STANDARD OPERATIVE PROCEDURE FOR PREPARATION OF RAJAT BHASMA

Srivastava Prashant*, Patgiri B. J. and Singh Azad

1MD Scholar, IPGT and RA (Gujrat Ayurved University, Jamnagar, India.
2Prof., IPGT and RA (Gujrat Ayurved University, Jamnagar, India.
3M. Pharma Scholar, IPGT and RA (Gujrat Ayurved University, Jamnagar, India.

ABSTRACT

Aim and Objectives To generate data in view of the development of standard manufacturing process of Rajata Bhasma and to develop its possible analytical profile. To evaluate the safety of Rajata Bhasma. To assess memory enhancing and adaptogenic activities of both the samples. Procurement and processing of basic raw material (Rajata), Procurement of materials needed for Shodhana and Marana, Samanya shodhana of Rajata, Vishesa Shodhana of Rajata, Shodhana of Hingula, Hingulottha Parada by Nada Yantra Vidhi, Shodhana of Gandhaka, Preparation of Rajata Pishi, Preparation of Rajata Kajjali, Preparation of Rajata Bhasma. Material And Method Ashodhita Hingula, Ashodhita Gandhaka and Tila tail were procured from the pharmacy of the Gujarat Ayurved University, Jamnagar. Result and Observations Samanya Shodhana On first quenching- shining of metal decreases. From 2nd quenching onward characteristic sound was produced prior heating of Rajata due to deposited oil on the metal surface. Lustre lost after 3 quenching. Whiteness increased after 3 quenching in Takara and Kanji. Surface become rough and cracks can be seen after shodhana in Kulattha Kwatha. Vishesa Shodhana Complete loss of metallic shine after 7 times quenching, the surface became rough.

KEYWORDS: Ashodhita Hingula, Ashodhita Gandhaka and Tila tail.

INTRODUCTION

Rajata is one among the Sapta Dhatu Varga in classical literature on Rasashastra and it is an important metal having high therapeutic value. Therapeutic application of Rajata has been mentioned for internal administration in Charaka Samhita in the context of Bramha

*Corresponding Author Dr. Srivastava Prashant
MD Scholar, IPGT and RA (Gujrat Ayurved University, Jamnagar, India.

Article Received on 01 May 2018, Revised on 21 May 2018, Accepted on 12 June 2018
DOI: 10.20959/wjpps20187-11926
Rasayana. The process of Bhaskaran is used to transform metals and minerals into bioassimilable form, i.e., Bhasma. The metals and minerals obtained from ore have to undergo various processes (Samsakara) such as Shodhana and Marana. The term “nanoparticles” is used to describe a particle with size in the range of 1nm-100nm, at least in one of the three possible dimensions. Several physical and chemical methods have been used for synthesizing and stabilizing silver nanoparticles.\(^{(1)}\) The most popular chemical approaches, including chemical reduction using a variety of organic and inorganic reducing agents, electrochemical techniques, physicochemical reduction and radiolysis are widely used for the synthesis of silver nanoparticles. Green synthesis of silver nanoparticles i.e. using plant extract as a reductant and stabilizing agent is currently emerging as a new trend in field of nanosciences.\(^{(2-5)}\) Hingula alone and mercury along with sulphur together, both are best suitable media for preparing Rajata bhasma and also possess no toxic effect on long-term use. Rajata bhasma was proven to be safe in pharmacological study i.e. acute (7 days), subacute (45 day), chronic (60 days) toxicity. Swarnakshiri Marita Rajata Bhasma is found to be more effective than Gandhaka Marita Rajata Bhasma in patients of Female infertility (Vandhyatava). Rajata bhasma was found more efficacious in comparison to Rajata sindura in the management of patients of depression. Charaka Samhita (1000 BC by Acharya Agnivesh) - Included in Pancha Lauha group. Sushruta Samhita (700 BC by Acharya Sushruta) Included in Parthiva group and Trapvadi Gana. Acharya Vagbatta-Rajata is indicated to purify the drinking water. Rasarnava (12th Cen. A. D. by Shri Bhairavananda Yogi) Included in classification of 6 metals and Sara Lauha group. Types of Rasarnava has mentioned that 2 types of Rajata which are Tara Shukla and Tara.\(^{(6-14)}\) Krishna Number of formulations in different classical literatures- Bhaishajya Ratnavali – 90, Sharangadhara Samhita Madhyama Khand in -5, Rasendrasara Sangraha -45, Rasaratna Samuchchaya -19, Rasa Prakash Sudhakara 10. Commonly used media for Marana of Rajata Mulika, Ariloha, Parada, Gandhaka. SamanyaShodhanaofRajataSamanyakshodhan, Reference: SharangadharaSamhita, Madhyam Khand 11/2. Vishesha Shodhana Reference: Rasatarangini 16/34, Principle Dhalana in nimbu swaras, Procedure: 7 times quenching in lime juice, Principle: Nirvana 3 times in each media. Size: 100 grams, Media: Tila tail, Takara, Arnal, Go-mutra and Kullatha kwatha.\(^{(15-20)}\)

