ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Research Article

A RESEARCH ON PHARMACUETICAL PREPARATION OF *TAMRA GARBHA POTTALI*

Himabindu[1*], Ravi Chavan[2], M.S.Doddamani[3]

*[1]Assistant Professor, Dept of RSBK, Nagur Ayurveda Medical College, Bijapur.

[2]Associate Professor Dept. of RSBK, TGAMC, Bellary.

[3]Professor & Hod, Dept of RSBK, GAMC, Shivamoga, India.

ABSTRACT

Ayurveda a science of life bloomed on its own concepts of health maintenance and curative aspects. One of the prenomial off shoot of Ayurveda is *Rasashastra*, an Indian alchemy. *Pottali kalpana* is a peculiar pharmaceutical dosage form, is unique in terms of its preparation, mode of administration, quick in action, less dose and easy for transportation. *Tamra Garbha pottali* (TMGP) is one such herbo-mineral-metallic complex formulation containing *Tamra bhasma* (T.B), *Shodita Swarna*, *Hingulotta Parada* and *Shodhit Gandhaka*. Among the different pharmaceutical methods, *Gandhaka paka* method is considered to be the best method to enhance the properties of the drugs and to keep them in a concise form.

Pilot study of 6 *Pottalis* was conducted to standardize the temperature required to do *Pottali paka* and to assess the *Pottali siddi lakshanas* like *Vyoma varna* of *Gandhaka paka,* hardness of *Pottali* and changes of silk cloth tied to the *Pottali*. The main study conducted in 2 batches on the standards made by the pilot study. Observations made on the time duration required for the study, temperature to be given to *Paka*, changes in the *Gandhaka varna* till attainment *Vyoma varna* noted. The Study gave standard pharmaceutical method of *Pottali paka* w.s.r to *Tamra garbha pottali*.

KEYWORDS: *Tamra Garbha pottali, Tamra bhasma*, *Pottali*, *Pottali siddha Laksana*, *Gandhaka Paka.*

INTRODUCTION

Rasashastra is one of the prenomial off shoot of Ayurveda which deals with the herbo-mineral formulations. Ever since the inception of Hindu Alchemy by *Parada* and *Gandhaka*, it's evolution lead to series of compounds and formulations. *Pottali* is one such formulation. *Pottali* word was used for different purposes in Ayurvedic literature. The word *Pottali* is derived as पुट – पोट – पोट्टलि – पोट्टलिका ।

Here the word *Puta* applied to minimize, to concise or to make compact having *Pratyaya*, further from the root La with "I" *Pratyaya* meaning to take or to receive, thus the word *Pottali* formed. Among the different *Pottalis* mentioned in classics, *Tamra Garbha Pottali* (TMGP) is *Sagandha*, *Sagni*, *Murchita parada yoga*, congaing ingredients like *Tamra bhasma*, *Shodhit Swarna*, *Hingulotta Parada*, *Shodhit Gandhaka*, a generic formulation have its distinct role therapeutically. It is the need of the hour to explore pharmaceutical aspect of the formulation. Hence present study made an effort to set a standard manufacturing procedure for *Tamra Garbha pottali* preparation which is indicated in many of disorders like *Kaphajanya* and *Tridoshaja Shwasa*, *Kaasa*, *Jvara*, *Shula*, *Vardhakya*, and *Shosha*.

MATERIAL AND METHODS

Preparation of *Kajjali* & *Tamra bhasma*

Parada extracted from *Hingula* through *Hingulotta parade*[1] method. *Gandhaka shodhana* carried out in *Kurma puta*[2] method. Equal quantity of *Hingulotta Parada* and *Shodhit Gandhaka* are mixed in a *Khalva yantra* and *Mardhana* carried out till attainment of *Kajjali siddhi lakshanas* for 150 hours.

Pure *Suchi vyadha Tamra patras* taken and subjected to *Shodhana*[3] and *Vishesha shodhana*[4] as per the classical reference. *Tamra bhasma* was prepared according to the classics[5] using *Samaguna Kajjali* and *Nimbhu swarasa* as media. *Gandhaka* which is stated as *Shulvari*[6] is taken as *Marana* media in the successive *Putas*. *Tamra bhasma* was subjected to various classical parameters of *Bhasma pareeksha* along with *Amla dadhi pareeksha* which is specific for *Tamra bhasma*, all found positive after 31st *Puta*. *Amritikarna*[6] of *Tamra bhasma* was carried out as per the classical reference.

