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PHARMACEUTICAL STUDY OF MRIGANKARASA

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ABSTRACT

Rasasastra is a branch which deals with medicinal properties of minerals and metals. According to the different process involved and shape of the product *acharyas* have classified *rasaushadhis* as *Khalveeya rasa, Parpati, Pottali* and *Koopipakwa rasa*. By the preparation of above mentioned *rasaushadhis Acharyas* mainly aimed to reduce the toxicity as well as the dosage. Many of these can act as emergency medicines. Increased global curiosity regarding the safety and efficacy of various metallic and mineral preparations in *Rasasastra*, there is an imminent need to pay attention to the establishment of Standard operating procedure (SOP) for producing good quality product by following certain parameters fixed after a number of experiments. Pharmaceutical study of *Mriganka Rasa* is an attempt to unfold the idea behind the technique used to prepare the drug. It is a metallic preparation described in *Rasayogasagaram* and *Sidhabheshajamanimala* in the *kshaya prakaranam* which contains mainly *Vangam, Gandhaka, Navasara* and *saindhava lavanam*. It is a *koopipakwa* preparation which is mainly indicated for all types of *Prameha*. Most of the *koopipakwa rasas* contain mercury as a main content. But in this preparation mercury is absent. Wide range of indications from *Prameha* to *Dhatukshaya* shows its efficacy. So, knowing its pharmaceutical and therapeutical importance the present study has been conducted. Methodology includes pharmaceutical study with observations and results. Pharmaceutical part of the study was conducted as per the textual reference of *Rasayogasagaram*. The average yield of *gandhaka* after *shodhana* was 291.33g, *navasara*

was 485g, *vanga* was 140.83g, *jaritha vanga* was 119.66g, *navasara saindhava satva* was 112.66g and that of the *mrigankarasa* was 50g

Keywords: *Mriganka rasa, Koopipakwa rasa, Satvapatana, Jarana*

INTRODUCTION

Rasaushadhis are a category of Ayurvedic formulations that has to be explored scientifically and therapeutically. *Rasasastra* is a branch which deals with medicinal properties of minerals and metals. According to the different process involved and shape of the product *acharyas* have classified *rasaushadhis as Khalveeya rasa, Parpati, Pottali, Koopipakwa rasas* etc. By the preparation of above mentioned *rasaushadhis* the *Acharyas* mainly aimed to reduce the toxicity as well as the dosage. In clinical practice the usage of *rasaushadhis* is increasing because of the shortage of herbal drugs, increased demand, multiple pathology and need for an instantaneous relief. *Mriganka Rasa*[1] taken for the present study is a mineral preparation mentioned in *Rasakaumudi* and *Sidhabheshajamanimala* in *kshaya prakarana* and also in *Rasayogasagaram.* This is *a kupipakva rasayana* preparation in which *parada* is not an ingredient. This is prepared in a specially designed glass bottle covered with seven layers of mud smeared cloth, which is then heated over fire in a *Valuka yantra* and finally the product is collected from the base of the bottle. Various preparations by the name *Mrigankarasa* are available in different Rasa texts. But these differ in ingredients and indications from the *Mrigankarasa* that is taken for the present study. Thus, the present study "*Pharmaceutical study of Mrigankarasa*" is an attempt to unfold the idea behind the technique used to prepare the drug. The formulation has got a wide range of indications from *Prameha* to *Dhatukshaya*. Thus, the study was conducted for pharmaceutical standard and to get the therapeutic importance. The ingredients present in this formulation are *Navasara*, *Saindhava, Vangam* and *Gandhakam*. So, knowing its pharmaceutical and therapeutical importance the present study has been conducted

Aim and Objective

To develop standard product (*Mrigankarasa)* as per classical parameters.

Materials and Method

Developing a standard protocol is the major objective of the study. To achieve the aim apart from the conceptual study the pharmaceutical study was carried out, and all the findings dealt with this are being discussed here. The pharmaceutical study was carried out in 6 sections:-

1. Selection and collection of raw materials
2. *Shodhana* of individual drugs
3. *Apamarga kshara nirmanam*
4. *Satvapatana*
5. *Vangajarana*
6. *Mrigankarasa nirmana*

Selection of Raw Materials: The ingredients of this preparation like *Gandhaka*, *Vanga, Navasara* and *Saindhava* were selected on the basis of their *grahya lakshnas* mentioned in the classics. These drugs were collected from Kannur.

