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RAJATA CHANDRODAYA - A UNIQUE *RASAOUSHADH*I PREPARED IN VERTICAL MUFFLE FURNACE

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ABSTRACT:

Objectives: The present research was carried out to prepare the popular *Rasaoushadi* i.e *Rajata Chandrodaya* being one among the unique *Kupipakwa Rasayana yoga* mentioned in Rasashastra by conventional method by using Verticle Muffle Furnace to ensure multiple adavantages of Muffle Furnace. **Material and Method**: The drug *Rajata Chandrodaya* contains *Shoditha Rajata,Shodhita Parada, Shoditha Gandhaka* which were taken in a proportion of 1:8:16 ratio respectively as per the reference of *Bheshaja samhita.* **Results:** the total weight of *Rajata chandrodaya* obtained was 81g. **Conclusion:** *Rajata Chandrodaya* was successfully prepared in Verticle Muffle Furnace by adopting *Kramagni Paka* with total duration of 39 hours which resulted in minimization of time duration, less human effort and fuel consumption.

Keywords: *Rajata Chandrodaya,* Vertical Muffle Furnace, *Kupipakwa Rasayana*

INTRODUCTION

Rasashastra is a branch of science comprised of unique preparations of *Rasadravyas.* Kupipakwa Rasayana Yogas are one such preparations considered under Parada murchana bheda which are popular among the Ayurvedic physicians with respect to its therapeutic utility and commomly known as Sindhura kalpanas. *Rajata Chandrodaya* [1] is one of the *Kupipakwa Rasayana Yoga* [2] prepared in specialized glass bottle with specific heating pattern. As per the classical reference it is indicated as *Balya* and *Rasayana* drug. It consists most complex procedure and consumes more time and human effort with excess fuel consumption in traditional Bhatti method which becomes tedious work as per present scenario. Hence in the present study traditional bhatti was replaced by the Verticle muffle furnace and the drug *Rajata Chandrodaya* was prepared in Verticle muffle furnace.

MATERIALS AND METHODS

Materials

Raw materials used for the preparation of *Rajata Chandrodaya* such as *Rajata ,Hingula* and *Gandhaka* were selected as per *grahya lakshnas* mentioned in *Rasa* classics procured from genuine source. Extraction of *Parada* from *Hingula*[3],purification of Sulphur [4], purification of *Rajata*[5] and preparation of *Kajjali* were carried out as per the classical reference in laboratory of PG Department of Rasashastra and Bhaishajya Kalpana, Alva's Ayurveda Medical College Moodbidri

Methods

The preparation of *Rajata Chandrodaya* was divided into three stages, namely *Purvakarma* (Preoperative), *Pradhanakarma*(Operative), *Pashchatkarma* (Post operative).

Purvakarma

25g:200g:400g of *Shodhita Rajata, Hingulotta Parada* and *Shodhita Gandhaka* were taken in the ratio of 1:8:16 respectively and prepared *Kajjali* were taken in a *khalva yantra*[6] and triturated well till the whole mixture was converted into fine black, lusterless powder(*Kajjali*) [7]. Then this mixture was levigated with *Kumari swarasa* and *Rakta karpasa pushpa swrasa*[8] for one day each. After complete drying of the mixture, 250g of *Kajjali* was filled which was upto one third of the *kupi* and was placed in Vertical muffle furnace [9] embedded with heating element chamber measures, inner- 15inch height, 6 inch width, 6 inch length, outer – 15 inch height, 9 inch width, 9 inch length, mild steel body measures 25 inch height, 22 inch width, 22inch length. The insulation mould was kept inside the bottom of the heating element of the muffle, to adjust the height of the *kupi* before the procedure. The *Kupi* has been kept

in the centre of the heating element chamber with the distance of 1/2 inch from the sides. The *Kajjali* filled *Kupi* was kept firmly with support of sand filled inside the insulation mould.

