PHARMACEUTICO ANALYTICAL STUDY OF MAKSHIKABHASMA – AN ANALYTICAL STUDY – RASA SHASTRA/RESEARCH

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ABSTRACT

SwarnaMakshika is an important Maharasa explained by many of the Rasa vaidyas. Swarnamakshika is a prime mineral for both Dhatuvada and Dehavada. It has been dealt in detail in the classics of Rasa shastra. Makshika is the only mineral containing Iron, Copper and Sulphur. Therapeutically a wide range of diseases like prameha, apasmara, krimi, netrarogas and many of the twakrogas are treated extensively with SwarnaMakshikabhasma. Proper identification of the sample of Swarnamakshika, shodhana by two methods by pachanasamskara, marana by varahaputawas carried out. Qualitative and quantitative analysis of Makshikabhasma, Atomic Absorption Spectroscopy (AAS) along with NPST (Namburi Phased Spot Test) were carried out in the view of Standardisation of Makshikabhasma.

Keywords: Dhatuvada, Dehavada, pachanasamskara

INTRODUCTION

Rasa shastra is a well-established branch of Ayurveda serving humanity with its unique heritage of drugs derived from minerals, metals and animal origin processed with herbs. Bhasmas are unique preparations of Rasashastra prepared by marana by which the metals and minerals get converted into micro fine form. Swarnamakshika is one among the Maharasas which is used in case of Swarna-bhava. Because of its Rasayana property and wide applicability, swarnamakshikabhasma is widely prescribed by the vaidyas. Based on the grahyalakshanas, swarnamakshika is selected for medicinal purposes like the one having swarnavarna, guru, snigdha, ishatneelavarna (bluish tinge) and kashekanakavatgrusham that is, that which produces golden streak on rubbing. Swarnamakshika is considered to be
the prana of rasa and it is inevitable in mercu-
rial operations. Swarnamakshika has
laghuguna, madhura rasa, sheetaveerya and
undergoes katuvipaka. It is tridoshaghna and
in particular it is kaphapittahara. Ashud-
dhaswarnamakshika is said to produce com-
pliations like mandagni, vishthambha, kusha,
balahani, netravikaras, gandamala, haleem-
aka etc., diseases. Hence, makshika has to be
purified before subjecting for marana.

AIMS AND OBJECTIVES
To do the shodhana of makshika by two dif-
ferent methods
To do the marana of shuddhamakshika by
varahaputa
To analyse the makshikabhasma by AAS,
NPST and Bhasmapareekshas.

MATERIALS AND METHODS
PHARMACEUTICAL WORK
SHODHANA OF MAKSHIKA
Method I – Shodhana of makshika was done by
boiling it with equal quantity of erandataila
for two hours, washed in hot water and
weighed by recording the temperature. Weight
of the makshika had increased by 20gms.
Method II – swarnamakshika obtained from
first procedure was taken in Lohapatra and
boiled in matulungaswarasa for 2hours. There
was a weight gain of 10gms by the second
procedure.

MARANA
Marana was done by Puta method. Shudd-
dhaswarnamakshika and shuddha Gandhaka
were taken in equal quantity in Khalvayantra
and Bhavanawas given with Matulungaswa-
rasa. Chakrikas were prepared, dried in shade
and subjected to Varahaputa by placing 350
vanopals below and 150 vanopals above.
Such 4 putas were given. In the 5th puta 450
vanopals were used, by placing 225 above
and 225 below the sharava. Bhasmapareekhas
were done after the 5th puta along with pan-
chayangendriyapreekshas. Results are ex-
plained in the table. From 7th puta onwards
quantity of gandhaka and number vanopals
were gradually decreased.

Swarnamakshikabhasma obtained from 6th puta
was added with ¼th quantity of gandhaka.
Vanopals were reduced to 400. From 8th puta
wards, 1/8th part of shuddhagandhaka was
taken to the total quantity of makshikabhasma
obtained from the 7th puta, triturated in khal-
vayantra along with matulungaswarasa and
chakrikas were prepared in the usual manner.
Number of vanopals were also reduced to
350. Same number of vanopals and shudd-
dhagandhaka were continued for the 9th puta
also.

ANALYTICAL WORK
Bhasmapareekshas were carried out from
5th puta onwards.

Table 1: Lakshanasbhasma at 5th and 9th puta

<table>
<thead>
<tr>
<th>Pareekshas</th>
<th>5th puta</th>
<th>9th puta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varna</td>
<td>Muddy red</td>
<td>Dark red</td>
</tr>
<tr>
<td>Sparsha</td>
<td>Soft fine</td>
<td>Fine</td>
</tr>
<tr>
<td>Gandha</td>
<td>Metallic</td>
<td>Nirgandha</td>
</tr>
<tr>
<td>Rekhapurnata</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Apunarbhava</td>
<td>-</td>
<td>Partially positive</td>
</tr>
<tr>
<td>Varitara</td>
<td>-</td>
<td>Positive positive</td>
</tr>
<tr>
<td>Rasa</td>
<td>Metallic</td>
<td>Tasteless</td>
</tr>
</tbody>
</table>
Table 2: showing the observations of Bhasmapareekshas of Makshikabhasma

<table>
<thead>
<tr>
<th>No of puta</th>
<th>Nishchandratva</th>
<th>Rekhapurna</th>
<th>Varitara</th>
<th>Apunarbhava</th>
<th>Dadhipareeksha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>+</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>+</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>+++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>+++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>+++</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Modern parameters such as Qualitative and quantitative analysis including organoleptic characters, estimation of total ash, determination of acid insoluble ash, loss on drying at 110 degree centigrade, Ph value, estimation of particle size was carried out.

