STANDARD MANUFACTURING PROCEDURE (SMP) OF ABHRAKA SHODHANA

1 Bhurkunde Sunil Baban 2Birardar Shivanand T. 3 Bedarkar Prashant. 4Prajapati P.K.
1MD Scholar, 2 PhD Scholars, 3 Assistant Professor, P4Professor, P. G Department of Rasa Shastra and Bhasihajya Kalpana, IPGT & RA Gujarat Ayurved University, Jamnagar, Gujarat, India

INTRODUCTION

In Indian system of medicine, metal and minerals are frequently used in therapeutics without any untoward effects. In the Medieval period many pharmaceutical processing like shodhana (purification), marana (incineration), sattvapatana (extraction) etc. are developed in Ayurvedic pharmaceutics for metallic and mineral preparations.1 Historically shodhana concept was in existence since the time of Charaka Samhita as while enumerating the fundamentals necessary of Gunantaradhana.2 The concept has further developed after the development of Rasashastra in the field of Ayurvedic medicine. Ayurvedic drugs are achieved from natural sources such as plants, animal and minerals. Therapeutically metals and minerals used since Vedic period, due to their additional advantages like smaller dose, quick action etc. which became an important part of Ayurvedic medicine.3 As in Rasashastra, the metals, minerals and few drugs of poisonous nature are found used which likely to contain some toxic effects. Hence with a view to remove or

ABSTRACT

Abhraka Bhasma is widely used in Ayurvedic field by many Ayurvedic physicians, commonly used in Jwara (Fever), Pandu (Anaemia), Amavata (Rheumatoid Arthritis), Shwasa (Asthma) and Kamala (Jaundice). Ingestion of Ashodhit Abhraka causes Mandagni (Loss of appetite), Hridroga (Heart diseases) etc. It is a most important step before processing in to Bhasma (incinerated powder). So Shodhita Abhraka should be used for preparation of Abhraka Bhasma. For the proper shodhana of Abhraka Bhasma, there is need to develop Standard Manufacturing Procedure. Thus an attempt has been made to introduce SMPs for Abhraka shodhana. Aim and Objective: To develop standard manufacturing procedure for Abhraka shodhana. Materials and Methods: Total three batches of Abhraka shodhana of 1000 g were prepared by adopting classical guidelines. Results and Discussion: Average 1000 grams of Abhraka was taken and yield of 918.67 g of Shodhita Abhraka was obtained. The average loss in final product was 8.13%. Average total time required for each nirvapa procedure was 54.29 min. Average Shodhana time required for one batch of 1000 g of Abhraka was 378.33 min Conclusion: SMP of Abhraka Shodhana is prime requirement for preparation of Bhasma. The average yield of Shodhita Abhraka was 91.86 %. Loss is due to flow of brittle and fine particles of Abhraka particles in the air. Keyword: Abhraka, Bhasma, Biotite, Shodhana, Standard Manufacturing Procedure
minimize their toxicity and to make them suitable for further processes, a number of pharmaceutical procedures have been found evolved which are considered helpful in reducing the toxic effect of such drugs. The frequently used metals and minerals in Ayurveda includes Parada (mercury), Swarna (gold), Rajata (silver), Tamra (copper), Loha (iron), Abhraka (Biotite), and Swarna Makshika (Copper pyrite). The metallic preparations are used in the form of bhasma (incinerated powder) and shodhana is first and primary step before proceeding in to Bhasma. Process of Shodhana is divided in Samanya shodhana (general purification) and Vishesha shodhana (special purification). Samanya Shodhana includes heating the drug up to red hot stage or up to complete melting then quenching for either three or seven times in each liquid media that include Tila taila (sesame oil), Takra (clarified butter), Gomutra (cow’s urine), Kanji (sour gruel) and Kulattha kwatha (decotion of Dolichos biflorus Linn). Vishesha Shodhana involves the same process of heating or quenching but the liquid media is specific for different metals and minerals; such as Naga is purified quenching it in Churnodaka, Gandhaka purified in Godugdha, Loha is purified in Triphala Kwatha etc. Abhraka Bhasma is more commonly used by various Vaidya in Ayurvedic practice. In classics Abhraka Bhasma is used in various diseases like Amavata, Kshaya, Shwasa, Kasa Arsha, Jwara, Raktapitta, Pandu, Mutraghata, Vataroga, Kamala, Udararoga. In classics, it is mentioned that utility of Ashodhit Abhraka causes Mandagni, Hridroga, Parshwashool, Shotha, Pandu and Kushtha. So shodhita Abhraka should be used for preparation of Abhraka Bhasma. Various processes are mentioned classics for Abhraka shodhana with different liquid media. Various Acharyas have mentioned more than 38 drugs for Abhraka Shodhana. In Rasaratna Samuchhaya, Milk was mentioned for the Abhraka Shodhana. Milk is available throughout year at any session in market and low cost. Therefore in present study, we used milk for Abhraka Shodhana by Nirvapa method for seven times.