Preparation of *Tamra Garbha pottali*

The method of preparation was according to the *Rasayogasagara*[7]. In classics different opinions are there regarding the duration of heat for *Pottali paka*. Hence, pilot study was carried out initially to assess the temperature and duration of heat required to attain *Pottali siddhi lakshanas*. 6gm of *Hingulotta Parada* and 750mg of *Shodhit Swarana patras* were triturated to prepare *Dhatu pishti*. *Datu pishti prakshalana* was carried out with *Nimbhu swarasa* and *Saindhava*. 10 gm of *Shodhit Gandhaka* added to *Dhatu pishti* trituration carried out till attainment of *Kajjali siddhi lakshanas*.120gm of *Tamra bhasma* was added to the prepared *Kajjali*, trituration carried out for 24 hrs as said in classics. *Kumari swarasa bhavana* was given to the *Tamra Garbha Pottali kajjali* for 7 times. Slight weight gain was observed after 7 *Bhavana*. *Shikararambha* (conical) shape given to the *Pottali* after 7th *Bhavana* and dried under shade. 6 *Pottalis* weighting 12gm each were prepared for pilot study and two *Potalis* weighting 1 *Pala* each were prepared for main study. The dried *Tamra Garbha pottali* tied in 4 layered silk cloth, which is spread with *Shodhit Gandhaka* (1/4th part of *Pottali* wt) in each layer, and tied to a *Loha shalaka*, immersed in *Druta Gandhaka* in a *Mrit patra*. *Mrith patra* was kept at the centre of *Valuka yantra*. *Mandagni* was given throughout the procedure. Pyrometer was kept in *Valuka* 5cm always from *Mrith patra* to assess the temperature. The observations and results were noted systematically. After attainment of *Pottali siddhi lakshanas*, *Tamra Garbha pottali* taken out of *Gandhaka paka*, allowed for *Swangasheeta*, adhered *Gandhaka* was scraped and stored in a air tight container.

The whole procedure of *Tamra Garbha pottali Kalpana* will be divided under 3 headings as follows.

Table 1: The whole procedure of *Tamra Garbha pottali Kalpana*

1. *Purva karma*	a. Preparation of *Pottali* for *Gandhaka Paka* b. Placing of *Mrit patra* in *Valuka Yantra*
2. *Pradhana karma*	a. Uniform Heating Pattern b. Observation and Recording of Temperature c. Maintaining the *Gandhaka* Level
3. *Paschat karma*	a. Removal of *Pottali* from *Mrith patra* b. Removal of debris around the *Pottali* c. Collection of Final product

Observations

Table 2: Observations made during *Swarna Pisti*

Swarna Pisti	***Shuddha Swarna Patra***	***Hingulottha Parada***	***Nimbu Swarasa***	***Saindhava Lavana***	***Swarna Pisti* after *Prakshalana***	**Loss during *Pisti***
1	750mg	6gm	30 ml	1 pinch	9gm	0

Table 3: Showing different phases of *Tamra Garbha Pottali Kajjali* during Trituration

Hours	**Observation**
At 0 min	*Swarna Pisti* + *Gandhaka*
After 5 min	Light Grey with small *Swarna Pisti* particles
After 30 min	Greyish green colour with shiny particles
After 1 Hour	Yellow streaks with more shiny particles
After 5 Hours	Colour turned to Black
After 10 Hours	Black powder with shiny particles
After 50 hours	flakes adhered to *Khalwa*.
After 100 hours	flakes started to merge with *Kajjali* powder.
After 150 hours	flakes reduced, shining particles seen in *Kajjali*
After 210 Hours	*Kajjali* + *Tamra bhasma*
After 214 Hours	Mixture became homogeneous
After 220 Hours	Attained *Rekha purnata* & *Shlakshnata*
After 230Hours	*Varitara* test was positive
After 234Hours	Shining particles were reduced

Table 3: *Bhavana* with *Kumari svarasa*

	Quantity of *Kumari*	Duration of *Bhavana*	Observation
1	40 ml	4 ½ hr	Colour was blackish gray with persistent irritant odour.
2	40 ml	4 hrs	Colour was black with persistent irritant odour.
3	40 ml	4 ½ hrs	Colour was black with persistent irritant odour.
4	40 ml	4 ½ hrs	Colour was black.
5	40 ml	4 ½ hrs	Colour was black with slight irritant odour
6	40 ml	4 hrs	Colour was black.
7	40 ml	3 ½ hrs	Colour was black with reduced irritant odour.

