Marana process.

### Purpose of Apamarga in jarana :-

Apamarga belongs to the Kshara dravya. Metal can be turned into powder by using Kshara as a catalyst. Kshara may contribute to the metal's becoming brittle and softer by virtue of its bhedana (penetration) quality. Alkali is the best oxidising agent for metals because it oxidises and corrodes them.

.... In the open air or atmosphere, the reactive components of *Achyranthes aspera* (apamarga) assisted in further dissolving tiny particles into tin compounds. Eventually, these tin compounds could be transformed into potassium stannite, potassium stannate, and SnO<sub>2</sub> (tin dioxide).

..... *Achyranthes aspera* (apamarga) is primarily composed of potash, which, at high temperatures, yields potassium oxide. The quantity or concentration of

potassium oxide that reacts with tin during the jarana process determines the formation of tin compounds. SnO<sub>2</sub> (tin dioxide), K<sub>2</sub>Sn<sub>2</sub>O<sub>2</sub> (potassium tin dioxide), K<sub>2</sub>SnO<sub>2</sub> (potassium stannite), K<sub>2</sub>SnO<sub>3</sub> (potassium stannate), and Sn (free tin) are possible final products of jarana. .... The metal may get chloridised due to the apamarga's chloride ion content.

### Jarana vis a vis Poling:

.The Jarana and Poling processes are closely related. In the former case, the process resembles a redox reaction in which oxidation and reduction co-occur.

Poling: Poles made of green wood are used to stir the molten metals. At the high temperature of molten metals, wood generates methane and other hydrocarbons, which reduces any oxide present in the metal.

....In this process, the metal is rubbed with Apamarga panchanga churna and then continuously heated. Gases like hydrocarbons produced while burning the wood reduce the metal oxide formed during the Shodhana process and convert much of it to metallic form but in a finely powdered state. Due to continuous stirring and rubbing, more surface area of the metal is exposed to the air, thus forming oxide, and gradually, the metal is converted to powder form.

... While there are oxidation and reduction reactions during Jarana, most of the response is reduction. This

is supported by the observation that Jarita Vanga weighs less than the initial amount taken, indicating that this was not merely an oxidation reaction.

▪ **Calcination:**

... Thermally decomposing a material involves raising its temperature to a high point below its melting point.

...In the jarana, when all particles of vanga were converted into powder form, they were piled up and covered with an earthen plate, in short, to make it devoid of air, and then heated to red, which indicates the process of calcination, where again the metal is not melted but may be undergoing decomposition.

• **Volatilisation:**

During intense heating in a free air supply, volatile substances like phosphorus, arsenic, antimony, sulfur, selenium, tellurium, organic matter, moisture, etc., are eliminated.

**Kshara Nirmoolana:** Following Apamarga's combustion during Jarana, Jarita Vanga will be mixed with the burnt remnants primarily made of highly alkaline calcium carbonate. The product is repeatedly washed with water to remove this extra alkalinity until the red litmus paper stops turning blue. ...While tin dioxide powder is water-insoluble, alkalis such as calcium carbonate easily dissolve in water during this washing process. As a result, water and these alkalis are readily eliminated.

...Despite the precautions, however, there is always a possibility that fine particles of tin powder will be

expelled during stirring, along with water. This could be the cause of the product's 10 grams loss.

## CONCLUSION

Jarana is an intermediate step for Putiloha Marana. In the Vanga Jarana, the low-melting-point Vanga dhatu is compounded with the yavakuta choorna of apamarga panchanga, which can withstand comparatively higher heat, so the metal doesn't volatilise during the actual Marana process. In the early stages of Churna Prakshepa, Jarana can be regarded as roasting. In this case, churna can be thought of as a catalyst. We were poling during the Kashta Vighattana stage. Stage of Sharava Pidhapana is calcification.

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