**Aim and Objective:** Considering all these points in view, present work has been planned to develop SMP of Abhraka Shodhana.

**Material and Methods**

**Collection of raw materials:** Raw Abhraka was procured from Pharmacy, Gujarat Ayurved University, Jamnagar and authenticated as per classical texts. Cow’s milk was procured from local market of Jamnagar. Raw Abhraka was tested for Ayurvedic grahya lakshana (acceptable parameters) like Snigdha, Pruthudala, Varnasanyukta, Bharatoadhikam, Kajalasannibha, Anjannibha. Abhraka shodhana was done in three batches with one kg of Abhraka in each batch. Necessary equipment’s like Charcoal burner, electric blower, Pyrometer, metal tongs, steel vessel, Cow dung cakes, Iron pan, Measuring cylinder, Weighing balance, cotton cloth, etc. were arranged prior to begin the process.

**Abhraka Shodhana**

**Ingredients:** Raw Abhraka – 1000 Gms, Cow Milk (Godugdha) – 7 Litres.

**Procedure:** 1000 g of raw Abhraka was weighed and heated in an iron pan. Required amount of milk (1 lit.) was taken in a steel vessel with the help measuring jar. The temperature of charcoal was maintained with the help of Electric blower to get uniform heat. The chips of raw Abhraka were turned up and down with the help of metal tongs to give equal exposure of heat to both the surfaces. It took 45-60
minutes to achieve the red hot stage. When the Abhraka pieces became completely red hot, they were quenched in the milk. After 4 to 5 minutes, the milk was separated by filtering it through cotton cloth and soft pieces of Abhraka were collected in an iron pan to subject it for next Nirvapa. Remaining quantity of milk was measured. Temperature of coal and Abhraka were noted by using pyrometer. The similar method was followed for further six times for all the three batches. Before every Nirvapa, fresh milk was taken. After 7th Nirvapa, Shodhita Abhraka was taken in S.S. tray and spread it well. Tray was kept in an oven at 50°C for 8 hrs to evaporate the milk which is absorbed by Abhraka during Shodhana process. After complete drying, trays was removed from oven and weighed. This Shodhita Abhraka was used for further procedure.

**General Observations**

- When the red hot raw Abhraka is quenched in milk, ‘Hissing’ sound was produced and fumes were evaporated having milky smell.
- Before quenching of red hot Abhraka in milk, the milk temperature was 28°C, after quenching the temperature of milk was suddenly raised up to 78°C.
- Colour of milk was changed from white to whitish brown.
- Some pieces of Abhraka were flooded over milk.
- Abhraka became softer and separated easily.
- After 4th Nirvapa, the fine particles of Abhraka were floating in air.
- Colour of Abhraka changed to golden brown.
- During Abhraka heating, fumes and typical milky smell was observed.
- Abhraka changed into coarse powder after 7th Nirvapa.

- After each Nirvapa, the weight of Abhraka was increases due to adhesion of milk over the surface of Abhraka.

