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COMPARATIVE PHARMACEUTICO-CHEMICAL STUDY OF RASASINDOOR WITH EMPLACEMENT OF SINGLE AND DUAL KANCHKUPI

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ABSTRACT

Rasasindoor (HgS) is a unique Kupipakwa Rasayana preparation having Parada and Gandhaka in it. Kupipakva rasayana is developed by many Rasaacharya for the preparation of heat treated mercurial. Rasasindoor is a wellknown drug for its wide range of utilization in therapeutics with different anupanas. The kajjali is used as raw material for the preparation of Rasasindoor. In this paper, the modern portable valukayantra is used for the preparation of Rasasindoor. Whole process is divided and performed as shodhana of contents (parada, gandhaka), kajjali preparation, preparation of samguna bali jarit Rasasindoor in same valukayantra and its comparative study with emplacement of single and dual kupi. In this present study the kramagni pattern is used to prepare the Rasasindoor. The digital pyrometer is used for the measurement of temperature. Observations of both the Rasasindoor were recorded sub sequentially. Many research papers are published for Rasasindoor but the accurate analytical values are not given in any standard book. In many pharmaceutical industries the Rasasindoor is prepared in large scale. The Rasasindoor is prepared in 5-6 kupi in same valukayantra. But due to this the heat is not given properly to other Kupi. So that there is little bit of difference occurred at final product. It can be concluded that the Single Kupi Rasasindoor should be prepared in valukayantra. The more the kupi is used to prepare the Rasasindoor, the more the difference is found. So to avoid such differences, it should be prepared in single kupi with same valukayantra.

KEYWORDS: Rasasindoor, Kupipakva rasayana, Shodhana, kupi, valukayantra.

INTRODUCTION

It is already said that the asadhya vyadhi and also shivtra can be treated with the Parada heated preparation.[1] In Rasashastra this Rasaushadhi can be divided into kharliya, parpati, kupipakwa and pottali. Among this, the kupipakwa rasayan has the special importance because of its low dosage form, tasteless, and fast action.[2] There are many procedures for kajjali formation which depends on the proportion of Gandhaka. Rasasindoor is the sagandha sagni murchana. It's a unique mercurial preparation used in Rasashastra having Parada and Gandhaka in it. As it has explained in Rasatarangini, that the proportion of Gandhaka increases, the more will be the therapeutic utilities of parada. In modern era the Rasasindoor has prepared in very large scale with multiple kanchkupi. So there is a little bit of physico-analytical difference in each Rasasindoor kupipakva rasayana. The difference may be due to the corking procedure with different timing. The kupi plays an important role in the preparation of Rasasindoor. It is found in this present paper that the quality of Rasasindoor which is prepared in single kupi is found to be better than the dual kupi. Hence in present study the physico-analytical comparison of Rasasindoor prepared in single and dual kupi in modified portable valukayantra[3] is done to know the better outcome of the Rasasindoor.

MATERIAL AND METHODS

Shodhana of contents

1) Shodhana of Parada - Reference: Parada Samhita 80/35 Total time required: 84 hrs. Total days required: 12 days.

Procedure: Ashuddha Parada is taken in khalvayantra. Rason swaras is prepared and triturated with parada. The colour of swarasa became black. Kshalana with hot water is done. Parada is settled at base of khalvayantra. The Shuddha Parada is collected in the glass jar. Ashuddha Parada – 500 gm Shuddha Parada- 480 gm.

2) Shodhana of Gandhaka[4] - Reference: R.T.8/7-12
Total days required: 5 days.

Procedure: Ashuddha Gandhaka is taken in Khalvayantra and crushed into fine powder. Goghruta is taken in a steel pot and heated in a slow fire. When goghruta completely melted then powdered Gandhaka is added to it. After melting of gandhaka in goghruta, mixture is

poured in other utensils having godughdha covered with cloth. Temperature is maintained between 110^0c – 120^0c during each dhalan procedure. Shuddha gandhaka is washed out with hot water. For one dhalana procedure, 15 minutes of time is required. In this way it is done for three times.

Ashuddha Gandhaka – 500 gm Shuddha Gandhaka obtained - 460 gm.

Sam-Gandhaka Kajjali[5] preparation

Shuddha parada (460 gm) and shuddha Gandhaka (460 gm) is taken in equal quantity. Mardana is done continuously 72 hours to get black powder of smooth consistency and free from lustrous particles of parada.

Shuddha Parada- 460 gm Shuddha Gandhaka-460 gm Total Kajjali formed- 900 gm.