Pradhana karma

The 250g of *Kajjali* was filled in *Kacha kupi* and was placed at the Heating element chamber of the Verticle Muffle Furnace. *Kramagni paka* [10] was followed throgout the procedure. The temperature was set at the temperature controller for 100^0C. For the first 7 hours *Mrudvagn*i was given i.e. temperature maintained between 125^0C to 250^0C. For the next 19 hours, *Agni* was gradually raised to *Madhyamagni* stage i.e. 250^0C to 450^0C and last 10 hours *Teevragni* was given i.e. Temperature maintained between 450^0C to 675^0C. The neck of *kupi* was cleared with the help of red hot iron rod to avoid the blockage at the neck of the bottle by sulphur. After the appearance of *Sindhoora Siddhi lakshana's* corking was done. The heating was maintained at high temperaure. Later the temperature was gradually decreased to room temperature.

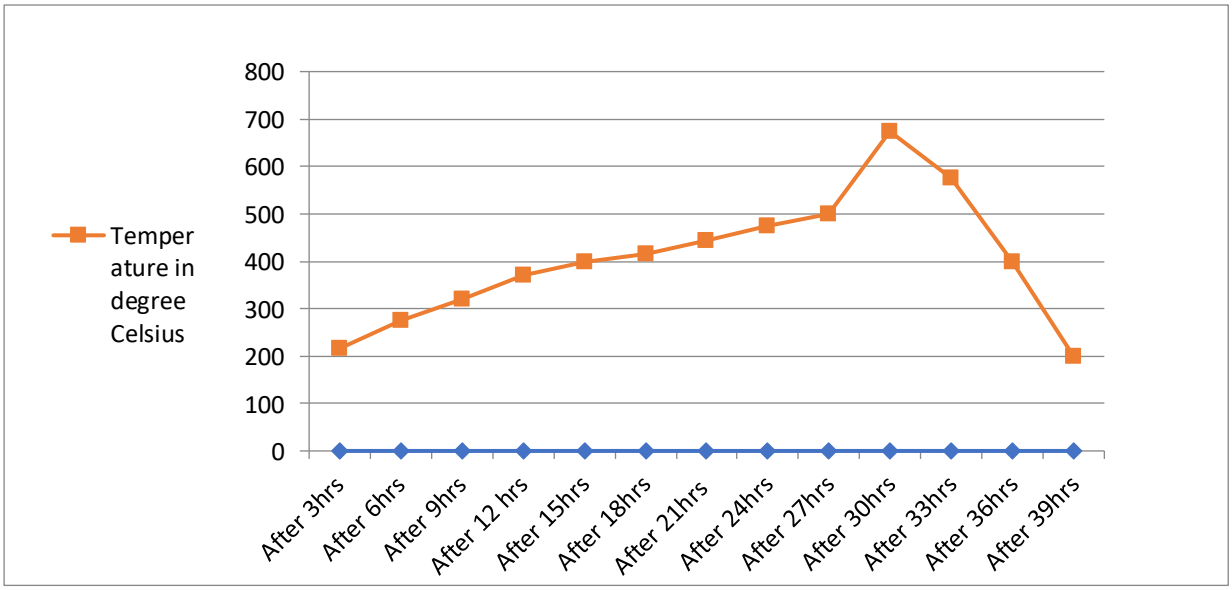
Table no.1 Observation during the preparation of *Rajata Chandrodaya*

Time	**Time in Hours**	**Set temp in furnace in ^{0}C**	**Reached temp in furnace**	**Display temp in ^{0}C**	**Observations**
9.25am	0 Hr	100	100 at 9.30am	100	
9.45am	15min	150	150 at 10.00am	152	White fumes seen through torch light inside the *kupi.*
10.00am	15min	175	175 at 10.05am	175	Characteristic odour of sulphur was appreciated
11.05am	1hr	185	185 at 11.09am	185	Slight white fumes seen outside the *kupi* with increased odour
12.09pm	1hr	200	200 at 12.10pm	200	Slight yellow fumes inside the bottle, and odour of sulphur was appreciated.
01.09pm	1hr	215	215 at 1.13pm	215	
2.13pm	1hr	230	230 at 2.17pm	230	Dense white fumes accumulated at the neck of *kupi*

