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COMPARATIVE PHARMACEUTICAL STUDY OF RASAGARBHA POTTALI

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ABSTRACT

Introduction: In *Rasashastra, Rasa* (Mercury) is the main constituent of herbo-mineral medicines. *Rasagarbha Pottali* is a unique *Rasa* preparation. There is a need of standardizing the *Pottali kalpana* through various Pharmaceutical processes to know its yield, compactness and *Pakakala*. In the current study *Rasagarbha Pottali* (*RGP*) is prepared by three *bhavana dravyas* viz... *Kumari swarasa* (*RGP-K*), *Isabgol* (*RGP-I*) and *Babbula Niryasa* (*RGP-B*). **Methods:** *Parada* is extracted from *Hingula* and *Kajjali* is prepared by mixing with *Dhatu Pisti*. Prepared *Kajjali* is triturated with *Kumari swarasa, Isabgol & Babbula niryasa* and three *Pottalis* are prepared respectively by *Gandhaka drava paka* method. **Results:** 507 g of *Parada* is obtained from 860 g of *Hingula*. 9hrs, 7hrs & 6 hrs are the *Paka kala* of *RGP-K*, *RGP-B* & *RGP-I* respectively. *RGP-K* is compact with good hardness, *RGP-B* is less hard and *RGP-I* is slightly compressed and hard. **Discussion:** The resinous constituent of Aloe Vera (Kumari) binds the ingredients of *RGP-K* firmly and gives shape and compactness. *Acacia arabica (Babbula Niryasa)* in *RGP-B* is the mixture of *polysaccharides* and *glycoprotein* which makes the *Pottali* less hard and brittle. Shape of *RGP-I* after *paka* is retained but slightly compressed because of fiber and elastic property of *Plantago ovata (Isabgol).***Conclusion:** By analyzing the comparative pharmaceutical points one can conclude that, *RGP-K*, *RGP-B* and *RGP-I* all the three *Pottalis* can be prepared in 9hrs, 7hrs and 6 hrs of *Pakakala* respectively. *RGP-K* and *RGP-I* are well compacted after *paka*, Where as *RGP-B* is less hard and brittle.

Keywords: *Rasagarbha Pottali, Kumari swarasa, Isabgol, Babbula Niryasa*, comparative pharmaceutical study

INTRODUCTION

Since 8th C, the golden period of *Rasashastra* started. *Rasashastra* embodies mainly the science of metals considering *Rasa* (Mercury) as a chief metal. Among the various *Rasa Kalpanas*, "*Pottali*" is considered as effective form of mercurial formulation [1]. *Rasagarbha Pottali* is a classical *Pottali Rasayana* containing *Hingulottha Parada, Kajjali, Shodhita Gandhaka* and *Swarnatanutantu Khanda*. While explaining *Rasagarbha Pottali* the *bhavana* dravyas along with *Kumari swarasa (Aloe Vera), Isabgol*

(Plantago ovata) and *Babbula niryasa (Acacia arabica)* are also mentioned [2].

The main aim of Pharmaceutical study is to find out working standards for the formulations and safe use of therapeutics. The present study aims at assessing the comparative study of Pharmaceutical processing of '*Rasagarbha Pottali* (*RGP*)' prepared by three different *bhavana* dravyas by *Gandhaka drava paka* method. They are *Kumari swarasa* (*RGP-K*), *Isabgol* (*RGP-I*), *Babbula Niryasa* (*RGP-B*).

OBJECTIVES:

- To Carry out *Visesha Shodhana* of *Swarna* [3].
- To prepare *Samaguna Kajjali* [4].
- To Prepare *RGP* by three different *Bhavana dravyas* i.e. *Kumari swarasa* (*RGP-K*), *Isabgol* (*RGP-I*) *and Babbula Niryasa* (*RGP-B*) [5].
- To carry out comparative Pharmaceutical study of each *RGP*.

MATERIALS AND METHODS:

MATERIALS:

Table No: A

Hingula	860 g
Gandhaka	341g (for *Kajjali*)
Gandhaka	45.770 kg (for *Gandhaka paka*)
Swarna Patra	2.587 g
Kanchanara Patra Swarasa	200 ml
Nimbu swarasa	Q.S
Saindhava Lavana	a pinch
Haridra churna	1 tsp.
Go-dugdha	Q.S
Kumari swarasa	150 ml
Isabgol	200 ml
Babbula Niryasa	200 ml
Silk cloth, *Khalva Yantra*, *Urdhwa patana Yantra, Kurma puta, Valuka yantra,* etc.	