MATERIAL AND METHOD

Rajata was purchased from the market in the form of thick silver (99.25%) and was converted to Kantakavedhi Patra of 32 gauzes. It was made into pieces of 2” x 4”. Among
the raw drugs, fresh fruits of *Nimbu* (*Citrus lemon* Linn.) purchased from the local market and authenticated. Fresh leaves of *Kumari* (*Aloe vera* (L.) Burm.f.) were collected from the botanical garden, IPGT & RA, Jamnagar, and authenticated and *Swarasa* of both the drugs was prepared in the dept of RSBK. *Ashodhita Hingula, Ashodhita Gandhaka*, and *Tila tail* were procured from the pharmacy of the Gujarat Ayurved University, Jamnagar.

**RESULT AND OBSERVATIONS**

_Samanya Shodhana_ On first quenching- shining of metal decreases. From 2\textsuperscript{nd} quenching onward characteristic sound was produced prior heating of *Rajata* due to deposited oil on the metal surface. Lustre lost after 3 quenching. Whiteness increased after 3 quenching in *Takara* and *Kanji*. Surface become rough and cracks can be seen after _shodhana_ in *Kulattha Kwatha_.

_Vishesha Shodhana_ Complete loss of metallic shine after 7 times quenching, the surface became rough.

Table No.1. Results of _Shodhana_.

<table>
<thead>
<tr>
<th>Media</th>
<th>Avg. time(min) for red hot stage</th>
<th>Avg. wt. obtained (g)</th>
<th>Avg. weight loss/gain (g)</th>
<th>Cummulative % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tila Taila</em></td>
<td>4.30</td>
<td>100</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Takra</em></td>
<td>9.38</td>
<td>100</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><em>Kanji</em></td>
<td>5.40</td>
<td>99.25</td>
<td>0.75</td>
<td>0.75↓</td>
</tr>
<tr>
<td><em>Gomutra</em></td>
<td>8.15</td>
<td>99</td>
<td>1.0</td>
<td>1↓</td>
</tr>
<tr>
<td><em>Kulattha Kwatha</em></td>
<td>9.40</td>
<td>98.5</td>
<td>1.5</td>
<td>1.5↓</td>
</tr>
<tr>
<td><em>Lime juice</em></td>
<td>7.45</td>
<td>97</td>
<td>3</td>
<td>3↓</td>
</tr>
</tbody>
</table>

Table No. 2. _Marana of Rajata_.

<table>
<thead>
<tr>
<th>Name of Ingredient</th>
<th>Quantity (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw <em>Shodhita Rajata</em></td>
<td>95</td>
</tr>
<tr>
<td><em>Shodhita Gandhaka</em></td>
<td>1892.5</td>
</tr>
<tr>
<td><em>Shodhita Parada</em></td>
<td>95</td>
</tr>
<tr>
<td><em>Ghritakumari Swarasa</em></td>
<td>2300 ml</td>
</tr>
</tbody>
</table>
Operating procedure of Rajata bhasma preparation

Fig no.1 raw aloe vera
Fig no.2 swaras of Aloe vera
Fig no.3 Patra of Rajat
Fig no.4 Rajat pwd form
Fig no.5 mix it with aloe vera
Fig no.6 Muffle furnace
Fig no.7 Rajat in mud vessel
Fig no.8 chakrika of rajat
Fig no.9 Gandhak Sudha
Fig no.10 burn form of Rajat
Fig no.11 Chacckrika of Rajat
Fig no.11 dove mass of Rajat
Images of Rajata Bhasma chakrikas after Putapaka