3.17pm	1hr	250	250 at 3.24pm	250	Slight accumulation of yellowish particle at the neck of *kupi* with dense yellow fumes
4.24pm	1hr	275	275 at 4.26pm	275	*Kajjali* started to melt
5.26pm	1hr	290	290 at 5.53pm	290	Dense yellow fumes seen outside the *kupi*
6.53pm	1hr	305	305 at 6.55pm	305	Slowly cessation of yellow fumes observed
7.55pm	1hr	320	320 at 7.56pm	320	*Kajjali* melted completely
8.56pm	1hr	340	340 at 8.57pm	340	Strong sulphur odour appreciated.yellow particles deposited at the neck of *Kupi*.
9.57pm	1hr	355	355 at 9.58pm	355	*Sheeta shalaka* inserted. *Kajjali* was slight sticky.
10.58pm	1hr	370	370 at 11.00pm	370	Dense *Gandhaka* fumes found. Bottom could not seen with torch.
12.00am	1hr	385	385 at 12.10am	385	*Sheeta shalaka* inserted, melting of *kajjali* ascertained.
2.10am	2hr	400	400 at 2.11am	400	Boiling of *Kajjali* started.
4.11am	1hr	415	415 at 4.12am	415	Neck of the *kupi* was blocked and cleared with hot *shalaka*
5.12am	1hr	430	430 at 5.21am	430	Hot *shalaka* inserted 3 times. Blue flame at the mouth of *kupi* was observed.
6.21am	1hr	445	445 at 6.42am	445	Density of yellow fumes reduced gradually
11.53am	5hr	475	475 at 12.00pm	475	*Sheeta shalaka* inserted, some adhered product taken from the neck of *kupi.*
12.33pm	1/2hr	500	500 at 12.35pm	500	Hot *shalaka* was inserted, block was cleared off. Blue flame

					started to appear.
1.52pm		515	515 at 1.52pm	515	Hot *shalaka* was inserted. Increase in 1inch flame was observed at the neck of *kupi*
1.58pm		525	525 at 1.59pm	525	Blue flame still persists
2.21pm		535	535 at 2.38pm	535	Blue flame gradually diminished
3.38pm	1hr	560	560 at 3.45pm	560	Slight Blue flame was seen inside the *kupi*, slight *Suryodaya lakshana* could be seen at the base of the *kupi*
7.45pm	4hr	575	575 at 7.45pm	575	Copper foil test was done. Copper foil was kept over mouth of the bottle, the surface of the coin turned into greyish white in colour. *Suryadaya lakshana* was well appreciated, No flames observed. Corking done
8.05pm	20min	600	600 at 8.09pm	600	
8.09pm	1min	615	615 at 8.11pm	615	
8.12pm	1min	625	625 at 8.14pm	625	
8.17pm	3min	635	635 at 8.18pm	635	
8.22pm	4min	645	645 at 8.23pm	645	
8.24pm	1min	655	655 at 8.25pm	655	
8.25pm	1min	665	665 at 8.26pm	665	
8.28pm	2min	675	675 at 8.29pm	675	Peak temperature,maintained for 45min
9.15pm	45min	650	650 at 9.16pm	650	Reduction of temperature
9.16pm	1min	625	625 at 9.16pm	625	…….
9.20pm	4min	600	600 at 9.20pm	600	…….
9.24pm	4min	575	575 at 9.24pm	575	……
9.29pm	5min	525	525 at 9.29pm	525	…….

9.42pm	13min	500	500 at 9.52pm	500	……
9.52pm	18min	450	450 at 10.10pm	450	……
10.45pm	35min	400	400 at 10.45pm	400	……..
10.46pm	1min	350	350 at 10.59pm	350	……...
10.59pm	13min	300	300 at 11.15pm	300	……..
11.15pm	1 min	250	250 at 11.35pm	250	……..
11.35pm	20min	200	200 at 11.40pm	200	……
11.45pm	5min	150	150 at 11.50pm	150	Furnace was switched off



Graph no. 1 Temperature pattern of *Rajata Chandrodaya*

Pashchat karma

After complete cooling of the Muffle furnace, sand was removed from the insulation mould and then *Kupi* was taken out from the E.M.F. The mud smeared cloth layers of the *Kupi* were scrapped out with a knife. A jute thread dipped in Kerosene was tied to the *Kupi* 2-3cm below the level of sublimated product and ignited. When the whole thread was burnt off, wet cloth was wrapped around that burning thread where it was tied. The bottle was broken into 2 equal halves with a breaking sound. From the neck region product was collected as a single block with a central hole by a gentle tapping and was stored in a clean sterile container.