***Shodhana* of individual drugs with Observations and Results:** This section includes 3 practicals.

Practical no 1: The practical number 1 deals with purification of *Gandhaka*. *Gandhaka shodhana* was carried out as per the reference from *Ayurveda Prakasha*[2] where purification is done by *Kurmaputa vidhi* in *Goksheeram*. Three samples of *Gandhaka* were purified by this method. In this method *Gandhaka* which is spread over a cloth tied on the mouth of a mud pot containing milk which is covered by another same sized pot and *sandhilepana* done was subjected to *kurma putam* using 20 *vanopala* (2189 g). The maximum temperature reached was 250^0C. By this the impurities whose melting point above 250^0C may remain stick on the surface of cloth without falling into the milk and the fat-soluble impurities were lost in the milk. For the 1st sample it took 4.30 hrs for complete

burning and *swangasheetam* and for the remaining two samples it took only 4.20 hrs. For 1st and 2nd sample the maximum temperature (200-250^{0}C) remained for 20 minutes and that for 3rd sample remained for 30 minutes. After *shodhana* there was a loss of 8g (2.67%) of *Gandhaka* for sample1 and 3 and a loss of 10g (3.33%) for sample2. This loss of weight may be due to the loss of impurities present in the sulphur. But in all the three samples the yellow colour of *Gandhaka* turned to lemon yellow and the form was globular. This was powdered and used for the preparation of *Mriganka rasa.* The average yield of *Gandhaka* was 291.33g.

Practical No 2: Practical no2 deals with *vanga shodhana* by *Dalana* method. This method of purification was selected from *Rasaratnasamucchaya*[3]. Various methods of purification of *vanga* were described by various *Acharyas* but this method seems to be commonest and was selected for the study. Three samples of *Vanga* were purified by this method. In this method *vanga* was melted and poured into *nirgundi swarasa* mixed with *haridra choornam* through a *Pithara yantra*. This method was repeated for 3 times as per the reference. 150g *Vanga* was taken for shodhana.350ml of *nirgundi swarasa* was required for a single *dalana* for the three samples. From 1500g of fresh *nirgundi patra* 1050 ml of *swarasa* was obtained and this was used for the three *dalana* process for a single sample. *Haridra choorna* was added in the quantity of 1/16th part of *vanga* for each *dalana* according to *Rasaratnasamucchaya.*

For doing this procedure a specially designed *yantra* known as *Pithara yantra* was used. This *yantra* was designed according to the reference in *Rasayanasaram*[8]. It consists of an iron vessel with an iron lid. In the centre of the lid there is a small opening of 2.8cm diameter. The melted *vanga* was poured through this small opening. In all the samples the *vanga* took only 2 minutes for completely melting and the melting point was found to be in the range of 218-225^{0}C. Flame temperature was maintained between 590-600^{0}C.Ph of *nirgundi swarasa* containing *haridra churnam* was 5.88 before *dalana*. After 1st *dalana* pH increased to 5.89, after 2nd *dalana* to 5.89 and to 5.98 after 3rd *dalana*. This was almost similar for other two samples too. This change in pH shows that the *swarasa* became slightly alkaline after *dalana*.

After each *dalana* there was only slight loss in *swarasa,* which can be considered to be negligible. A blackish yellow coloured layer was seen on the surface of melted *vanga*, but after 1st *dalana* the colour changed to black. These may be the impurities. During melting of *vanga* for 2nd and 3rd *dalana*, there was bursting sound heard, it may be due to some moisture content left back in the *vanga* after washing and drying. Melted *vanga* became solidified on pouring into *swarasa* and it may be due to sudden cooling. Processes like melting and sudden cooling have their own contribution in the purification of *vanga*. On heating only, the *vanga* melts and the impurities remain on the surface of molten *vanga*. These can be removed by washing in hot water. For 1st sample a loss of 3g was seen after 1st *dalana*, a loss of 2 g after 2nd *dalana* and a loss of 2.5 g after 3rd *dalana*. So, in total a loss of 7.5 g was seen for sample 1. For sample 2 and 3 a loss of 10 g was seen. This loss may be the loss of impurities and also the loss that happened during the time of washing and cleaning after each *dalana*. Thus, after *shodhana, vanga* became more brittle and the average yield was 140.83 g.