Table 4: Temperature pattern and Observation - Pilot study of *Tamra Garbha pottali*

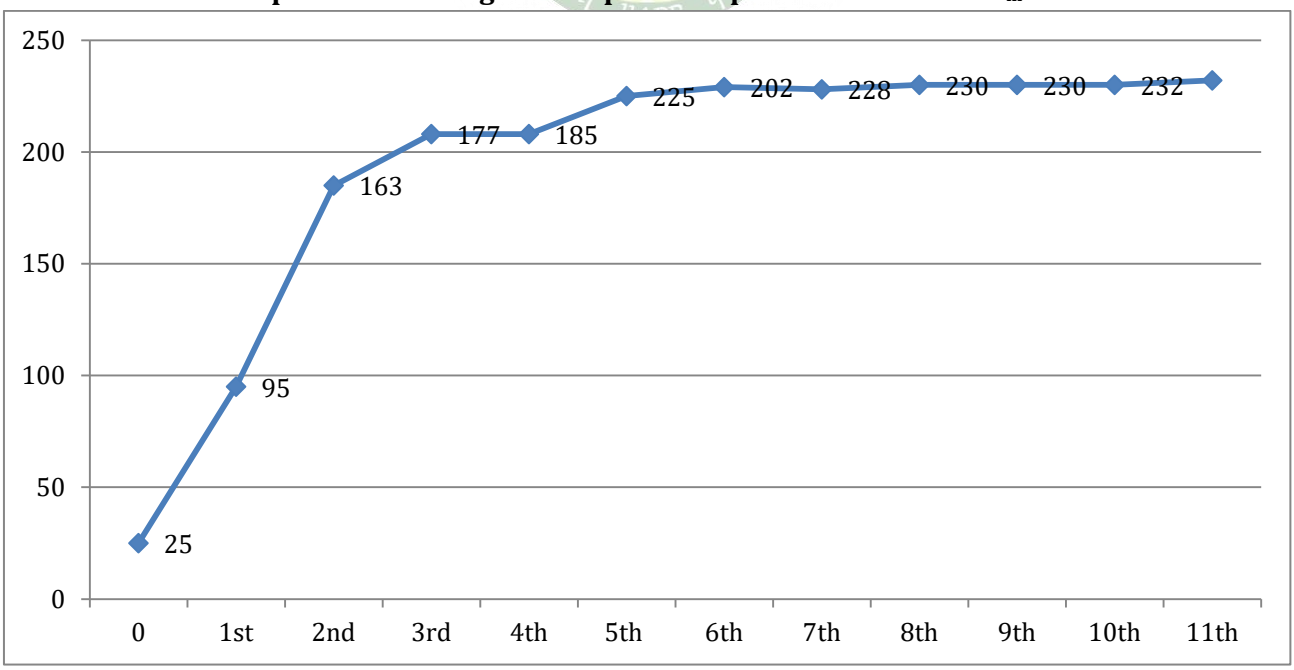
Time	Temp (0c)	Observation
4.15am	26	Agni is ignited, 4800 gm of *Shuddha gandhaka* taken. *Gandhaka* started melting slowly
7.15 am	187	Complete melting of *Gandhaka*. *Pottali* is immersed in molten sulphur
8.15 am	208	Golden yellow colour of sulphur is observed
8.45 am	209	1st *Pottali* was taken out @ 1 ½ hr
9.15 am	202	Sulphur turned to dark brown colour
10.15 am	235	Colour of sulphur turned to dark brown, S fumes became denser, 2nd *Pottali* was taken out @ 3rd hr
11.15 am - 2.15pm	222 - 228	Dense fumes of sulphur seen, thick layer of scum was removed, *Gandhaka* attained dark brown colour
12.15 – 1.15 pm	228 - 239	*Gandhaka* attained Reddish brown colour, 3rd *Pottali* was taken out @ 6th hr
1.15 – 2.15 pm	239	Reddish brown colour of *Gandhaka*, Viscosity of *Gandhaka* increased
2.15 – 3.15 pm	226	Bluish tinge in colour of *Gandhaka* started to appear, 4th *Pottali* removed @ 8th hr (Metallic sound heard)
3.15- 4.15 pm	225	*Gandhaka* turned to chocolate brown colour, Dark bluish reflects of *Gandhaka* observed, 5th *Pottali* removed @ 9th hr (Metallic sound clearly heard)
4.15 – 5.15 pm	224	*Gandhaka* fumes reduced
5.15 - 6.15 pm	223- 239	Observed for *Vyoma varna* of *Gandhaka*, burning of silk cloth, metallic sound of *Pottali*
6.15 – 7.15pm	239- 248	6th *Pottali* removed @ 12th hr