METHOD:

The whole method of preparation includes:

Extraction of *Parada* from *Hingula*: [6]

Parada is extracted from *Hingula* by the *Hingulakrusta Parada* method mentioned in *Rasa Tarangini*. And it is taken into a porcelain mortar and *Haridra churna* is added and triturated for 3 days.

Table No: B
507 g of *Parada* was extracted from 860 g of *Hingula*

Gandhaka Shodhana: [7]

Gandhaka Shodhana was carried out in *Godugdha* by subjecting it to *Kurma Puta* by *Bhoodhara Yantra* method. *Shodhita Gandhaka* was of pale Yellow Colour with greenish tinge & shiny. It was in granular form and few were streak like, fully immersed in the milk.

Visesha Shodhana of *Swarna*: [8]

Swarna Patras are cut into small layer like pieces and heated to red hot in a mild flame and suddenly

quenched into *Kanchanara Patra Swarasa* and washed in warm water. Same procedure was repeated for 2 more times. For each time *Nirvapa* fresh sample of *Kanchanara patra Swarasa* was used.

Preparation of *Swarna Pisti*: [9]

Table No: C
Shodhita Swarna Patras : 2.587 g
Shodhita Parada : 41g
prepared *Swarna-pisti* : 43.587 g.

Shodhita Swarna Patras were cut into small pieces and added slowly into *Khalva yantra* containing *Shodhita Parada* and triturated. Amalgamation of *Swarna* and *Parada* was taken place after 6 hrs of *mardana*. After complete formation of *Pisti*, *Nimbu swarasa* and *Saindhava Lavana* was added and triturated well. After 3 hrs of trituration *swarasa* colour turned into greyish black. The *Pisti* was then washed with luke warm water, until the water stopped turning into black colour and all the acid content disappeared. Then this *Swarna-pisti* was collected and weighed.

Preparation of *Kajjali*: [10]

Table No: D

Parada	:	331 g
Gandhaka	:	331g
Kajjali	:	662 g

Parada and *Gandhaka* were taken in a clean *Khalva Yantra*. Then gently triturated with uniform speed till all the *Kajjali Siddhi Lakshanas* were observed. After 72 hrs, *Kajjali* was taken between thumb and index finger made wet then rubbed and was exposed to sunlight, minute particles were observed in furrows of finger confirming *Rekhapurnatva test*. *Nischandra, Varitara, uttama test* was confirmed. Obtained *kajjali* is 662 g.

Preparation of Final *Kajjali* for *RGP*: [11]

Table No: E

Swarna Pisti	:	43.587g
Gandhaka	:	10.35 g
Kajjali	:	662 g

Gandhaka is added to the *Swarna-pisti* in a *Khalva yantra* and triturated properly till it is properly mixed. Later the above mixture is mixed with the prepared *kajjali* and again trituration continued. After 72 hrs *Kajjali* appeared Smooth and *Rekhapornata test* found positive. For better fineness and smoothness of *kajjali*, *mardana* was continued up to 280 hrs.

Distribution of *RGP Kajjali* For three *Bhavana dravyas*:

Table No: F

238.6 g for *Kumari swarasa* (150 ml)
238.6 g for *Babbula Niryasa* (200 ml)
238.6 g for *Isabgol* (200 ml)

All the three *bhavana* are given separately for 7days respectively.

Distribution of *kajjali* for Pilot study and Main study:

Table No: G

Kajjali for	wt. before *bhavana*	wt. after *bhavana*	wt. gain	For pilot study	*kajjali* for main study
RGP-K	238.6 g	250 g	11.4 g	80 g	120 g
RGP-B	238.6 g	295 g	56.4 g	100 g	145 g
RGP-I	238 g	270 g	31.4 g	100 g	120 g

PILOT STUDY:

Table No: H

	Kajjali	7 days *Bhavana*	*Poogakara Pottali*
RGP-K	80 g	40ml *Kumari swarasa*	5 *Pottali*: 10.5 g, 11 g, 11.5 g, 11.5 g, & 12 g
RGP-B	96 g	60 ml *Babbula niryasa*	8 *Pottali*: 9.5 g, 10 g, 10.5 g, 10.5 g, 10.5g,11.5g, 12 g & 12 g
RGP-I	96 g	60 ml *Isabgol*	8 *Pottali* : 8.5 g, 8.5 g, 9.5 g, 9.5 g, 9.5 g, 9 g, 10 g & 10 g