**DISCUSSION**

For Shodhana, Average 1000 g of Abhraka taken and yield of Shodhita Abhraka was 918.67 grams. Average loss of 8.13% was occurred during the Shodhana process. Average time required for each nirvapa procedure 54.29 min. Average time required for shodhana for one batch was 378.33 min. Average one litre of milk was required for Shodhana of 1000 g of Abhraka. After the quenching of red hot Abhraka, the almost 40% of milk was evaporated. Before the quenching of Abhraka in milk the average temperature of milk is 28.57°C, which was suddenly raised to 77°C. After each nirvapa, 5 to 10 min was required for next red hot stage of Abhraka for further shodhana, which was might due to presence of milk which was absorbed by Abhraka in previous nirvapa. Shodhana is a process which removes the physical as well as chemical impurities of the raw drug. Chemically 99.9 % pure is not taken as shodhita until and unless it gone through Ayurvedic purification. During Shodhana procedure, raw Abhraka was heated to red hot stage and quenched into liquid media and repeated the same procedure. Successive heating and quenching process lead to sudden variations in temperature of the Abhraka. After heating the material, the intermolecular space is increased and molecular arrangements deforms. After application of heat, inter atomic tension is increased and also increasing inter atomic distance. After quenching, sudden change in temperature disturbs inter atomic tension and weakens the electro-static bond in between two atoms leading to change in the molecular arrangements. This change causes the brittleness of the drug leading to breaking and
size reduction which is one of the desired characteristic of shodhana. Repeated quenching causes disruption in equilibrium, increased brittleness, reduction in hardness and finally reduction in particle size. To flow the particles in air due to their lightness causing weight loss of the raw drug. After quenching in milk, it gave hissing sound due to sudden cooling of the red hot Abhraka patra. After quenching, sudden rise in temperature of the milk causes evaporation with white fumes. During nirvapa process cracks are seen on the surface and broken in to coarse powder. Due to brittleness, some particles of Abhraka are observed floating over the surface of milk. After successive nirvapa of Abhraka in liquid media, it leads softer and easily separable Abhraka. Reduction in particle size helps in absorption, smoothness leads to non-irritability and changes make the material body friendly. Colour change from white to whitish brown is due to fine particles of Abhraka that derived from Abhraka patra. Colour of Abhraka became golden brown colour due to removal of impurities. Temperature of the milk is increased after quenching is due to contact with red hot Abhraka patra. Weight gain observed after each quenching is due to adherence of milk to the Abhraka patra. Loss in the milk volume after quenching is due to evaporation and adherence to Abhraka patra. Weight loss is observed after complete drying of the Abhraka patra than the initial weight of raw Abhraka patra. It is due to flow of the particles of the Abhraka which became brittle after each quenching in milk. It was also observed that Abhraka takes comparatively more time to get complete red hot during shodhana procedure. After the each Nirvapa surface area of the Abhraka was increased. After the shodhana Abhraka colour became golden brown. Abhraka become soft, light in weight and coarse powdered.

CONCLUSION

Shodhana is a prime procedure of Ayurvedic pharmaceutics which is utilized for further pharmaceutical procedure or used in formulation. Shodhana detoxifies the drug and increases the safety and efficacy of the drug. Quenching of red hot Abhraka in to milk cause sudden rise of temperature causing evaporation of milk and resulting 40% loss. Average 54.29 min time was required for red hot stage of Abhraka. Sudden cooling of red hot Abhraka gave brittleness which is desired character of Abhraka. The average yield of Shodhita Abhraka was 91.86%. The brittleness of Abhraka causes the flow of Abhraka particles in to the air. After Shodhana, the raw Abhraka was turned in to soft, brittle and shiny particles. The results of present ensure the uniformity of the operative procedures. Thus the SMP of Abhraka shodhana can be utilized for the pharmaceutical procedures and for formulations. The present study can be considered as standards for further researches.

Table No: 1 Showing the observation during the Abhraka Shodhana

<table>
<thead>
<tr>
<th>Nirvapa no.</th>
<th>Wt of Raw Abhraka (gms)</th>
<th>Milk (ml)</th>
<th>Duration of heat for Abhraka getting red hot stage (min)</th>
<th>Initial temp of Milk</th>
<th>Milk remaining after quenching of Abhraka</th>
<th>Final temp of milk</th>
<th>Avg. gain* of Abhraka (Gms)</th>
<th>Total duration required for complete nirvapa process (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

www.iamj.in

IAMJ: Volume 4; Issue 02; February - 2016
**Table No. 2 Showing the temperature during Abhraka Shodhana**

