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PHARMACEUTICO ANALYTICAL STUDY OFMAKSHIKABHASMA– AN ANALYTICAL STUDY – RASA SHASTRA/ RESEACRH

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ABSTRACT

SwarnaMakshika is animportant *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*varahaputa*was 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 *Swarnabhava.* 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 mercurial operations. *Swarnamakshika* has *laghuguna, madhura rasa, sheetaveerya* and undergoes *katuvipaka*. It is *tridoshaghna* and in particular it is *kaphapittahara*. *Ashuddhaswarnamakshika* is said to produce complications like *mandagni, vishthambha, kusha, balahani, netravikaras, gandamala, haleemaka* etc., diseases. Hence, *makshika* has to be purified before subjecting for *marana*.

AIMS AND OBJECTIVES

To do the shodhana of makshika by two different 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. *Shuddhaswarnamakshika* and *shuddha Gandhaka* were taken in equal quantity in *Khalvayantra* and *Bhavana*was given with *Matulungaswarasa*. *Chakrikas* were prepared, dried in shade and subjected to *Varahaputa* by placing 350 *vanopalas* below and *150 vanopalas* above. Such 4 *putas* were given. In the 5th*puta* 450 *vanopalas* were used, by placing 225 above and 225 below the *sharava*. *Bhasmapareekhas* were done after the 5thputa along with *panchagyanendriyapreekshas*. Results are explained in the table. From 7th *puta* onwards quantity of *gandhaka* and number *vanopalas* were gradually decreased.

Swarnamakshikabhasma obtained from 6thputa was added with ¼th quantity*of gandhaka*. *Vanopalas* were reduced to 400. From 8thputa onwards, 1/8th part of *shuddhagandhaka* was taken to the total quantity of *makshikabhasma* obtained from the *7thputa, triturated in khalvayantra along with matulungaswarasa and chakrikas were prepared in the usual manner.* Number of *vanopalas* were also reduced to 350. Same number of *vanopalas* and *shuddhagandhaka* were continued for the 9th*puta* also.

ANALYTICAL WORK

Bhasmapareekshas were carried out from 5th*puta* onwards.

Table 1: *Lakshanasbhasma* at 5th and 9thputa

Pareekshas	5thputa	9thPuta
Varna	Muddy red	Dark red
Sparsha	Soft fine	Fine
Gandha	Metallic	*Nirgandha*
Rekhapurnata	Positive	Positive
Apunarbhava *Varitara*	- Partially positive	Positive positive
Rasa	Metallic	Tasteless

Table 2: showing the observations of Bhasmapareekshas of Makshikabhasma

No of puta	*Nishchandratva*	*Rekhapurna*	*Varitara*	*Apunarbhava*	*Dadhipareeksha*
1	+	-	-	-	-
2	+	+	-	-	-
3	+	++	-	-	-
4	+	++	-	-	-
5	-	++	-	-	-
6	-	+++	-	-	-
7	-	+++	-	-	-
8	-	+++	+	-	-
9	-	+++	+	+	+

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

Sl	Parameters	Results
1	Copper as Cu	26.17%
2	Iron as Fe	18.12%
3	Sulphur as S	4.17%

Table 4. Swarna makshikabhasma analysis

Sl	Parameters	Results
1	Copper as Cu	5.12%
2	Copper as cupprous oxide(Cuo)	6.40%
3	Iron as Fe	38%
4	Sulphur as SO_4	1.98%
5	Sulphur as S	1.72%
6	Iron as Fe_2O_3	20.10%

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%

NAMBURI PHASED SPOT TEST(NPST)
NPST was carried out for the determination of genuinity of *swarnamakshikabhasma.*
As*makshika* contains *tamra*as 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 ferrocyanide 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 durmelanasyamelana* which explains the importance of *swrnamakshika* 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 dravyas* 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. Varahaputa* was given in *marana* of *swarnamakshika*. Qualities of *erandataila* like *snigdha, teekshna, sukshma and bhedana* properties might have *snigdhata* in the *makshika* along with its *bhedana*. 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 *shodhana*in 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 *puta*s 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 *vanopalas* used.

Bhasmapareekshas were tested from 4th *puta*onwards. Metallic taste and odour was not perceived after 6th *puta* onwards. *Varitara* test was slightly positive from 5th *puta* onwards but passed completely in 8th puta. By the end of *9th 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 500ºC 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 9th*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.

Trituration of purified *makshika* and purified *gandhaka* with *matulungaswarasa* in *khalvayantra.*

Sharavasamputa* in *varahaputa

***Chakrikas* of *Makshikabhasma* after 2nd puta**

Chakrikas of *makshikabhasma* after 9th puta.

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