ABSTRACT

Gandhakaajeerna baddho rasa (GABR) is a unique preparation mentioned in Rasayogasagara which has therapeutic ability to cure all diseases when given with suitable Anupana (vehicle). The main ingredients are Shuddha Parada, Shuddha Gandhaka, Kakamachi, Tambula, Dathura and Meghanada. The pharmaceutical procedures involved are Shodhana, Jarana, Murchana & Bandhana. Parada & Gandhaka were taken in 1:2 ratio in a specially designed yantra which was kept in Valuka bhanda (sand apparatus) & heated on Mandagni till cessation of Sulphur fumes. Later paka was continued on Mandagni by adding Swaras of Kakamachi (Solanum nigrum), Nagavalli/Tambula (Piper betel), Dhatura (Datura metel) & Meghanada (Amaranthus spinosum). Till date no research work was done in any institute relating to present formulation or adopting this technique. Hence an effort was made to standardize the method of preparation of GABR.

Keywords: Gandhakaajeerna baddho rasa, Jarana, Murchana & Bandhana

INTRODUCTION

Rasa Shastra deals with medicinal aspects of metals, minerals, precious stones and poisonous plant drugs. It has been serving humanity from centuries with its unique metallic and herbo-mineral formulations. Rudra (Lord Shiva) was considered as the first physician, from whom the branch of Rasa Shastra has evolved. The Rasauṣhadhīs have wide range of therapeutic efficacy and innate qualities like quick action, less dose, palatability, ability to cure incurable diseases and known for their prolonged shelf life. Shodhita Parada (Purified Mercury) is equal to Ambrosia (nectar). It cures the diseases when subjected to Murchana, bestows Mukti – liberation when subjected to Bandhana, and gives immortality when it was subjected to Marana. Incarnation. Parada doesn’t attain disease curing property until subjected to Jarana with Gandhaka. GABR is a unique formulation in which Parada was subjected to all most all the above procedures like Shodhana, Jarana, Murchana & Bandhana.

AIM & OBJECTIVES:

• Compilation of various references pertaining to Gandhakaajeerna baddho rasa.
• Pharmaceutical study of Gandhakaajeerna baddho rasa

DRUG REVIEW:

Gandhakaajeerna baddho rasa (GABR) was identified in “Rasayogasagara”. The author Hariprapanna Sharma compiled this formulation from Rasa granthas such as Rasaratnakara, Rasa Raja Shiromani, and Yoga Mahar-
Reference of this drug was also traced in Manthanabhairava’s “Anandakanda”\(^6\), “Vastu Swachhandamrutam”\(^7\) a Unani book written by Tuniraja in 1891.

“Gandha baddha” is it’s another name mentioned in Rasayogasagara\(^4\), Anandakanda\(^5\). In Rasaratnakara, Anandakanda and Vastu Swachhandamrutam, Swarasas of only three herbal drugs were mentioned- namely Kakamachi, Nagavalli and Dhatura. In Rasayogasagara, Meghanada was mentioned in addition to the above three drugs. In the present study Pharmaceutical process was done taking Rasayogasagara sloka as the chief reference.

**GABR PREPARATION**

**CHIEF REFERENCE:** Rasayogasagara 1\(^{ST}\) Vol-1, करसाः,yoga no-444

**Materials:** Shodhita Parada, Shodhita Gandhaka, Kakamachi swarasa, Nagavalli/Tambula swarasa, Dhatura swarasa, Meganadha/Tanduliyaka swarasa

**Method/ Principle:** Shodhana of Parada, Gandhaka, Swarasas nirmana, Jarana, Murchana, Bandhana

**Apparatus:** Khalwa yantra, Muslin cloth, Darvi, stainless steel vessels (for Shodhana), Specially prepared GABR nirmana yantra (for Jarana), funnel, pipette (for pouring Parada, Gandhaka), Mixer (for Swarasa preparation), vessels, Shalaka.

