

PHARMACEUTICAL STANDARDIZATION AND PRELIMINARY PHYSICO-CHEMICAL  
EVALUATION OF *TRINAKANTAMANI BHASMA*Bhavin M. Chavda\*<sup>1</sup>, Dr. Bharat D. Kalsariya<sup>2</sup> and Dr. Darshan K. Parmar<sup>3</sup><sup>1</sup>3<sup>rd</sup> Year P.G. Scholar, Upgraded Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College, Vadodara, Gujarat, India.<sup>2</sup>Principal and Professor, Upgraded Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College, Vadodara, Gujarat, India.<sup>3</sup>Assistant Professor, Upgraded Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College, Vadodara, Gujarat, India.

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**ABSTRACT**

*Bhaskarana* is process in which a substance which is bio-incompatible is converted into bio-compatible form by various *Samskara*. *Marana of Ratna, Uparatna* is not advised in Ayurveda. *Trinakantamani Bhasma* is well known formulation used by Ayurveda physician. *Trinakantamani Bhasma* was prepared by reference of Bhashajya Samhita, *Bhasma-Pishti Prakarana*,<sup>[1]</sup> which is indicated for *Vataja, Pittaja* and *Kaphaja Galagraha, Gala Granthi, Gandamala*. Total 10 pilot batches has been prepared to decide the quantum of heat and temperature at which *Bhasma* can be prepared. Three batches of *Bhasma* has been prepared in EMF by setting temperature at 230°C. Average liquid media (*Punarnava Panchanga Svarasa, Adhahpushpi Panchanga Svarasa, Vijaysara Tvak Svarasa*) used for *Bhavana* were 130,143 and 128 ml respectively. Average yield for three batches was 0.77 %. Time required to attain peak temperature was 20 minutes and for self-cooling 14 hours were required. Color was changed from light yellow to brownish yellow. Physico-chemical parameters for each batch of *Trinakantamani Bhasma* did not show any major changes in all the parameters.

**KEYWORDS:** *Bhasma*, EMF, Standardization, *Trinakantamani*.**1. INTRODUCTION**

Rasashastra, an ancient science which include various metal, mineral, gem-stone and semiprecious gem stone. Varieties, acceptable characters, their purification and incineration methods are well elaborately described.

*Bhasma Kalpana* is the type of medicine, which deals with metals and minerals to produce the drugs with higher efficacy in lower doses. *Bhasma* preparation is done by applying an indigenous process called as *Marana* in Rasa Shastra. *Bhaskarana* is process in which a substance which is bio-incompatible is converted into bio-compatible form by various *Samskara*.

*Trinakantamani* is one of the *Dravya* of *Uparatna Varga*. *Trinakantamani (Kaharuba, Kaherva, Kerbo)* is derived in Ayurveda from Unani system of medicine in 19<sup>th</sup> century. *Trinakantamani* word is made up of two words, *Trina* means grass and *Kanta* means attractive. *Kaharuba* is Persian,<sup>[2]</sup> word, which is made up of 2 words i.e. *Kaha* and *Ruba*,<sup>[4]</sup> the meaning of which is *Kah*,<sup>[3]</sup> = Dry grass and *Ruba*,<sup>[4]</sup> = Puller, means Grass

puller. *Trinakantamani* is basically fossil resin of pine family trees. *Trinakantamani Bhasma* is indicated for *Vataja, Pittaja, Kaphaja Galagraha, Gala Granthi, Gandamala*.<sup>[5]</sup>

In present era of globalization, there is need of standardization for Ayurveda medicine to provide good quality drugs with higher efficacy and potency. So here an attempt has been made to develop standard manufacturing process (SMP) of *Trinakantamani Bhasma* and preliminary assessment was done by physico-chemical parameters.

**2. MATERIALS AND METHODS****Procurement of raw material**

Raw *Trinakantamani* was procured from herbovedaoversaes.com. *Punarnava Panchanga, Adhahpushpi Panchanga* and *Vijaysara Tvak* were collected from Government Ayurved Pharmacy, Rajpipla, Gujarat.

**Identification and Authentication-** Procured *Trinakantamani* (June,2020) was authenticated by Neel

Gem Testing Laboratory, Ahmedabad, Gujarat (ISO 9001:2000 Certified lab) as Amber Stone. All the raw drugs were identified and authenticated by Pharmacognosy department of Food and Drugs Laboratory, Vadodara, Gujarat by following API guidelines. All the samples were genuine and authenticated samples were used for *Trinakantamani Bhasma*.