Result after *Gandhaka paka* of *RGP-K*

Table No: I

Pottali	*Paka kala*	Weight	
		Before *paka*	After *paka*
1	3hrs	10.5 g	12.5 g
2	6hrs	11 g	14.5 g
3	8 hrs	11.5 g	15.5 g
4	9hrs	11.5 g	14.5 g
5	10hrs	12 g	13.5 g

Result after *Gandhaka paka* of *RGP-B*:

Table No: J

Pottali	*Paka kala*	Weight	
		Before *paka*	After *paka*
1	45 min	9.5 g	9.5g
2	1:30 hrs	10 g	10.5g
3	3 hrs	10.5 g	10 g
4	5 hrs	10.5 g	9 g
5	6 hrs	10.5 g	9 g
6	7 hrs	11.5 g	8.5g
7	8 hrs	12 g	8g
8	9 hrs	12 g	8g

Table Result after *Gandhaka paka* of *RGP-I*:

Table No: K

Pottali	*Paka kala*	Weight	
		Before *paka*	After *paka*
1	45 min	8.5 g	8.5 g
2	1:30hrs	8.5 g	8.5 g
3	3hrs	9.5 g	9 g
4	5hrs	9.5 g	8 g
5	6hrs	9.5 g	8 g
6	7hrs	9 g	7.5 g
7	8hrs	10 g	7 g
8	9hrs	10 g	7 g

So by above practical, the *Pakakala* of *RGP* known by Pilot study are:

Table No: L

Pottali	*Pakakala* from starting of heating	*Pakakala* after Melting of Sulphur
RGP-K	11 hrs	09 hrs
RGP-B	09 hrs	07 hrs
RGP-I	08 hrs	06 hrs

MAIN STUDY:

Table No: M

	Dried *Poogakara Pottali*
RGP-K	3 *Pottalis* of 40g, 40.5g, 39.5g
RGP-B	3 *Pottalis* of 44g, 44.5g, 32 g
RGP-I	3 *Pottalis* of 34g, 34 g, 34 g

Generalised method of *Gandhaka Drava paka* method of *Pottali karma* is followed by maintaining *Mrudvagni* between 190° C to 215°C. After attaining the features of *Pottali siddhi lakshanas* like *Vyoma varna* of *Gandhaka*, burning of silk cloth & metallic sound the heating is stopped. And *Pottali* is removed, scrapped for adhered *Gandhaka* and polished.

silkcloth

***Pottali* tied to Iron rod**

Valuka Yantra


Immersion of *Pottali* in *Gandhaka drava*


Vyoma varna*, Burnt silk cloth and Polished *Pottali

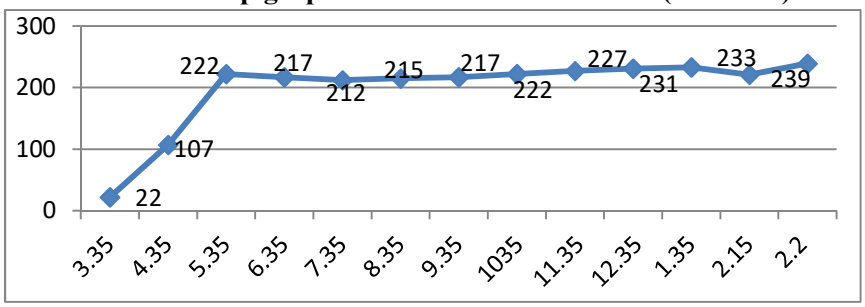
RGP-K

Temperature pattern and Observation of *RGP-K*:

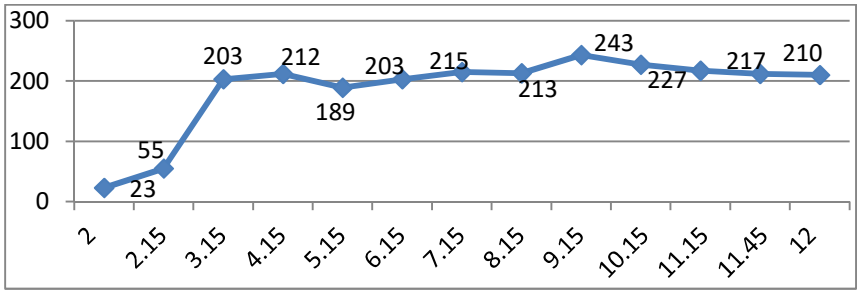
Table: N

Time	Temp (^{0}c)	Observation
1.45 Am	22^{0}C	Fire ignited
2.00 Am	28^{0}C	
2.15 Am	57^{0}C	
2.30 Am	65^{0}C	
2.45 Am	107^{0}C	*Gandhaka* started to melt
3.00 Am	170^{0}C	Scum removed
3.15 Am	205^{0}C	
3.30 Am	210^{0}C	*Gandhaka* melted completely
3.45 Am	222^{0}C	*Pottali* immersed
4.00 Am	222^{0}C	
4.15 Am	220^{0}C	
4.30 Am	218^{0}C	Yellow colour of sulphur is seen
4.45 Am	217^{0}C	
5.00 Am	216^{0}C	Fumes of sulphur started to appear.
5.15 Am	216^{0}C	
5.30 Am	215^{0}C	Golden yellow colour of sulphur
5.45 Am	212^{0}C	
6.00 Am	212^{0}C	Scum collected at the surface of *paka* is removed
6.15 Am	213^{0}C	
6.30 Am	214^{0}C	Sulphur- Brownish yellow colour
6.45 Am	215^{0}C	Sulphur became more viscous
7.10 Am	217^{0}C	
9.20 Am	217^{0}C	Brown colour of sulphur is observed
9.35 Am	217^{0}C	Sulphur fumes became denser
9.50 Am	219^{0}C	
10.50 Am	223^{0}C	
11.05 Am		Dark brown colour of *Gandhaka* is seen
11.35 Am	227^{0}C	
11.50 Am	228^{0}C	Bluish black colour of *Gandhaka*
12.05 pm	230^{0}C	*Pottali siddhi lakshanas* appeared and *Pottali* removed

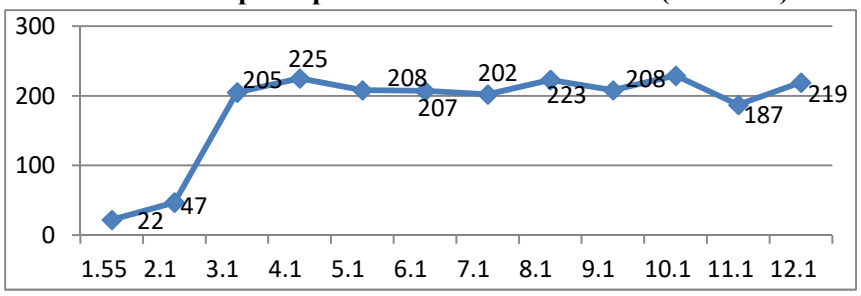
Time & Temp graph: 1 **(*RGP-K 1*)**



Time & Temp graph: 2 **(*RGP-K 2*)**



Time & Temp Graph: 3 **(*RGP-K 3*)**



[Similar Temperature pattern and Observation are followed for *RGP-B* & *RGP-* I]

RESULTS:

PHARMACEUTICAL STUDY:

Yield of Preparation of *Hingulottha Parada*:

Table: 01

Extraction of *Parada* from *Hingula*	Initial wt. of *Hingula* (860g)	Wt. of *Parada* extracted	Loss	*Parada* Obtained in %	Total Yield in
1st Batch	230 g	135 g	95 g	58.69	507g 59.05 %
2nd Batch	200 g	120 g	80 g	60	
3rd Batch	230 g	130 g	100 g	56.52	
4th Batch	200 g	122 g	78 g	61	

Yield of *Gandhaka* after *Shodhana*:
Total *Gandhaka* taken: 48.210 kg, Total loss: 2.440kg, Total yield: 45.770 kg
Observations made during *Swarna-pisti*:

Table: 02

Swarna Pisti	*Suddha Swarna Patra*	*Hingulottha Parada*	*Nimbu Swarasa*	*Saindhava Lavana*	*Swarna Pisti* after *Prakshalana*	Loss during Pisti
1	2.587 g	41 g	60 ml	1 pinch	43.587 g	0

Kajjali distribution for Pilot study and Main study:

Table: 03

Kajjali for	Wt. before *bhavana*	Wt. after *bhavana*	Wt. gain	For pilot study	For main study
RGP-K	238.6 g	250 g	11.4 g	80 g	120 g
RGP-B	238.6 g	295 g	56.4 g	100 g	145 g
RGP-I	238 g	270 g	31.4 g	100 g	120 g

Pakakala:
The *Pakakala* of Respective *Pottali* known by Pilot study are:

Table: 04

*Pottali*s	From the beginning of process	After the melting of sulphur
RGP-K	11 hrs	09 hrs
RGP-B	09 hrs	07 hrs
RGP-I	08 hrs	06 hrs

MAIN STUDY:
Observations:

Table: 05

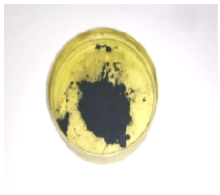
Pottali in 3 batches		Duration Hrs	Wt. Before *Gandhaka paka*	Wt. After *Gandhaka paka*	Yield	Total Before *Paka*	Total Before *Paka*	Total Yield
RGP - K	1	8:45	40 g	47 g	7g	120 g	144.5 g	24.5 g Gain (19.5%)
	2	9:35	40.5 g	47.5 g	7g			
	3	8:20	39.5 g	50 g	9.5g			
RGP - B	1	7:45	44 g	34 g	10 g	140.5 g	110 g	30.5 g Loss (21.7%)
	2	7	44.5 g	33 g	11.5 g			
	3	7:15	52 g	43 g	9 g			
RGP - I	1	6	32 g	28.5 g	3.5 g	100 g	89 g	11 g Loss (11%)
	2	6	34 g	30.5 g	3.5 g			
	3	6:30	34 g	30 g	4 g			

DISCUSSION

Rasagarbha Pottali is a *Sagandha, Sagni, Bahird-hooma, Gandhaka jaarita, Kajjali bandha Pottali Kalpana* containing *Parada*, *Shuddha Gandhaka churna*. In the current experiment *RGP* is prepared from the *bhavana* medias i.e. *Kumari swarasa* (*RGP-K*), *Isabgol* (*RGP-I*) and *Babbula Niryasa*

(*RGP-B*) and its comparative pharmaceutical study is undertaken.

Kajjali Mardana: After 72 hrs *Kajjali* appeared Smooth and *Rekhapornata test* found positive. For better fineness and smoothness of *Kajjali*, *mardana* was continued up to 280 hrs.

Kajjali > 

Rekhapurnata > 

Bhavana dravyas: *Kumari Swarasa* contains *aloe resin A, B, C* and *Aglyconealoesone* "These resinous constituents bind the ingredients of *RGP-K* firmly and give shape and compactness." Other constituents are: *Hydroxyanthraquinone, barbaloin, γ-hydroxy aloinisomers and emodinchrysophanol derivatives* will aid medicinal attributes to the *Kajjali*. Shape of *Pottali* after *paka*: *Poogakara* is retained.

Babbula Niryasa also called as *Gum Arabic* is the mixture of *polysaccharides* and *glycoprotein* gives it the properties of glue and thus acts as a binding agent in *RGP-B*. Shape of *Pottali* after *paka*: Round / Bolus & brittle, because of early melting of gum and loosening of bonds.

Since the *Isabgol* or *Psylliym Ovata*, contains high *fiber* that varies from 75 % to 80%, and a *polysaccharide Mucilage*, these properties attributes the *Laxative* and *binding* property to the *RGP-I*. Shape of *Pottali* after *paka* is retained but slightly compressed because of fiber and elastic property of *Isabgol*

Pakakala and Compactness of *Pottali*:

By knowing the pilot study and the Main study it is confirmed that:

1. *Pakakala* of *RGP-K* is found to be 9 hrs. It is well compact with good hardness
2. *RGP-B*'s *pakakala* is estimated as 7 hrs. The *Pottali* reduces its hardness and becomes more brittle by more *pakakala* because of the property attributed by *Gum Acacia*.
3. *RGP-I Pakakala* is estimated as 6 hrs. The *Pottali* is hard but its shape is slightly compressed after *paka* because of the elastic property of fibers present in *Isabgol*

CONCLUSION

Pottali Kalpana can be understood as a specific Pharmaceutical technique which is intended for keeping different constituents in their processed, purified, incinerated, *sindhoora* form into unique complex formula. As per the classical reference the three types of *Rasagarbha Pottali*s were prepared by three *bhavana dravyas* i.e. *Kumari swarasa, Babbula Niryasa* and *Isabgol*.

By analyzing the comparative pharmaceutical points, one can conclude that, *RGP-K*, *RGP-B* and *RGP-I* all the three *Pottali*s can be prepared in 9hrs, 7hrs and 6 hrs of *Pakakala* respectively.

Pakakala should be optimum. Giving more heat may break the *Pottali* into cracks and its hardness will reduce.

Shape of *RGP-K* is retained in *Poogakara* even after *Gandhaka paka*. *RGP-I* is hard but its shape is slightly compressed after *paka* because of the elastic property of fibers present in *Isabgol*. *RGP-B* attained round shape since the *Gum Acacia* which is a *bhavana dravyas* will get melted early. *Kumari swarasa* attributed *Rasayana* property to the *Pottali*. *Isabgol* as a *laxative* the property is attributed to the *Pottali*.

Babbula is a gum; due to intense heat exposure it attained a round shape and brittle in consistency.

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