**Procedure:** Total Pharmaceutical procedure was carried out in five stages

**Stage I - YANTRA NIRMANA**-Preparation of Yantra (apparatus) and Lid

In chief Reference the preperation was said to be conducted in a Yantra made up of mud with a length of 16 angulas, diameter of 2angulas closed at one end & opened on other side. Tha same was made

\[
\begin{align*}
1\text{ angula} & = 3/4 \text{ inch} \quad \Rightarrow \quad 1.9 \text{ cms} \\
16 \text{ angulas} & = 16 \times 3/4 = 12 \text{ inches} \quad \Rightarrow \quad 30 \text{ cms}
\end{align*}
\]

When no specifications are mentioned regarding the ingredients to be used for making Yantras or Musha (vessels) then as a general rule materials advised for Samanya Musha should be taken. Samanya musha dravyas include burnt husk, coal powder, horse dung and wool. But after making trials on this, it was understood that now-a-days it is practically not possible for the potters to make them. So normal potter’s preparative method was adopted. Initially Red soil devoid of stones and sand was taken. It was made into paste form by adding adequate quantity of water. Generally to prepare mud vessels, potter’s mix sand to this mud in 1:3 ratio. This gives strength, stability to the mud & it can be moulded into desired shape.

**Preparation of ‘Yantra’ with mud:**

When the prepared mud was placed on spinning wheel & tried to mould into desired shape with hands, it was found very difficult to mould the mud into a 12 inch long tube as the mud started to bend and crack with increase of length. So the technique was modified.

A wide platform of mud was made with uniform thickness. A Plastic pipe with dimensions as advised for Yantra was taken. The pipe was coated with oil on it’s outer surface. This Pipe was placed on the mud platform & the mud was wrapped around it carefully. One end of the tube was closed with equisized coin shaped mud. All the conjoining spaces were properly sealed. Now by twisting and pulling the pipe was removed out slowly & carefully. The oil applied over the pipe helped here for easy removal of pipe from the mud. After removal of the pipe, obtained mud shape was allowed for drying under shade. After five days of complete drying, it was baked on fire & collected after self cooling. The Yantra was named as Gandhakaajeerna
badho rasa Nirmana Yantra, in short form as GABRN Yantra.

By following the above technique total four GABRN Yantras were prepared

**Preparation of the Lid:**

In the reference sloka it was said to keep the mouth of the Yantra closed during the Paka. So a lid that completely closes the Yantra’s mouth was prepared. A brick piece was taken and it was carved into a lid by rubbing it against rough surface. Care was taken to obtain

- uniformity in shape
- Evenness on all sides
- Whether the Lid Fixes into the mouth of the Yantra properly (by checking it from time to time whether it closes the mouth on all sides).

This GABR Yantra was kept amidst Valuka puritha bhanda upto 12 angulas (23cms) i.e two thirds of its length (figno-1). The whole setup was kept on stove and heated on Mandagni till it becomes warm (figno-2).

**Stage II - Shodhana of Parada**

Shodhana of Parada was carried out by doing Mardana with equal quantity of Sudhachurna for three days. After Mardana it was filtered through double layered cloth. Lasuna kalka was added in equal quantity and Saind haya lavana was added in half the quantity of Parada. After completion of mardana washing of contents was done with hot water to obtain Shuddha Parada (figno-3). Shodhana of Gandhaka was carried out by placing it in an iron ladle along with sufficient quantity of ghrita. It was heated up to melting and poured in a vessel of milk. The mouth of vessel was tied with cloth which was smeared with ghrita. Then it was washed with hot water and powdered. This procedure was repeated for six more times to obtain Shuddha Gandhaka (figno-4).

**Stage III - Placing Parada, Gandhaka into Yantra & heating upto Gandhakanirdhoomavasta**

50g Shuddha Gandhaka was poured in to Yantra using funnel(figno-5), 50g Shuddha Parada was placed over this carefully with a pipette(figno-6) and over this another 50g of Shuddha Gandhaka was poured(figno-7). The Yantra mouth was closed with the lid & heated on Mandagni till Gandhakanirdhoomavastha, i.e complete cessation of Sulphur fumes. Time to time the lid was opened to observe the changes. Slowly Parada, Gandhaka started to melt emitting thin yellow sulphur fumes which got intensified with time & were subsided completely after period of ten hours(figno-8,9,10).