#### Pharmaceutical Study

**Ingredients:** *Trinakantamani* powder, *Punarnava Panchanga*, *Adhahpushpi Panchanga*, *Vijaysara Tvak*.

**Instruments:** *Tambada Khalva Yantra*, Electric Weighing Machine, Measuring beaker, Spoon, Mixer, Sieve – 200 mesh, Electric Muffle Furnace, Air tight container.

#### Manufacturing of liquid media for *Trinakantamani Bhasma*

*Punarnava Panchanga Svarasa*, *Adhahpushpi Panchanga Svarasa* and *Vijaysara Tvak Svarasa* were used as *Bhavana Dravya* and prepared as per classical reference. Trituration should be done for one day with respective liquid media.

**Pilot batches:** Total 6 batches have been prepared by using different temperature pattern and quantity of fuel according to classical methods.

In **1<sup>st</sup> batch**, 8 cow dung cakes were used and max.temp.500°C achieved. The material burns out and leaving a blackish residue. It happens may be due to more heating than required. In the **2<sup>nd</sup> batch**, total 6 cow dung cakes were used and max.temp. 400<sup>0</sup> C achieved. Color of *Chakrika* was not changed and no blackish residue found. It occurs may be due to insufficient heating. In **3<sup>rd</sup> batch**, 6 cow dung cakes were taken in an iron soccer and max.temp. 480<sup>0</sup> C achieved. Material burnt out and blackish residue of *Trinakantamani* was obtained. It may be due to fuel quantity was more than required. In **4<sup>th</sup> batch**, 4 cow dung cakes were used, max. temp. 370<sup>0</sup> C achieved. *Chakrika* was hard and no any color change was found. In **5<sup>th</sup> batch**, coarse powder of 4 cow dung cakes were taken and max. temp. 170<sup>0</sup> C achieved. *Chakrika* was harder in compare to 4<sup>th</sup> batch, no any color changes was found. In **6<sup>th</sup> batch**, coarse powder of 3.5 cow dung cakes, maximum temperature 140<sup>0</sup> C achieved. Observation was same as per 5<sup>th</sup> batch.

In **7<sup>th</sup> pilot batch**, small pieces of *Trinakantamani* were taken and **burnt over gas** by putting in wire mesh. At 280<sup>0</sup> C material got liquefied and at 300<sup>0</sup> C, it was burnt out. After observing 7 pilot batches. After 7<sup>th</sup> batch, it was decided to make *Bhasma* in Electric Muffle Furnace (EMF) by setting different temperature.

In **8<sup>th</sup> batch**, temperature of EMF as set at 240<sup>0</sup> C, when temperature achieved, EMF was switched off. After self-cooling, *Bhasma* was collected. *Chakrika* gets little bit harder consistency but not harder than previous batches, color becomes slight dark. In **9<sup>th</sup> batch**, temperature of EMF as set at 225<sup>0</sup> C and switched off. After self-cooling, *Bhasma* was collected. *Chakrika* gets slight softer but no color changes observed.

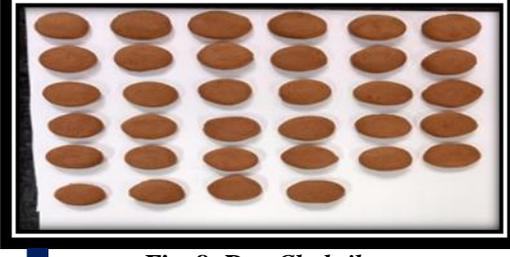
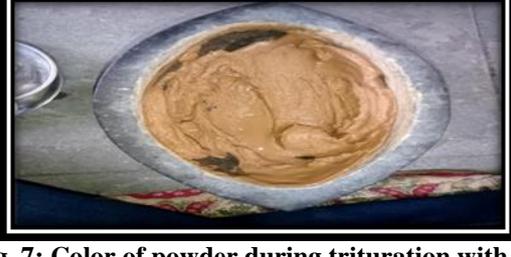
In **10<sup>th</sup> batch**, temperature of EMF as set at 230<sup>0</sup> C and after achieving EMF was switched off. After self-cooling, *Chakrika* gets softer than batch 9<sup>th</sup>, but no color changes observed.

**Main batches:** For main batch of *Trinakantamani Bhasma*, 150 g powder of *Trinakantamani* was taken and three batches were prepared.