Table 3. Sample of shuddha Swarnamakshika

<table>
<thead>
<tr>
<th>Sl</th>
<th>Parameters</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Copper as Cu</td>
<td>26.17%</td>
</tr>
<tr>
<td>2</td>
<td>Iron as Fe</td>
<td>18.12%</td>
</tr>
<tr>
<td>3</td>
<td>Sulphur as S</td>
<td>4.17%</td>
</tr>
</tbody>
</table>

Table 4. Swarnamakshikabhasma analysis

<table>
<thead>
<tr>
<th>Sl</th>
<th>Parameters</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Copper as Cu</td>
<td>5.12%</td>
</tr>
<tr>
<td>2</td>
<td>Copper as cuprous oxide(Cuo)</td>
<td>6.40%</td>
</tr>
<tr>
<td>3</td>
<td>Iron as Fe</td>
<td>38%</td>
</tr>
<tr>
<td>4</td>
<td>Sulphur as SO4</td>
<td>1.98%</td>
</tr>
<tr>
<td>5</td>
<td>Sulphur as S</td>
<td>1.72%</td>
</tr>
<tr>
<td>6</td>
<td>Iron as Fe2O3</td>
<td>20.10%</td>
</tr>
</tbody>
</table>

Atomic Absorption Spectroscopy(AAS)
Determination of Iron by AAS:
Reagents used – nitric acid, hydrochloric acid, dilute sulphuric acid 10% w/w solution of ammonium thiocyanate in water. Percentage of Iron found by AAS was
Raw Swarnamakshika – 29.68%
Shuddhaswarnamakshika – 26.17%
Swarnamakshikabhasma – 5.12%
Determination of Sulphur by Eschka mixture revealed the percentage of sulphur to be
Raw sulphur –14.48%
Shuddhagandhaka – 4.71%

In swarnamakshikabhasma – 1.72%

NAMURI PHASED SPOT TEST(NPST)
NPST was carried out for the determination of genuinity of swarnamakshikabhasma.
Asmakshika contains tamraas well as iron identify both tamra group and lauha group were tested in order to identify the presence of Cu and Fe. For the detection of tamra group 5% Hcl, 2.5% potassium ferro cyanide were used.
Result: a well-defined chocolate coloured red spot with a blue margin which confirms the presence of Cu. Deep blue periphery confirms Fe.
Lauha group was detected by using 5% of Hcl, 2.5% potassium ferro cyanide solution and 0.25gm of Swarnamakshikabhasma.
**Result:** central bleached spot with a deep blue wide periphery was observed.

**DISCUSSION**

*Rasa ratnasamuchchaya* considers *swarnamakshika* as *Rasendraprana* and *dur-melanasyamelana* which explains the importance of *swarnamakshika* in *lohavada* as the life of *parada* and its utility in the *melana* of 2 metals having antagonistic properties. It is also considered as *Rasayangrya*, that is best among *rasayanas* having extremely aphrodisiac property and hence its utility in *dehavada* can be understood. It is one of the *rasa dravya* containing 2 chief metals that is copper and iron along with sulphur.

Wide range of *putas* varying from *gajaputa* to *kukkutaputa* is explained in the classics of *rasa shastra*. *Varahapatra* was given in *marana* of *swarnamakshika*. Qualities of *erandataila* like *snigdha*, *teekshna*, *sukshma* and *bedana* properties might have *snigdhatara* in the *makshika* along with its *bedana*. Sulphur must have got evaporated during the process of boiling (*pachana* with *erandataila* and *matulungaswarasa*) with a change in the colour to grey. This colour change might be due to the formation of iron oxide in the presence of oxygen during *shodhana*. Temperature recorded during *shodhanai* both methods were 220 degrees in first half an hour and 480 degrees after 1 and half an hour. During the process of *shodhana* addition of *gandhaka* in all *putas* helped in easier disintegration of metals and minerals especially copper as *gandhaka* is told as *shulbari*. *1st puta* required *bhavana* for 2 days. (6hours per day). The time duration of *mardana* decreased in the succeeding *putas* along with the number of *vanopala* used.

*Bhasmapareekshas* were tested from 4*th* *puta* onwards. Metallic taste and odour was not perceived after 6*th* *puta* onwards. *Varitara* test was slightly positive from 5*th* *puta* onwards but passed completely in 8*th* *puta*. By the end of 9*th* *puta*, positive results for *apunarbhava* and *nirutthapareekshas* were obtained.

After the *shodhana* of *makshika* the percentage of copper had reduced 29.68% to 26.17%, iron decreased from 25.20% to 18.12% and sulphur from 14.48% to 4.17% as per AAS. After *bhasmeekarana* of *makshika* there was further decrease in the percentage of copper from 26.17 to 5.12, iron from 18.12 to 4.18 and sulphur from 4.71 to 1.72. This may be due to reaction that was taking place at average temperature of 500°C in the closed crucible tending more oxidation. Loss in sulphur may be due to sublimation.

**CONCLUSION**

The physical properties of *makshika* like colour, consistency changed during the process of *shodhana*. *Shodhana* procedure carried out in this particular study is a comparatively easier method when compared to other procedures of *shodhana* of *makshika*. *Bhasma siddhi lakshanas* were obtained after 9*th* *puta*. NPST showed the presence of Ferric oxide with deep blue wide and central bleached spot while presence copper with chocolate coloured central spot with blue periphery.
REFERENCES


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