**Stage IV – Swarasa nirmana & Paka with Swarasas**

Swarasa of Kakamachi (figno-14), Nava Valli (figno-16), Dhatura (figno-18) and Meghanada (figno-20) were prepared as per the requirement. The homogenous mixture that was formed after Gandhakanirdhoomavastha stage was continued to boil on mandagni by adding the luke warm made Swarasa of Kakamachi (figno-21) & heated till it evaporates completely (figno-23). Later Swarasa of Nagavalli, Dhatura and Meghanada were added one after the other in the same manner & and this cycle of Swarasas was continued till the completion of Gandhaka jarana.

**Stage V - Breaking & collection of end product**

Heating was continued till the complete evaporation of the swaras & was left for self cooling- Swanga sheetam. The Yantra was broken and the final product was collected. It was grinded well into a homogenous mixture(figno-25,26).

**OBSERVATIONS:**

- After Shodhana, brightness of the Parada was increased.
After Shodhana, Gandhaka color was changed from dull yellow to thick, bright yellow color with increased luster.

It took around ten hours for attaining Gandhaka nirdhoomavastha- stopping of yellow Sulphur fumes totally. At this point the added Parada and Gandhaka were turned into thick, viscous, dense, black tar like liquid.

When the Swarasa was made lukewarm its color changed from thick green to brownish green and consistency changed from dense to opaque.

Adding little bit Swarasa it immediately came up to top with effervescence and sound. After adding further liquid the effervescence and sound were decreased. Within five minutes the semisolid homogenous mixture obtained was converted into granule form on adding the Swarasa. By stirring it continuously, it was again converted into liquid within fifteen minutes. This observation was same with each Swarasa. By the end of evaporation of liquid, semisolid matter was observed.

It took around seven hours for the complete evaporation of the Kakamachi, ten hours each for Nagavalli, Dhatura and Meghanada Swarasas respectively.

The Signs of Completion of Jarana were observed when Kakamachi Swarasa was added again and Paka was done till the complete evaporation of the Swarasa. The heating was stopped and was left for self cooling.

The end product was adhered at the bottom and also over walls of the Yantra.

The sediment at the bottom was hard stony like, light in weight and dark black in color.

The sediment over the walls of Yantra was in dull and greenish black in color.

The obtained end product was brownish black in color.

Results: Weight of the Yantra -950g, Fluid Capacity of the Yantra -300ml.

Table No. 1 : Showing Result of Shodhana

<table>
<thead>
<tr>
<th>S.no</th>
<th>Material taken for Shodhana</th>
<th>Initial Weight</th>
<th>Final Weight</th>
<th>Loss in Weight</th>
<th>Loss %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parada</td>
<td>300g</td>
<td>290 gm</td>
<td>10 gm</td>
<td>3.33%</td>
</tr>
<tr>
<td>2</td>
<td>Gandhaka</td>
<td>500g</td>
<td>495g</td>
<td>5g</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table No.2: Showing result of Swarasas preparation for all the drugs

<table>
<thead>
<tr>
<th>S.no</th>
<th>Drug</th>
<th>Weight of drug taken</th>
<th>Volume of Extracted Swarasa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kakamachi</td>
<td>700gms</td>
<td>300ml</td>
</tr>
<tr>
<td>2</td>
<td>Nagavalli/ Tambula</td>
<td>700g</td>
<td>320ml</td>
</tr>
<tr>
<td>3</td>
<td>Dhatura</td>
<td>550g</td>
<td>300ml</td>
</tr>
<tr>
<td>4</td>
<td>Meghanada</td>
<td>800g</td>
<td>310ml</td>
</tr>
</tbody>
</table>

NOTE: The above pharmaceutical procedure was carried out for four times to standardize the time taken, yield.
Table No.3: Showing the weight of the final product in each practical

<table>
<thead>
<tr>
<th>S.no</th>
<th>Weight of the ingredients</th>
<th>Practical no</th>
<th>Time taken</th>
<th>final product (GABR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Parada – 50g</td>
<td>I</td>
<td>47 hours</td>
<td>141g</td>
</tr>
<tr>
<td>2.</td>
<td>Gandhaka - 100g</td>
<td>II</td>
<td>49 hours</td>
<td>138g</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>III</td>
<td>46 hours</td>
<td>139g</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>IV</td>
<td>47 hours</td>
<td>142g</td>
</tr>
</tbody>
</table>

- Maximum temperature recorded inside the yantra at time of Gandhakanirdhoomavast- 
ta was 139°C on average.