150 g of fine powder of raw *Trinakantamani* was used for preparation of *Trinakantamani Bhasma* **Fig. 1**. First of all, levigation was done with *Punarnava Panchanga Svarasa* for 8 hours (counting as one day) **Fig. 2**. After proper drying of material it was weighed and taken for levigation with *Adhahpushpi Panchanga Svarasa* for 8 hrs **Fig.3**. After *Bhavana* of *Vijaysara Tvak Svarasa* **Fig. 4**, uniform sized pellets **Fig. 8** were prepared. It was properly dried and weighed. After drying of pellets were taken in *Sharava Samputa* and *Sandhibandhana* was done **Fig.9**. *Sandhibandhana* was subjected to EMF by setting temperature at 230<sup>0</sup>C. After self cooling, *Chakrika* were powdered and stored in air tight container **Fig.11**.

All three batches of *Trinakantamani Bhasma* were analysed by organoleptic characters and physico-chemical parameters i.e. loss on drying,<sup>[6]</sup> total ash,<sup>[7]</sup> acid insoluble ash,<sup>[8]</sup> water insoluble ash, acid soluble ash, water soluble ash,<sup>[9]</sup> sulphated ash.<sup>[10]</sup>

3. RESULTS AND DISCUSSION

 <p>Fig. 1: Powder of <i>Trinakantamani</i></p>	 <p>Fig. 2: <i>Punarnava Panchanga Svarasa</i></p>
 <p>Fig. 4: <i>Adhahpushpi Panchanga Svarasa</i></p>	 <p>Fig. 3: Color of powder during trituration with <i>Punarnava Panchanga Svarasa</i></p>
 <p>Fig. 5: Color of powder during trituration with <i>Adhahpushpi Panchanga Svarasa</i></p>	 <p>Fig. 6: <i>Vijaysara Tvak Svarasa</i></p>
 <p>Fig. 8: Dry <i>Chakrika</i></p>	 <p>Fig. 7: Color of powder during trituration with <i>Asana Tvak Svarasa</i></p>
 <p>Fig. 9: <i>Sharava Samputa</i></p>	 <p>Fig. 10: Color of <i>Chakrika</i> after <i>Puta</i></p>
 <p>Fig. 11: <i>Trinakantamani Bhasma</i></p>	

**Table 1: Showing general observations and change in color of powder during each Bhavana.**

S.No.	Name of Liquid media	Observations	Change in color
1	<i>Punarnava Panchanga Svarasa</i>	Initially, liquid media was floating over powder and after 10 min of levigation, trituration process was easily performed.	Light yellowish to slight dark yellow
2	<i>Adhahpushpi Panchanga Svarasa</i>	Initially, liquid media was floating over powder and after 10 min of levigation, trituration process was easily performed.	Slight dark yellow to light yellow
3	<i>Vijaysara Tvak Svarasa</i>	Liquid media was mix with powder and trituration was easily performed.	Light yellow to brownish yellow

**Table 2: Showing quantity of liquid media used in each batch of Trinakantamani Bhasma.**

S. No.	Name of Ingredients	Batch 1	Batch 2	Batch 3	Average
1	<i>Trinakantamani powder</i>	150 g	150 g	150 g	150 g
2	<i>Punarnava Panchanga Svarasa</i>	130 ml	140 ml	120 ml	130 ml
3	<i>Adhahpushpi Panchanga Svarasa</i>	155 ml	135 ml	140 ml	143 ml
4	<i>Vijaysara Tvak Svarasa</i>	115 ml	140 ml	130 ml	128 ml

**Table 3: Showing initial weight and final weight of Trinakantamani powder after each Bhavana with different Bhavana Dravya.**

<i>Bhavana Dravya</i>	Time taken for each <i>Bhavana</i> (hrs.)	<i>Trinakantamani Powder</i>							
		I.W.		F.W.		I.W.		F.W.	
		B1		B2		B3			
<i>Punarnava Panchanga Svarasa</i>	8 hrs.	150	155	150	153	150	152		
<i>Adhahpushpi Panchanga Svarasa</i>	8 hrs.	156	156	153	154	153	153		
<i>Vijaysara Tvak Svarasa</i>	8 hrs.	156	156	154	154	153	153		