Table 5: Temperature record during – *Tamra Garbha pottali Paka* - Batch I & II

Duration	Temperature (0C) Batch I	Observation Batch I	Temp (0C) Batch II	Observations Batch II
0 – 2 hrs	250 - 1850 C	Complete melting of *Gandhaka*. TMGP immersed in molten Sulphur.	26 – 185	Complete melting of *Gandhaka*. *Tamra Garbha pottali* immersed in molten Sulphur.
2 – 3 hrs	185 – 208	Golden yellow colour of sulphur is observed	185 – 200	Golden yellow colour of sulphur is observed

3 – 4 hrs	208	Thin layer of scum started to appear, Sulphur turned to dark brown colour	200 – 213	slight fumes of 'S' started to appear. 'S' turned to dark yellow colour Thin layer of scum was removed.
4 – 5 hrs	215 – 225	Dark brown colour of *Gandhaka* is observed. Sulphur fumes became denser.	213 – 219	Dark brown colour of *Gandhaka* is observed. Sulphur fumes became denser.
5 – 6 hrs	225 – 229	Colour of sulphur was dark brown with red tinge	219 – 222	Colour of sulphur was dark brown with red tinge
6 – 7 hrs	229 – 228	Dense fumes of sulphur seen. Thick layer of scum was removed.	222 – 223	Dense fumes of sulphur seen. Thick layer of scum was removed.
7 – 8 hrs	228 – 230	*Gandhaka* attained Reddish brown colour.	223 – 226	*Gandhaka* attained Reddish brown colour.
8 – 9 hrs	230	Viscosity of *Gandhaka* increased.	223	Viscosity of *Gandhaka* increased.
9 – 10 hrs	230	Bluish tinge in colour of *Gandhaka* started to appear. *Gandhaka* fumes reduced.	223	Bluish tinge in colour of *Gandhaka* started to appear. *Gandhaka* fumes reduced. Slight burning was observed in 1st layer of silk cloth.
10 – 11 hrs	230 - 232	Observed for *Vyoma varna* of *Gandhaka*, burning of silk cloth, metallic sound of *Pottali*. At the end of the 11th hr *Pottali* taken out of *Mrith patra*.	223	Observed for *Vyoma varna* of *Gandhaka*, metallic sound of *Pottali*. At the end of the 11th hr *Pottali* taken out of *Mrith patra*.