Graph No.1. Temperature Pattern graph for Rajata Bhasma in EMF.
DISCUSSION

Rajat Bhasma is said to be of Black in color apart from “Raktotpala” varna (Red color). It has been mentioned first of all in Veda and used therapeutically internally since the period of Charaka Samhita. Morphological and organoleptic changes and observations during shodhana and an end product (shuddha Rajata) like Decreased shining, Observance of characteristic sound during heating, Loss of Lusture, Increment in whiteness after quenching in Takara and Kanji, surface changes to rough and cracks at the end of samanya shodhana and complete loss of metallic shine after Vishesh shodhana. Suggest documented effects of quenching process like frequent changes in grain sizes, rearrangements, arrangement-arrangement of crystal structure, phase transformations, crystal defects, doping of organic moieties, the reaction of upper surface with organic solvents etc. Increase whiteness after quenching in Kanji and Takara suggest reactivity with these acidic media whereas additional changes in loss of metallic luster after vishesha shodhana justifies the necessity of Vishesh shodhana process.

Difficulty information of pishti even after 3 hours of continuous trituration suggest chemical changes in Rajata after Shodhana ie delays amalgam formation that further suggest change in reactivity.Data of colour changes and weight changes in initial six puta suggest the consistency.There was non uniformity in intermediate product of Marana till 7 the to 9 the puta then after it achieved uniformity in this parameter which is suggestive of formation of uniform compound. Increase whiteness after quenching in Kanji and Takara suggest reactivity with these acidic media whereas additional changes in loss of metallic lustre after vishesha shodhana justifies necessity of Vishesh shodhana process. Difficulty information of pishti even after 3 hours of continuous trituration suggest chemical changes in Rajata after Shodhana ie delays amalgam formation that further suggest change in reactivity.Data of colour changes and weight changes in initial six puta suggest the consistency.There was non uniformity in intermediate product of Marana till 7 the to 9 the puta then after it achieved uniformity in this parameter which is suggestive of formation of uniform compound. Uniformity in subsequent operating procedures and its outcomes from 10th puta onwards which is apart from effect of maintenance of uniform temperature pattern. Data of weight loss in comparatively more in initial seven puta even at lower temperature than later suggest formation of comparatively more thermostable compound.Significant reduction in requirement of bhavna Drava after 7 the puta and maintenance thereafter suggest change in moisture capacity of intermediate products. Instead of classical method, EMF is preferred for
giving puta for Rajata marana. Temperature pattern can be maintained according to need with precision and minimal loss of energy as it is a closed system. It is ideal for pharmaceutical validation of rasaushadhi, mainly where nature of product is principally temperature dependent. Black Colour of Bhasma favours formation of sulphides and oxides of Silver. However predominantly Black colour suggests more content of Sulphides which is supported with stoichiometric analysis. Most of the classical references quote black colour of Rajata Bhasma. In spite of insignificant change in weight of intermediate product, change in colour after Marana and quantity of Bhavana Drava required in successive puta as that of before and as that of added quantity of sulphur, still more number of Puta may have therapeutic value as oxides of silver are highly unstable at much lower temperature than applied for pharmaceutical process of putana (200-300°C) and the contents undergo several chemical changes owing to organosulphur compounds.

CONCLUSION
Pharmaceutical preparation of Rajata Bhasma with samaguna gandhaka kajjali, in 1st puta followed half quantity of Shuddha gandhaka and Bhavana with Kumari Swarasa for batch size of 95gms of Shuddha Rajata, yielding 158% bhasma (as that of Rajata), peak temperature of average 550°C, achieved in 90 min and total 30hrs duration for heating (including self cooling) in 20 puta may be considered as SMP for future studies. Thus prepared Rajata Bhasma is a mixture of Sulphides and Oxides of Silver with a significant quantity of organic and organosulphur compounds with 15% of Ag, 15-31% of Sulphur and very negligible 0.0015% Hg.

REFERENCES