- The average time taken is 47.5 hours & Average yield of GABR was 140gms.

STEP WISE PREPARATION OF GANDHAKAAJEERNA BADDHO RASA

A) (Fig no-1) Yantra Preparation
B) (Fig no-3) Shuddha Parada
C) Placing of Ingredients into Yantra & Subjecting to Mandagni Paka till Gandhakanirdhoomavasta

(Fig no-2) Yantra kept on heating apparatus
(Fig no-4) Shuddha Gandhaka
(Fig no-5) Adding Shuddha Gandhaka
(Fig no-6) Adding Shuddha Parada
D) Swarasa Preperation
(Fig -13) kakamachi fresh drug

(Figno-14) kakamachi Swarasa

(Fig no-15) Nagavalli fresh drug

(Fig no-16) Nagavalli Swarasa

(Fig no-17) Dhatura fresh drug

(Fig no-18)Dhatura Swarasa
Kumar Saikrishna & Sridurga: Pharmaceutical Standardization Of Gandhakaajeerna Baddho Rasa

(Fig no-19) Meghanada fresh drug
(Fig no-20) Meghanada Swarasa

E) Paka with Swarasa till completion of Jarana
(Fig no-21) Adding of Swarasa
(Fig no-22) Paka with Swarasa
(Fig no-23) At the end of Paka

F) Collection of GABR
(Fig no-24) After completion of Jarana
(Fig no-25) Breaking
DISCUSSION

The name Gandhakaajeerna baddho rasa was formed by three words such as- Gandhaka + aajeerna + baddha rasa. The word aajeerna gives two meanings

1) AJEERNA- that Parada which is solidified out of undigested/semi digested Gandhaka.

2) AAJEERNA- that Parada which is solidified after complete digestion of Gandhaka.

If we take the first meaning as such then it will be contrary to the important guide line given at the end of the practical which states to continue the paka with Swarasas till the completion of Gandhaka Jarana. Therefore reading the formulation name as AAJEERNA BADDHORASA will convey the Pharmaceutical process more clearly than the earlier..

- Murchchana involved in this formulation is Sagandha and Saagni Murchchana.
- Jarana- Jarana involved is Dviguna Gandhaka Jarana.
- In Rasa granthas- Rasarnava, Rasaprika-shasudhakara, Rasendrachudaman, Rasendrasarasangrah, the effect of the herbal drugs –Kakamachi, Nagavalli, Dhatura and Meghanada on Parada were described as below.

Table No.4: Showing the effect of ingredients on Parada from various texts

<table>
<thead>
<tr>
<th>S.NO</th>
<th>NAME OF THE DRUG</th>
<th>EFFECT ON PARADA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kakamachi</td>
<td>Niyamana, Bandhana, Marana, Murchana, Dravana, Nirjivana</td>
</tr>
<tr>
<td>2.</td>
<td>Nagavalli</td>
<td>Bandhana, Jarana, Nirjivana, Marana</td>
</tr>
<tr>
<td>3.</td>
<td>Dhatura</td>
<td>Marana, Bandhana</td>
</tr>
<tr>
<td>4.</td>
<td>Meghanada</td>
<td>Jarana, Marana, Niyamana</td>
</tr>
</tbody>
</table>

- Shodhana is done for Parada and Gandhaka. It is done to remove visible and invisible impurities, to reduce the toxicity and to enhance the therapeutic property.

Parada shodhana:
- Substances having Ushna, Teekshna, Kshara, Amla and Lavana property are considered as purifiers (Sarva malaharah Kshara). Lime is an alkaline substance; it may be helpful in removing external and internal impurities of Mercury.
- Lasuna and Saindhava lavana have also Ushna, Teekshna and Vishada property which might be helpful in minimizing the toxic qualities of Mercury. Hence, these might have been suggested for Shodhana.
- Garlic has been proved as a best antidote for heavy metal poisoning. Hence,
processed Parada is augmented with antidote itself. Hence, one-step ahead in safety Lasuna was selected as a drug for Shodhana of Parada. Mercury purified with garlic can be used in formulating such drugs, which can be indicated essentially in Coronary Artery Disease (CADs), Cardio Vascular Disorders (CVDs), hyperlipidemia, tumours, hormonal disorders, atherosclerosis, and obesity.