Sam-Gandhaka Rasasindoor nirmaan[6]

Two different bathches are made for Rasasindoor which is prepared in same valukayantra. 250 gm of kajjali is triturated with vatankura swaras for one day in two different khalva yantra. Trituration is done continuously for 3 days. The preparation of Rasasindoor is performed in kanch kupi(a glass smeared with multani mithi and cloth) immersed in Modified portable valuka yantra. The kanch kupi is filled with 250 gm of kajjali with the help of funnel and then placed in valukayantra. The digital pyrometer is inserted into the valuka. Heat is given to the valukayantra. The temperature is maintained at room temperature to 250^0c for 6 hrs, further the temperature of 250-450^0 for other hours. After fumes are disappeared and corking was done, the temperature maintained at 450-650^0c. In between the procedure the hot iron rod was inserted regularly to clean the bottle neck and avoid blockage by deposition of sublimated sulphur. For the completion of the procedure, the copper plate test was done. After swangshita, kupi is taken out from the valuka yantra and kapadmithi was removed carefully. Kupibhedan was done.[7]

The red colour compound was found at the neck of the bottle. The weight of the 1st batch of Rasasindoor was 130 gm & for the 2nd batch, the weight was 125 gm. The yield of Rasasindoor for 1st batch was 52% and for the 2nd batch, the yield was 50%. Same procedure is done for other Rasasindoor prepared in single kupi in same valukayantra. The duration required for the preparation of Rasasindoor in the single kupi is less as compared with the dual kanchkupi. The duration of heat for Rasasindoor prepared in single kupi is 18 hour. But

the duration of heat in dual kupi is more. It is found to be 20 hour for A batch and 24 hour for B batch.

OBSERVATIONS AND RESULTS

The heat applied in the preparation of Rasasindoor is in kramagni pattern as mrudu agni (room temperature to 250^{0}c), madhayam agni (250^{0}c to 450^0 c), tivra agni(450^{0}c-650^{0}c).

Table No. 1: Showing the Temperature Pattern for Rasasindoor.

Temperature pattern	Rasasindoor prepared in dual kupi		Rasasindoor prepared in single kupi
	A batch	B batch	C batch
Mrudu agni	6 hour	6 hour	6 hour
Madhyam agni	8 hour	8 hour	6 hour
Tivra agni	6 hour	8 hour	6 hour

Table No. 2: Showing the Observations of Rasasindoor Nirmaan in Dual Kupi (A & B batch) and Single kupi (C batch).

Time	Observation			Temperature ^{0}C in		
	A batch	B batch	C batch	A	B	C
9.25 a.m	Dipaagni initiated	Dipaagni initiated	Dipaagni initiated	33	33	33
9.55 a.m	Mandaagni started	Mandaagni started	Mandaagni started	37	37	37
10.25 a.m	Furnance ignited well	Furnance ignited well	Furnance ignited well	95	95	97
10.55 a.m	Slight fumes white	Slight fumes white	Slight fumes White	100	100	100
11.25 a.m	Dense fumes white	Dense fumes white	Dense fumes white	120	120	130
11.55 a.m	Kajjali melted	Kajjali melted	Kajjali melted	130	130	150
12.25 p.m	Yellowish coloured fumes	Yellowish coloured fumes	Yellowish coloured fumes	150	150	180
12.55 p.m	Kajjali melted with dense yellow fumes	Kajjali melted with dense yellow fumes	Kajjali melted with dense yellow fumes	180	180	200
1.25 p.m	Yellowish fumes	Yellowish fumes	Yellowish fumes	190	190	220
1.55 p.m	Dense yellow fumes	Dense fumes yellow	Dense yellowish fumes	220	220	240
2.25 p.m	Dense yellow fumes	Dense fumes yellow	Dense fumes yellow	240	240	245
2.55 p.m	Fumes increased	Fumes increased	Yellowish fumes increased	250	250	250
3.25 p.m	Yellow fumes	Yellow fumes	Yellow fumes	260	260	260
	increased	increased	came outside the kupi			
3.55 p.m	Yellowish fumes	Yellowish fumes	Yellow fumes continued	270	270	320
4.25 p.m	Bluish flame came outside	Bluish flame came outside	Blue flame seen	280	280	340
4.55 p.m	Flame continued	Flame continued	Flame came outside	300	300	345
5.25 p.m	Flame continued	Flame continued	Bluish coloured flame	320	320	348
5.55 p.m	Flame continued	Flame continued	Bluish coloured continued	330	330	350
6.25 p.m	Flame continued	Flame continued	Bluish coloured continued	340	340	355
6.55 p.m	Flame continued	Flame continued	Bluish coloured continued	350	350	360
7.25 p.m	Flame increased	Flame increased	Flame increased	370	370	375
7.55 p.m	Flame increased	Flame increased	Flame increased	390	390	380
8.25 p.m	Flame increased	Flame increased	Flame increased	400	400	400
8.55 p.m	Flame increased	Flame increased	Flame increased	410	410	450