Practical No 3: Practical no 3 deals with the purification of *Navasara.* This method of purification was selected from *Rasatarangini*[4]. As this was the commonest method adopted for *Navasara shodhana,* it was selected for the present study. Three samples of *Navasara* were purified by this method. In this method *Navasara* was dissolved in 3 times water, filtered and heated till completely dried. On adding water into the *navasara* the temperature inside the vessel got reduced to 9^{0}C, which shows its exothermic reaction. The dissolving time was 9 minutes for the three samples. Ph of plain water was 6.46 and it changed to 5.80 after dissolving the *navasara*. Thus, water became acidic after dissolving *navasara.* There was no change in colour for water after dissolving *navasara*. For all samples, it took 2.30 hrs for completing the *shodhana* procedure. Also, within 15 minutes the solution started boiling. The boiling temperature range was 100-

106^0C. The temperature of vessel for 1st sample was 77^0C, for 2nd sample was 72^0C and that for 3rd sample was 82^0C. A white layer was seen on the surface of the solution after 50 minutes of boiling, for all the three samples. And after 1.20 hrs, the product turned semisolid and powdering started after 1.45 hr. Thus after 2.30 hr complete powder form of *navasara* was obtained.500g each was taken for *shodhana*. There was a loss of 22 g of *navasara* for sample 1, 13 g for sample 2 and 10 g for sample 3. The average yield was 485 g.

Apamarga kshara nirmana

A pilot study was done to compare the *Vanga jarana* using *apamarga panchanga* and *apamarga kshara*. 20 g of *shodita Vanga* was taken for each *jarana.* As per the reference[5] (RT) the *apamarga panchanga* required was only 1/4th part of *vanga* ie, 5g. But it was found that about 350 g of *apamarga panchanga* was required to complete the procedure. In the second procedure of *vangajarana* only 5 g of *apamarga kshara* was enough to complete the procedure. In *Agastya Vaidya Chandrika* there is a reference which state that wherever the *moolikas* are mentioned the *moolika kshara* is used. Thus, on the basis of this reference and the above done pilot study it was decided to do *vangajarana* using *apamarga kshara*.

Practical no 4 deals with the *Apamarga kshara nirmana*. *Apamarga kshara* was prepared according to the reference from *Sarangdhara Samhitha* chap 11/104. Various references are available for *apamarga kshara nirmana*, but this reference seems to be simple and easy, thus was selected for the present study. Fresh *apamarga* was collected, dried and burned to ash. Then this ash was mixed with 4 times water and kept undisturbed for one night. Next morning the supernatant portion was decanted and filtered for 25 times to get a clear solution. This solution was heated till completely evaporated and the *kshara* was collected from the bottom of vessel. Only one sample was prepared.

25 kg fresh *Apamarga* was collected. And after drying the weight got reduced to 8 kg. On burning this, 680g ash was obtained. This ash was added with 4 times water. From this ash 95g of *kshara* was obtained.

It took only 25 minutes for completely burning the dry *apamarga*. The pH of ash was 9.97, which rose to 10.92 after 25th filtration, showing that the alkalinity has increased. Also, *Gomutra Varna* clear solution was obtained after 25th filtration.

Percentage yield from fresh *apamarga* was 0.38%, from dry *apamarga* was 1.18% and that from burnt ash was 13.97%.

Vanga Jarana

Practical no 5 deals with *Vanga jarana*. *Vanga jarana* was done according to the reference of *Rasatarangini*[6]. *Jarana* is considered to be an intermediate procedure between *shodhana* and *marana*. Various methods are mentioned in *Rasatarangini* for *vanga jarana*. In the present study *vanga jarana* using *apamarga* was taken. *Shodhita vanga* was melted and added with *apamarga* (1/4th part) and stirred continuously till powder form was obtained.