Gandhaka Shodhana:
- Sulphur turns into liquid at 115.21°C. However, at that temperature, arsenic sulphides (Orpiment M.P. 310°C, Realgar M.P. 360°C) which are one of the chief impurities of sulphur stay in ghee as fine small solid particles. These crystals stay back in cloth and liquid sulphur flows freely through fine pores. Repetition of this procedure for seven times removes any traces of arsenics.
- ‘Ghee – Milk procedure’ can effectively separate sulphur granules from external impurities. Pure sulphur is neither lipid nor water-soluble, therefore, both water and lipid soluble impurities can be separated from sulphur, as sulphur has to pass through both media.
- Ghee serves as base for uniform spreading of temperature. It layers fine powder crystals of sulphur and prevents them to get in contact with external oxygen, which otherwise cause oxidation and considerable weight loss.
- Gandhaka is highly Pitta vardhaka. Both ghee and milk are Vata Pitta shamaka dravyas and among them ghee is the drug of choice among fats in reducing Pitta. Therefore, these can reduce ‘teevra pitta vruddhikara’ effect of Gandhaka.
- Milk and Ghee are Vishahara and Rasayana. These can remove Visha doshas of Gandhaka and impregnate Rasayana property to Gandhaka.
- Final cleaning with hot water removes greasy remnants of milk and ghee.

YANTRA NIRMANA:
- Usage of Kachakupi for Jarana can be seen from 10th century A.D. Nithyanath ji the author of Rasaratnakara belongs to 12th century A.D. This indicates that the author was aware of the usage of kachakupi, but specifically indicated a yantra made out of mud for Jarana in the present formulation. Therefore, in the present study in spite of availability of advanced equipments like clay-graphite crucibles, silica crucibles, clay crucibles, digestion tubes, the pharmaceutical procedure was carried out as per the chief reference using a Yantra prepared with mud.

MANDAGNI PAKA-
- Unlike in classical Gandhaka Jarana that is done in Kachakupi (Kramagni) by subjecting to Mridu, Madhyama and Teevragni stages- here Jarana is advised to be performed on Mridu or Mandagni agni stage alone.

GANDHAKA NIRDHOOMAVASTHA
- It was confirmed by copper foil test. Fumes were exposed to a copper foil. Yellow sulphur fumes left black discoloration on copper foils. On further heating shiny white fumes started coming out & they left silvery discoloration on copper foil. It’s known that Mercury vapour reacts with metals & gives silvery discoloration. This confirming the burning of extra sulphur from the mixture.

ADDING OF SWARASAS:
- After the adding & completion of Paka with Kakamachi swarasa, blackish semi-solid matter that was found at the bottom which indicates the formation of compound as a part of the processing.
- Same observations were noticed by Paka with Nagavalli, Dhatura and Meghanada swarasa also.
After the completion of one sequence of *Paka* with four drugs again *Paka* with fresh *Kakamachi swarasa* was started.

**SIDDHA LAKSHANAS**

- *Rasavada* experts were consulted to confirm the *siddha lakshanas* of *Jarana* in particular to this pharmaceutical procedure. Vaidya Lolla Ramchandra Rao, a popular *Rasavaidya* of Andhra Pradesh, who edited the Telugu version of *Rasaratnakara*, explained two points to confirm the completion of *Gandhaka Jarana* in this particular processing.

- As per his practical observation, in the context of this formulation *Gandhaka Jarana* is said to be completed based on these following points:
  1) The semisolid matter that was converted into granule form on adding *Swarasa* should remain as such even after the complete evaporation of the *Swarasa*.
  2) When the *Shalaka* was introduced up to bottom of *Yantra* it should be felt as if it was kept in sandy gravel and when taken out no matter should adhere to it.

While processing with *Kakamachi swarasa* for second time these signs were observed. Then the heating was stopped and left for self cooling.

**CONCLUSION**

The Chief reference of the present study is taken from *Rasayogasagara*. *Shodhanama, Jarana, Bandhana* and *Murchchana* are the principle procedures involved in the preparation of *Gandhakaajeerna baddho Rasa*.

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