9.25 p.m	Flame increased	Flame increased	Flame decreased gradually	420	420	455
9.55 p.m	Flame decreased gradually	Flame increased	Red hot stage observed	430	430	460
10.25 p.m	Red hot stage	Flame decreased gradually	Mudrana done	440	440	465
10.55 p.m	Mudrana done	Flame decreased gradually	Tivraagni initiated	450	450	470
11.25 p.m	Tivraagni initiated	Red hot stage	Tivraagni continued	480	480	475
11.55 p.m	Tivraagni continued	Mudrana done	Tivraagni continued	520	520	480
12.25 a.m	Tivraagni continued	Tivraagni initiated	Tivraagni continued	540	540	485
12.55 a.m	Tivraagni continued	Tivraagni continued	Tivraagni continued	580	580	490
1.25 a.m	Tivraagni continued	Tivraagni continued	Tivraagni continued	590	590	495
2.25 a.m	Tivraagni continued	Tivraagni continued	Tivraagni continued	600	600	500
3.25 a.m	Tivraagni continued	Tivraagni continued	Tivraagni ceased	610	610	650
4.25 a.m	Tivraagni continued	Tivraagni continued	-	620	620	-
5.25 a.m	Tivraagni ceased	Tivraagni Continued	-	630	630	-
6.25 a.m	-	Tivraagni continued	-	-	640	-
7.25 a.m	-	Tivraagni ceased	-	-	650	-

Table No. 3: Showing the yield of Rasasindoor.

Batches	Kajjali	Rasasindoor	Yield in %	Residue
A BATCH (dual kupi)	250 gm	130 gm	54	-
B BATCH(dual kupi)	250 gm	125 gm	52	-
C BATCH(single kupi)	250 gm	135 gm	56	-

Table No. 4: Showing Organoleptic Characteristics of Rasasindoor.

Batches	Color	Touch	Appearance	Taste
A BATCH	Dark maroon	Soft	Crystalline	Tasteless
B BATCH	Red colour	Soft	Crystalline	Tasteless
C BATCH	Red colour	Soft	Crystalline	Tasteless

Table No. 5: Showing the Analysis of Rasasindoor by Ayurvedic Parameters.

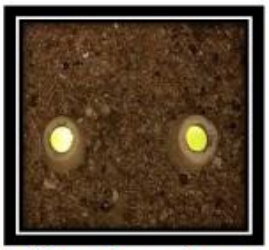
S.no	Test[8]	
1	*Varitaratva*	It means it can be float on the surface of water without disturbing the surface tension So that it can be easily digested in body.
2	*Unnam*	It is the test which is done after *varitaratva* i.e by adding the small grain of rice over *Rasasindoor*, if it does not sink and continue to float, than it is of quality drug. It indicates that the particle size is very less with high surface area. Therefore it can be stand on the surface of water.
3	*Rekhapurnatva*	In this procedure, the particles of *Rasassindoor* enter into the furrows of fingers. It shows that the particle size was less and can be easily absorbed in body.
4	*Sukshmatva*	The *Rasasindur* should be *sukshma* so that it can be absorbed properly in body.
5	*Nischandratva*	*Chandrika* or luster is the natural shiny of a metal. It shows the absence of mercury and free sulphur in *Rasasindoor*.
6	*Gatarasatva*	After the *Kupipakwa* procedure, the *sindoor* have no taste. If it has the taste then it shows the *apakvatva*.
7	*Vishisthavarnotpatti*	–A specific colour is formed for the final compound. The red colour for the rasasindoor.

Table No. 6: Showing Physico-Chemical Characteristic of Rasasindoor.

Parameter	Mercury as Hg %	Total Sulphur as S %	Loss on drying %	Total Ash %	Acid insoluble ash %	Water soluble Ash %	Alcohol soluble extractive%
Batch A (Dual kupi)	82.23	14.78	1.55	0.25	0.019	0.038	0.18
Batch B (Dual kupi)	82.19	14.26	1.3	0.23	0.029	0.040	0.19
Batch C (Single kupi)	83.26	14.81	1.18	0.029	0.018	0.03	0.16

Rasasindoor A & B batch(Dual kupi)

Rasasindoor C Batch(Single kupi)



yellow dense fumes

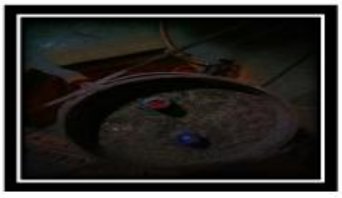
bluish flames

yellow dense fume in single kupi

Dense bluish flame

orange colour fumes

Red colour inside bottom



Red bottom stage in A batch

Copper plate test

Mudrana of A batch

Fig. No. 1: Rasasindoor Preparation in Single Kupi and Dual Kupi.