Temperature of the iron vessel was maintained between 200-230^0C for the three samples and the flame temperature was 600^0C. Powdering started after 45 minutes and within 2 hours *vanga* was completely powdered. After 4 hours the vessel became red hot and took another 4 hours to attain *swangasheeta*. This was almost same for all the three samples.

100g of *vanga* was taken for each *jarana* process and 25g of *apamarga kshara* was added for each *jarana* procedure. For sample 1 there was a gain of 17g, for sample 2 a gain of 22g and for sample 3 a gain of 20g. This weight gain may be due to the addition of *apamarga kshara*. The average yield of *vanga choornam* was 119.66g.

Satvapatana

Practical no 6 deals with the *Navasara Saindhava satvapatana*. This was done according to the reference of *Rasayogasagaram.* Here both *Shodhita Navasara* and *Saindhava* was taken 240g (5 *palam)* each as per the reference and subjected to *satvapatana* in a *Damaru yantra* for 12 hours. The yellowish flower like *satva* was collected from the upper pot.

On mixing *navasara* and *saindhava* the consistency remained the same, but there was odour of ammonia. About 126g *satva* was obtained from 1st sample, 112g

from 2nd sample and 100g from 3rd sample. The average yield of *satva* was 112.66g.

Mrigankarasa nirmana

Practical no 7 deals with the preparation of *Mriganka-rasa*. This was carried out according to the reference from *Rasayogasagara*[7]. As per this reference first *Navasara Saindhava satva* has to be prepared, that has been already discussed. Then this *satva* has to be mixed with equal quantity of *vanga choorna* and finally with *Gandhaka choornam* (quantity equal to the above mixture). This mixture was filled into the *kachakupi* and subjected to heating in a *valuka yantra* for 36 hours as per the reference. *Vanga churnam* was added into *Navasara Saindhava satva* and *mardana* done for 2 hours, a light grey coloured smooth powder was obtained. During mixing it emitted the smell of ammonia. And later on, to this mixture the *Shodhita Gandhaka churnam* was added and again *mardana* done for 2hours. After mixing with *gandhaka* a greyish green coloured smooth powder was obtained. For the three samples the sand became hot after one hour of heating when the temperature reached 220^{0}C. After 2hours of heating when the temperature has reached 250^{0}C there was appearance of fumes inside the bottle with an emission of foul smell similar to the smell of rotten egg. During the preparation of 1st sample, after 30 hours of heating when the temperature was raised to 600^{0}C, *gandhaka* started bursting out of the bottle along with flame on the mouth and this lasted for 30 minutes and then the temperature was lowered to 500^{0}C, as a result of which the flame along the mouth subsided and the bursting out of *gandhaka* also have stopped. Then until 36 hours the temperature was maintained between 500-550^{0}C. Since because of this for the next two samples temperature was maintained below 600^{0}C. For sample 2 the maximum temperature reached was 550 and for sample 3 it was 580^{0}C. After 36 hours of heating, when the fumes got subsided corking was done. And after *swangasheeta kupi* was taken out of the *valuka yantra*. The colour of *kapadamitti* was light black. For 1st sample the weight of *Mrigankarasa* obtained was 52.5g, for sample 2 it was 50g and for sample 3 it was 68g. The percentage weight loss for sample 1 was 72%, for sample2 was 44% and that for sample 3 was 54%. This weight loss may be due to the escape of free sulphur in the form of fumes.

Table 1: Showing the result of *Mrigankarasa*

Features	Sample 1	Sample 2	Sample 3
Weight before	300g	300g	300g
Weight of final product	52.5g	50g	68g
Residue	25g	60g	49g
Neck deposits	6g	58g	20g
Total fuel used	100kg	100kg	100kg
Rekha purnatha	+	+	+

Table 2: Showing classical physico chemical parameters of final product

Parameters	Features
Varna	*Swarnabha varna*
Sparsha	*Smooth*
Gandha	*Characteristic*
Rasa	*Lavana*
Rekhapurnatha	+