Graph no1: Showing the temperature pattern of Batch I - T_m.G.P



Graph no 2: Showing the Temperature Pattern of Batch II - T_m.G.P

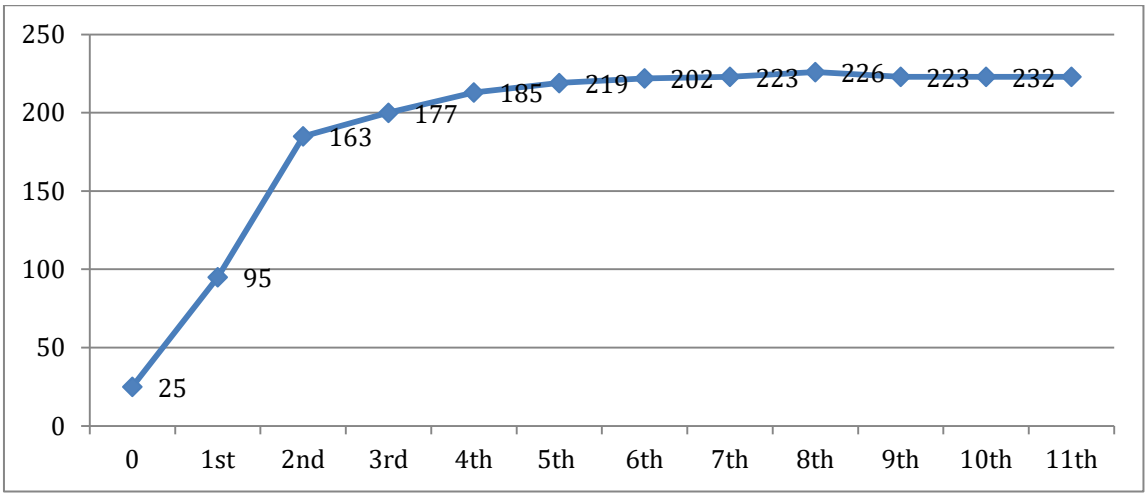


Table 6: Result after *Gandhaka paka*

Pottali	**Colour**	**Weight**	
		Before *Paka*	**After *Paka***
1	Greyish black	11.5 gm	12 gm
2	Dull black	12 gm	12 gm
3	Black	12.5 gm	13 gm
4	Black	13 gm	13 gm
5	Jet black	12.5 gm	13 gm
6	Jet black	12 gm	12 gm

Table 7: Result before and after *Gandhaka paaka*

Result	**Batch I**	**Batch II**
Weight of *Tamra Garbha pottali* before *Paka*	48.5 gm	48 gm
Weight of *Tamra Garbha pottali* after *Paka*	46.5gm	46.5 gm
Loss of weight After *Paka*	2 gm	1.5 gm

DISCUSSION

Tamra Garbha pottali is a *Sagandha*, *Sagni Murchita Parada* yoga containing *Tamra bhasma*, *Shodhit Swarna*, *Hingulotta Parada* and *Shodhit Gandhaka*, a complex herbomineral formulation. It is a unique *Pottali rasayana* prepared with *Gandhaka paka* method in *Mridu agni.* The method of *Pottali paaka* has still remained a topic which needs a standard to assess the *Pottali paaka lakshanas*, which may vary according to drugs used like *Swarna*, *Rajatha*, *Abhraka bhasma*, *Manashila*, *Haratala bhasma*, *Bhasmas* of *Sudha varga dravyas* etc, according to the *Agni* and its duration. In a nut shell, *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. This specific technique developed for potentiating the constituents, stabilizing firm bonding between the constituents forming a coordinating complex with high therapeutic efficacy.

Dhatu pishti was prepared by mixing *Shodhit Swarna* with *Hingulotta parada* (Table 02) *Mardana* carried out till it convert into silvery white colured intermetallic compound with metallic luster. Total 6 hr *Mardana* was carried out to attain above said *Lakshanas.*

$2Au + Hg \longrightarrow Au_2Hg$ (intermetallic compound)

Pishti prakshala with *Nimbhu swara* and *Saindava lavana* helps in removing the impurities and finely powdered *Shodhit Gandhaka* was added to the *Swarna pishti*, *Mardana* carried out for 210 hrs till attainment of *Kajjali siddi lakshanas* like *Kajjalabhasa, Nishchandrata.*

Tamra bhasma mixed to the *Dhatu pishti Kajjali* and *Mardhana* carried out for 24 hrs@ which lead to the formation of a complex compound. Fresh *Kumari Swarasa* was added to TMGP *Kajjali* and trituration was done for 4 hrs. This process carried out for 7 days. *Bhavana* with *Kumari swarasa* was not a mere *Bhavana* media in turn which helps in particle size reduction, uniform mixing of *Kajjali* and potentiating the product by converting the free elements into compound form and addition of organic compounds by heating process (chemisorption). *Kumari swarasa* is also acts as a binding agent, which helpful in giving *Shikarambha Akara* to the *Tamra Garbha pottali* before going to *Pottali paka*.