DISCUSSION

In this present paper, the comparative study of samguna jarit rasasindoor with emplacement of single kupi and dual kupi in valukayantra is done. In pharmacy industry the Rasasindoor is prepared in multiple kupi so to provide the large quantity of Rasasindoor in short period of time. But it is the time to focus on the quality of Rasasindoor. So here some efforts are taken to understand the importance of kupi with respect to Rasasindoor. The duration of Rasasindoor preparation in dual kupi i.e for A batch was 22 hr and for B batch it was 20 hr for samagunagandhaka Rasasindoor. The last procedure i.e the kupibhedan also proven the quality of product. The cover of the kupi is scrapped very easily; it showed that the agni is given properly so the pachan of the drug is also good. The duration of Rasasindoor in single kupi for C batch was 18 hour. The temperature pattern for both the batches were same as mrudu agni, madhyam agni and tivra agni. But the stages were occurred in B batches were

slow as compared to A batch. But for C batch the stages came fast. It means the Rasasindoor prepared in single kupi showed the better formation as compared to dual kupi. It may be due to the ignition was not given properly to A batch because of a single burner. The formation of the compound i.e Rasasindoor depends on the stages of the agni. The standardized kanchkupi is prepared for the Rasasindoor nirmaan. It means it is made up of same quantity of multani mitti, same quantity and quality of cloth and each kupi covered by seven layers of kapadmitti. Sometimes the lakhshana like red hot stage was occurred in 1st kupi than the other kupi. So the mudrana is done for 1st kupi after sometimes the red hot stage was occurred in second kupi. So the duration of corking between both the kupi decided the better quality of formation of Rasasindoor. In large manufacturing scale the Rasasindoor can be prepared with multiple kupi but the quality of the Rasasindoor is affected due to delayed stage of corking.

The analytical values of all the Rasasindoor were almost the same but the values of Rasasindoor prepared in single kupi were found to be better. There was more percentage of Parada. The loss on drying was also less. The duration for preparation of Rasasindoor was also less. The physico-chemical analysis also showed that the single kupi Rasasindoor was better. It showed that the Rasasindoor should be prepared with the single kupi so that the results will be fruitful. But in large scale, it is not possible to prepare the Rasasindoor in single kupi. So to save the time and to gain more quantity one has to focus on advanced instrumentation. The quality of Rasasindoor depends on the agni pattern. In almost in all the large manufacturing level this Rasasindoor is prepared within 5-6 hour. But it affects the quality of the final compound. As there was less samskar of the agni. Thats why Rasa Acharya said about the kramagni pattern with their lakshana. So it can be said that the quality of Rasasindoor is better prepared in single kupi than the dual kupi. It is already mentioned in Rasatarangini that the rasasindoor should be prepared in kramagni in which mrudu agni, madhyam agni, tivraagni of 6 hours each.[10] It means within 18 hour the Rasassindoor can be prepared but the agni should be proper. So that in this paper the Rasasindoor prepared with the help of single kupi was 18 hour which resembles as per the grantha. It is due to the agni was properly given to the single kupi while for the dual kupi the duration was varied. It is the main thing that there is very minute difference in the analytical values but the efficacy and the therapeutic value of the Rasasindoor is at importance. The absorption of the drug is depend on the quality of the drug which is present in the single kupi as the pachan of the drug is more in single kupi.

CONCLUSION

Hence it can be concluded that there is small difference in Rasasindoor prepared in same valukayantra, even though the compound is same i.e HgS. The moisture content, total ash, acid insoluble ash, water soluble ash, alcohol soluble extractives, all this parameter value were reduced in C batch(Single kupi) as compared to A and B batch(Dual kupi). It may be due to the corking procedure was first done in A batch than B batch. In manufacturing industries, the kupipakwa rasayana such as Rasasindoor was prepared in more quantity with many kupi in same valukayantra. But the Rasasindoor prepared in same valukayantra always have the minute difference in their appearance, physico-chemical analysis as we have already shown in this paper. And it may be depend on the last stage i.e red hot stage. The kupi which showed the red hot stage first would show the better results or physico-chemical characteristics. The weight of Rasasindoor for B batch is less then A batch. But it was more in C batch which is prepared in single kupi. It means there is minute difference in weight variation; physical, analytical values of both Rasasindoor and the kupi who passed the corking stage first would show better result than other. The tivraagni was given properly to all the batches. So there was no sulphur left at the bottom. All the contents in the kupi were sublimated at the neck of the *kupi*. There is no significant difference in analytical values of Rasasindoor but the efficacy and the therapeutic value may be hampered. So the further study should be done for the therapeutic evaluation of Rasasindoor prepared in single and dual kupi. Further higher technical, analytical study is required to study the difference in this formulation with emplacement of single and dual kupi in more detailed in manufacturing level.

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