<table>
<thead>
<tr>
<th>Nirvapa</th>
<th>Coal (°C)</th>
<th>Iron pan/Kadhai (°C)</th>
<th>Abhraka(°C)</th>
<th>Initial temp of Milk</th>
<th>After quenching temp of milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1012</td>
<td>946</td>
<td>810</td>
<td>28°C</td>
<td>78°C</td>
</tr>
<tr>
<td>2</td>
<td>1018</td>
<td>940</td>
<td>816</td>
<td>29°C</td>
<td>78°C</td>
</tr>
<tr>
<td>3</td>
<td>1009</td>
<td>938</td>
<td>808</td>
<td>28°C</td>
<td>76°C</td>
</tr>
<tr>
<td>4</td>
<td>1024</td>
<td>940</td>
<td>813</td>
<td>28°C</td>
<td>76°C</td>
</tr>
<tr>
<td>5</td>
<td>1028</td>
<td>935</td>
<td>809</td>
<td>29°C</td>
<td>76°C</td>
</tr>
<tr>
<td>6</td>
<td>1010</td>
<td>935</td>
<td>814</td>
<td>29°C</td>
<td>78°C</td>
</tr>
<tr>
<td>7</td>
<td>1018</td>
<td>940</td>
<td>810</td>
<td>28°C</td>
<td>77°C</td>
</tr>
<tr>
<td>Avg.</td>
<td>1017</td>
<td>939.14</td>
<td>811.42</td>
<td>28.57°C</td>
<td>77°C</td>
</tr>
</tbody>
</table>

*Abhraka weight was increases due to absorption of milk.*

**Table No. 3 Showing the results after Abhraka Shodhana**

| Shodhan Batch no. | Date of starting | Date of finish | Quantity of Raw Abhraka (gms) | Quantity of Shuddha Abhraka (gms) | Loss/Gain (after drying of Abhraka) (gms) | % Loss | Avg time each procedure (Min) |
|-------------------|------------------|----------------|-------------------------------|-----------------------------------|--------------------------------___________|--------|-------------------------------|
| 1                 | 23/12/2014       | 24/12/2014     | 1000                          | 937                               | 63 (L)                                 | 6.30   | 380                           |
| 2                 | 17/01/2015       | 18/01/2015     | 1000                          | 908                               | 92 (L)                                 | 9.20   | 385                           |
| 3                 | 20/05/2015       | 21/05/2015     | 1000                          | 911                               | 89 (L)                                 | 8.90   | 370                           |
| Avg.              |                  |                | 1000                          | 918.67                            | 81.33                                  | 8.13   | 378.33                        |

**Table 4: Equipment and their specifications used for Abhraka Shodhana**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Equipment’s</th>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Iron pan/Kadhai</td>
<td>Depth</td>
<td>30 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diameter</td>
<td>110 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Circumference</td>
<td>270 cm</td>
</tr>
<tr>
<td>2.</td>
<td>Measuring jar</td>
<td>Maximum Capacity</td>
<td>2.0 L</td>
</tr>
<tr>
<td>3.</td>
<td>Cotton cloth</td>
<td>Length</td>
<td>90 x 90 cm</td>
</tr>
</tbody>
</table>
4. Iron ladle
   Length: 119 cm

5. Stainless steel vessel
   Depth: 21 cm
   Diameter: 17.5 cm
   Circumference: 58 cm

6. Pyrometer
   Temperature range: Max. 1200°C

7. Stainless steel tray
   Length: 45 cm
   Breadth: 30 cm
   Depth: 7.5 cm

REFERENCE


16. Ayurveda Prakash, Edited by Arthavidyotini & Arthaparakasini Sanskruti Chapter no.2. Verse no.198-99,

17. Rasendra Sara Sangraha, By Indradev Tripathi, Siddhinandan Mishra, Chapter no.1. Verse no.146 Chaukhambha Orientalia publication, p.38


CORRESPONDING AUTHOR
Dr. Bhurkunde Sunil Baban
MD Scholar, Department of Rasashastra and Bhaishajya Kalpana
IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India

Email: sunilmdjamnagar@gmail.com

Source of support: Nil
Conflict of interest: None Declared