A *Pottli* weighing 48gm is prepared and dried under shade. Drying is a process where addition-elimination reaction helps in formation of complex molecule by removal of water/gaseous particles (condensation reaction). *Tamra Garbha pottali* was tied in 4 layered silk cloth and sandwiched with equal qt of *Shodhit Gandhaka* powder to that of dried *Tamra Garbha pottali* made into 4 parts.

Preparation of *Tamra Garbha pottali*

Pilot study was carried out to assess the duration and range of temperature for *Tamra Garbha pottali*. Initially *Shodhit Gandhaka* was taken in a mud pot and kept in *Valuka yantra*, made into *Drutha* (liquid) form. During the entire procedure *Mridu agni* i.e., 160^0-240^0 was maintained with the gradual increase from room temperature to the specific temp mentioned. The same pattern was followed for the main study, which is helpful in the formation of complex compound under pressure through liquid sulphur media.

OBSERVATIONS

1. Characteristic sulphur odour perceived at 150^0C i.e., after half an hour of heating.
2. Complete melting of whole sulphur after two hours of heating.
3. The *Tamra Garbha pottali* was immersed after melting of *Gandhaka* present in the pot.
4. White coloured Sulphur fumes were observed at i.e., after 2 & ½ hr of heating. The Sulfur having 114^oC as melting point, melts (Sλ) at 169^0C, combines with Oxygen forms SO_2 and escapes in the form of white fumes.
5. At 165-185^0C sulfur starts forming long polymer chains and thus its viscosity increase slightly and it appear with thick yellow fumes.
6. For every half an hour, molten *Gandhaka* is observed for its colour change according to time and temperature, helps in assessing the *Vyoma varna* of *Gandhaka*.

   After 9 hours, burning of silk cloth and *Vyoma varna* of Liquid sulphur was observed along with metallic sound (*Pottali* banged against the pot). *Pottali siddha lakshanas* were appeared and the *Pottali* was removed from molten sulphur and allowed for self cooling.

After self cooling, *Gandhaka* which is adhered to the TMGP was scraped out clearly.

Table 8: Showing the TMGP ingredients

Ingredients	Quantity
Tamra bhasma	10 *Karsha* (120 gm)
Kajjali (*Shodhit Parada*+ *Shodhit Gandhaka*)	1 *Karsha* (12 gm)
Shodhit Gandhaka	1 *Tanka* (4 gm)
Swarna tanutantu khanda	1 *Ratti* (750 mg)

REFERENCES

1. Sri Sadananda Sharma, Rasa Tarangini, edited by Kashinatha Shastri, 11th Edition, New Delhi, Motilala Banarasidas publication, 1979, 5th Chapter, verse 38-42, 82pp.
2. Acharya Shri Madhava, Ayurveda Prakasha, Hindi commentaries, edited by Shri Gulrajsharma Mishra, reprint, Varanasi, Chaukhambha Bharati Academy publication, 1999, 2nd chapter, Verse 20, 261pp.
3. Sri Vagbhatacharya, Rasa Ratna Samucchaya, Edited by Pandit Sri Dharmanandana sharma, 2nd Edition, Varanasi, Motilal banarasidas publication, 1996, 5th chapter, verse 53, 101 pp.
4. Acharya Sri Madava, Ayurveda Prakasha, Edited by Gulraj Sharma Mishra, 2nd Edition, Varanasi, Chaukamba Bharat Academy, 1999, 3rd chapter, verse 48, 355pp.
5. Sri Vagbhatacharya, Rasa Ratna Samuchchya, Edited by Dharmanandana sharma, 2nd Edition, Varanasi, Motilal banarasi das, 1996, 5th Chapter, Verse 50, 82pp.
6. Sri Sadananda Sharma, Rasa Tarangini, edited by Kashinatha Shastri, 11th Edition, New Delhi, Motilala Banarasidas publication, 1979, 8th Chapter, verse 3-5, 175pp.

Cite this article as:
Himabindu, Ravi chavan, M.S.Doddamani. A Research on Pharmacuetical Preparation of Tamra Garbha Pottali. International Journal of Ayurveda and Pharma Research. 2021;9(3):28-34.

Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Himabindu
Assistant Professor,
Dept of RSBK, Nagur Ayurveda Medical College, Bijapur.
Email: bindu013456@gmail.com

FIGURES