DISCUSSION

Mriganka rasa is a *koopipakwa rasayana* preparation which has got a wide range of indications. The present study was done to develop an SOP for *Mriganka rasa* and thereby exploring the various pharmaceutical procedures carried out for its preparation. Pharmaceutical

procedures like *shodhana, jarana, satvapatana, kshara nirmana* and finally *kupipakwarasa nirmana* were carried out to obtain the final product. All the procedures were carried out according to the textual references for three times. Only slight variations were noticed in the quantity and quality of the products. After *shodhana* there was a loss of 8g (2.67%) of *Gandhaka* for sample1 and 3 and a loss of 10g (3.33%) for sample2. This loss of weight may be due to the loss of impurities present in the sulphur. During *Vanga shodhana* for the 1st sample a loss of 3g was seen after 1st *dalana*, a loss of 2 g after 2nd *dalana* and a loss of 2.5 g after 3rd *dalana.* So, in total a loss of 7.5 g was seen for sample 1. For sample 2 and 3 a loss of 10 g was seen. This loss may be the loss of impurities and also the loss that happened during the time of washing and cleaning the *vanga* after each *dalana*. Thus, after *shodhana vanga* became more brittle. After *navasara shodhana* there was a loss of 22 g of *navasara* for sample 1, 13 g for sample 2 and 10 g for sample 3. The average yield of *navasara* was 485 g. After burning the dry *apamarga,* the pH of ash was 9.97, which rose to 10.92 after 25th filtration, showing that the alkalinity has increased. Also, *Gomutra Varna* clear solution was obtained after 25th filtration. Percentage yield from fresh *apamarga* was 0.38%, from dry *apamarga* was 1.18% and that from burnt ash was 13.97%. After *vanga jarana* for sample 1 there was a gain of 17g, for sample 2 a gain of 22g and for sample 3 a gain of 20g. This weight gain may be due to the addition of *apamarga kshara*. The average yield of *vanga choornam* was 119.66g. For *satvapatana*, on mixing *navasara* and *saindhava* the consistency remained the same, but there was odour of ammonia. About 126g *satva* was obtained from 1st sample, 112g from 2nd and 100g from 3rd sample. The average yield of *satva* was 112.66g. For 1st sample the weight of *Mrigankarasa* obtained was 52.5g, for 2nd it was 50g and for 3rd it was 68g. The percentage weight loss for sample 1 was 72%, for sample 2 was 44% and that for sample 3was 54%. This weight loss may be due to the escape of free sulphur in the form of fumes.

CONCLUSION

Due to changed global scenario it is necessary that certain updating and revalidation should be incorporated in Ayurvedic drug manufacturing sequence. Standards and specification which were present in olden days were sufficient to compete with time need but nowadays there is necessity to improve them to fulfil the norms of Quality Control and Standardisation, those which are must in this nuclear era. There is a wide scope for standardisation aspects of *Kupipakva rasayana kalpana* regarding the ingredients, their proportion, regarding the equipments, heating devices, fuel to be used, duration of heating, heating schedule, method of formulation etc. The formulation *Mrigankarasa* is specified in the treatment of *sarvameha* in the textbook of *rasasastra*. This unique formulation is mentioned in the textbooks like *Rasakaumudi, Sidhabhaishajya manimala*, and *Rasayogasagaram.* And the reference given in the second volume of *Rasayogasagaram* was taken for the present study. This study was an attempt to develop an SOP for *Mrigankarasa.* The product *Mrigankarasa* could be successfully prepared by this method. The temperature pattern, yield and other observations were noted and discussed. Pharmaceutical study deals with the collection of drugs, their *shodhana, Apamarga ksharanirmana, jarana* of *vanga ,satvapatana* of *navasara* and *saindhava* and finally the preparation of *Mrigankarasa*. Thus, a standard protocol was able to develop after this study.

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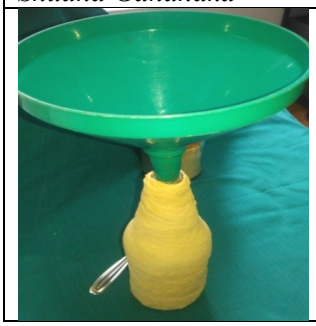
Pictures of *Mrigankarasa*

Shudha Gandhaka

Shudha Gandhaka

Vanga Churnam

Satvam



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