I.W. = Initial weight F.W. = Final weight B1-Batch 1 B2-Batch-2 B3- Batch 3

**Table 4: Showing result of Trinakantamani Bhasma.**

S.No.	Parameters	Batch -1	Batch-2	Batch-3
1.	Initial quantity of <i>Trinakantamani powder</i> (g)	150	150	150
2.	Total time taken for preparation of <i>Trinakantamani Bhasma</i> (hrs.)	38	38	38
3.	Final quantity of <i>Trinakantamani Bhasma</i> (g)	151	152	150
4.	Final yield (g)	1	2	1
5.	Final yield (%)	101.33	101.33	102.00
6.	Total gain (g)	1	2	1
7.	Total gain (%)	0.66	1.01	0.66
8.	Reason of gain	Due to addition of solid content of <i>Bhavana Drava</i>		

**Table 5: Showing organoleptic characters of Trinakantamani Bhasma.**

S.No.	Parameter	Batch 1	Batch 2	Batch 3
1	Color	Light yellow	Light yellow	Light yellow
2	Odour	Not specific	Not specific	Not specific
3	Taste	Taste less	Taste less	Taste less
4	Touch	Soft	Soft	Soft

**Table 6: Showing Physico-chemical parameters of Trinakantamani Bhasma.**

S.No.	Parameter	Batch 1	Batch 2	Batch 3	Average
1	Loss on drying (%)	0.74	0.39	0.48	0.54
2	Total ash (%)	1.39	1.14	1.25	1.26
3	Acid insoluble ash (%)	0.30	0.39	0.39	0.36
4	Water soluble ash (%)	0.40	0.59	0.50	0.49
5	Acid soluble ash (%)	99.7	99.6	99.6	99.6
6	Water insoluble ash (%)	99.6	99.4	99.5	99.5
7	Sulphated ash (%)	3.30	2.51	2.91	2.90

#### 4. DISCUSSION

All the raw drugs used for preparation of *Trinakantamani Bhasma* complies physico-chemical and pharmacognostical parameter mentioned in Ayurvedic pharmacopeia of India. *Punarnava Panchanga*, *Vijaysara Tvak* were within the standard limit of API. Standard parameter of *Adhahpushpi Panchanga* is not mentioned in API, so physico-chemical parameter done for *Adhahpushpi Panchanga* can be used as standard. Standard manufacturing process was followed in all the three batches.

Average *Bhavana Dravya* used for levigation were *Punarnava Panchanga Svarasa* (130 ml), *Adhahpushpi Panchanga Svarasa* (143 ml) and *Vijaysara Tvak Svarasa* (128 ml). By giving *Bhavana* of *Punarnava Panchanga Svarasa*, initially liquid media was floating over powder and after 10 min of levigation, trituration process was easily performed. In 2<sup>nd</sup> *Bhavana* by *Adhahpushpi Panchanga Svarasa*, at first fluid media was floating over powder and after 10 min of levigation, trituration was effectively performed. In 3<sup>rd</sup> *Bhavana* by *Vijaysara Tvak Svarasa*, liquid media was properly mixed with powder and trituration was easily performed.

During levigation by all three liquid media, color changes was observed was light yellowish to slight dark yellow in *Punarnava Panchanga Svarasa* and then became light yellow when levigated with *Adhahpushpi Panchanga Svarasa*. Lastly, it was brownish yellow after *Bhavana* of *Asana Tvak Svarasa*. Average yield was less because inorganic part of active principles of liquid media remain in small amount and it is difficult to give maximum heat to *Trinakantamani* as it is soft gemstone and resin like material. Total 24 hour *Mardana* was done for pharmaceutical preparation of *Trinakantamani Bhasma*. Time required to attain peak temperature in EMF was 20 minutes and for self-cooling 14 hours was required. Color of *Trinakantamani* was changed from light yellow to brownish yellow after completion of levigation. Final product is light yellow in colour. Physico-chemical parameters for each batch did not show any major changes in all the parameters.

#### CONCLUSION

Yield was found 151 g, 152 g and 150 g in each batch which indicates weight gain 100.66 %, 101.33%, 100% after completion of *Bhasma* preparation. Trituration was done for 8 hrs with each liquid media in each batch. Organoleptic characters complies in all three batches of *Trinakantamani Bhasma*. There is no any major changes found in physico-chemical parameter for all batches of *Trinakantamani Bhasma* except in sulphated ash. So here by analysing organoleptic characters and physicochemical parameters standard manufacturing process is established for *Trinakantamani Bhasma*.

#### ACKNOWLEDGMENT- Nil.

#### CONFLICT OF INTEREST – None.

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