Table No.2 Result: Showing Loss and Weight of *Rajata Chandrodaya*

Total Wt of *Kajjali*(g)	250g
Weight of *Kantastha*(g)	81g

Weight of *Talastha*(g)	17g
Loss(g)	152g

Observation and Result

On different phases of processing, the characteristics such as sulphur fuming, melting and boiling of *kajjali,*blue flame appearance were observed in appropriate duration. The confirmative tests like *sheeta shalaka* test, copper coin test and *suryodaya lakshana* were also ascertained during the process. The temperature maintained between 150^0C to 675^0C. Total Weight of *Rajata chandrodaya* obtained was 81g.

DISCUSSION

Rajata Chandrodaya is one of the *Kupi Pakwa rasayana* preparation was successfully prepared by adopting *kramagni paka* in modified Verticle Muffle Furnace in the present study. The radiation of heat through the traditional furnace during moderate and intense stage is very high, which will harm the personnel if exposed for a long duration of time. This problem in EMF is solved through an insulating layer, which prevents escape of heat. Working with such a modified method not only serves for better fuel efficiency and a pollution-free process, but also reduces human labor and exposure to heat[11]. In the present study the total duration of the *kramagni paka* was 39 hours where duration of *Madhyamagni* was longer and temperature ranges between 250^0C to 450^0C in order to facilitate the process of *Gandhaka jarana* and for the specificic chemical reaction to occur. Since the *Madhyamagni* stage was longer which resulted in loss may be due to more escapes vapors during procedure.

CONCLUSION

In the present study *Rajata Chandrodaya* was successfully prepared in Verticle Muffle Furnace by adopting *Kramagni Paka* with 7 hours of *Mrudvagn*i followed by 19 hours of *Madhyamagni* and last 10 hours of *Teevragni* which resulted in minimization of time duration, less human effort and fuel consumption and the obtained final product was of standard quality.

REFERENCES

1. Anonymus, Bheshaja samhita, Ayurvedic pharmacopoeia, chapter 2,1st Edition ,Gujarat; Swasthya mantralaya publication; 1966 : 268

2. Jha C B. Ayurvediya Rasashastra, 2nd Edition, Varanasi; Chowkambha Surabharati Prakashana; 2000 :173

3. Sharma Sadananda, Rasa Tarangini, Edited By Kashinath Shastri, Chapter 5, Verses 38-42,11th Edition, New Delhi ; Motilal Banarasidas Publication;1979 : 82

4. Madhava, Ayurveda Prakasha, Hindi Commentaries Edited By Vaidya Vachaspati Shri Gulrajsharma Mishra, Chapter 2, Verse 19,Varanasi, Chaukhambha Bharati Academy Publication, Edition ;1999: 260

5. Vagbhata, Rasaratnasamucchaya, With Rasaprabha Hindi Commentry By Dr Indradeva Tripathy, Edited By Dr Kapildevgiri, Chapter 5, Verse 29, Edition; 2012,Varanasi ; Chowkamba Sanskrit Sansthan; 2012 : 55

6. Anonymus, Bheshaja samhita, Ayurvedic pharmacopoeia, chapter 2, 1st Edition ,Gujarat ; Swasthya mantralaya publication; 1966 :268

7. Sharma Sadananda, Rasa Tarangini, Edited by Kashinath Shastri, Chapter 2 , Verse 27, 11th Edition, New Delhi ; Motilal Banarasidas publication;1979:16

8. Anonymus, Bheshaja samhita, Ayurvedic pharmacopoeia, chapter 2, 1st Edition ,Gujarat ; Swasthya mantralaya publication; 1966 :268

9. Vertical muffle furnace, available from http.//www.indfurnace.com cited 20/07/2019

10. Yadavji Trikamji, Rasamritam, Translated by Sri Damodhar Joshi, 1st Edition, Varanasi; Chaukamba Samskrit Prakashan ;1998: 20-21

11.Gokharn Rohit, Pharmaceutical standardization of Samaguna Bali Jarita Rasasindura prepared by conventional and modified method

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