International Journal of Pharmaceutical and Bio-Medical Science

ISSN(print): 2767-827X, ISSN(online): 2767-830X

Volume 01 Issue 08 November 2021

Page No: 123-128

DOI: https://doi.org/10.47191/ijpbms/v1-i8-01 , Impact Factor: 5.374

A Seer Evaluation on Pravala Garbha Pottali with its Characterization

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ABSTRACT

Pottali kalpanas are the distinctive preparations among *Rasayogas*, used to treat various disease conditions. It stands in the highest place among the *Murchita Parada yogas* because of its bonding nature as well as its efficacy. These preparations are famous for its unique method of preparation, quick administration and easy mode of transport. Usage of *Pottali kalpas* dates back 12th century A.D and about 87 different *Pottali* preparations are available in *Rasagranthas*. *Putapaka, Gandhaka dravapaka, Kaparda/Shankha purana* and *Bhavana* are the different methods of *Pottali kalpana* preparations. *Gandhakadrava paka* is the special method came into existence in 13th century for *Soushthava sampadna* (to allure patients by its colour). *Garbha Pottalis* come under *Gandhaka Drava paka* method where *dhatu paka* is done in *garbha* (midst) of *Gandhaka Drava*. *Pravala garbha Pottali* is one such rare formulation from *Pottali rahasya* of *Rasayogasagara*, which contains *Sudhavarga dravyas* along with *Parada*. Here, this study was taken to know the importance of *Gandhakadrava paka* and *Paka parinama* with respect to *Pravalagarbha Pottali* and studied pharmaceutically and analytically (XRD).

KEY WORDS: *Pravalagarbha Pottali*, *Pottali rahasyam*, XRD analysis.

ARTICLE DETAILS

Published On:
02 November2021

Available on:
https://ijpbms.com/

INTRODUCTION

Ayurveda is known for its unique method of *Chikitsa* (treatment), *Oushadha* (medicines) and different *Kalpanas* (dosage forms). *Rasashastra* and *Bhaishajyakalpana* is a special branch of *Ayurveda* which brings peculiarity in its dosage forms. *Parada* being considered as *Shreshtha dravya*, is made into different *Kalpanas* by a procedure called *Murchana*[1].

Pottali Kalpana being one among *Murchita Parada yoga*, is defined as *"Vistaaritasya vastunaha alpo bhavanam pottam Pottalaa iti grhnati iti Pottalii*[2]*"*. *Pottali kalpana* is one which gives compactness to the scattered drug material. It is widely known for its specific methods of preparation, unique end product, optimum potency, smaller dosage and larger therapeutic applicability. *Pottali kalpa* dates back 12th century A.D and about 87 different *Pottali* preparations are available in *Rasagranthas*. *Putapaka, Gandhaka dravapaka, Kaparda/Shankha purana and Bhavana* are the different methods of *Pottali kalpana* preparations. *Gandhaka dravapaka* is a method of preparation which rectifies *Guna rahitya* of *Oushadha* in *alpa samaya* and *Oushadha kshaya* during preparations. In *Rasayogasagara*, the author has explained in detail about *Garbha Pottali* in a separate chapter called *Pottali Rahasya*. There are around 18 different *Garbha Pottali* is mentioned in this chapter which are indicated in various acute and chronic conditions[3]. Basically they are prepared by triturating the mentioned ingredients with specific *bhavana dravya* and made into *Shikharakara or pugaphala sadrusha* (cone, round shape) and dried it. Later

the dried *Pottali* should be placed on *Kousheya vastra* (Silk cloth) and *Shuddha Gandhaka churna* should be sprinkled over the *Pottali* and wrapped with thread. Then it is placed in the vessel containing molten *Gandhaka*. This is placed in *Valuka yantra* and heat is supplied. The level of the *Gandhaka* should be maintained in vessel throughout the procedure. Procedure should be carried out till we get *Siddha Lakshanas* like *Vyomavarnata (*bluish colour) of molten *Gandhaka,* Metallic sound of *Pottali* when it is beaten on hard surface. The whole procedure should be done by supplying *madhyamagni* and care should be taken that *Pottali* is completely immersed in the *Gandhakadrava*.

Pravalagarbha Pottali(*PGP)* is one among them, which is the conglomeration of *Sudhavarga dravyas* (Calcium compounds). It contains *Godanti bhasma,* a main ingredient followed by *Pravala bhasma, Shankha bhasma, Muktha sphota bhasma* and *Pita kaparda bhasma*. *Shuddha Parada* and *Shuddha Gandhaka* are present in smaller quantity. This is mainly indicated in *Pandu, udara, Kasa, Shvasa, Gulma* and *Balarogas*.

MATERIALS AND METHODS

Materials: The reference of *PGP* was taken from text *Rasayogasagara* from the chapter *Pottali Rahasyam.* Raw materials were procured from drug preparation lab, Sri Sri College of Ayurvedic science and Research, Bangalore. *Pravala bhasma* was purchased from Dhootapapeshwar pharmacy. *Shodhana and Marana of mentioned Sudhavarga dravyas* were done according to *Rasatarangini*.

The most important Calcium compound is Calcium Carbonate. Calcium carbonate is a common substance found in rocks, shells of marine organism, snail, pearls etc. It is widely used medicinally as an inexpensive dietary calcium supplement or gastric antacid. There are three Polymorphs of anhydrous calcium carbonate - Vaterite, Aragonite and Calcite having increasing thermodynamic stability. Calcite form is better absorbed as compared to its other forms[4].

As *PGP*, contains *Sudhavarga dravya,* an attempt was done to prepare and the chemical form of the final product was analyzed through X-Ray Diffraction. This is an efficient analytical technique used to identify and characterize the unknown crystalline material. This is based on constructive interference of monochromatic X-ray and a crystalline sample. These X-rays are generated by a Cathode ray tube, filtered to produce monochromatic radiation which is directed towards sample. The interaction of incident rays with the sample produces constructive interference when the conditions satisfy Bragg's Law[6].

Table no.1 Showing ingredients and their quantity of *PGP*

Sl. No.	Ingredients	Taken Quantity(G)
1	*Pravala Bhasma*	10
3	*Mukta Sphota/Shukti*	10
4	*Pita Kaparda Bhasma*	10
5	*Shankha Bhasma*	10
6	*Godanti Bhasma*	20
7	*Parada Bhasma /Rasasindhura*	1.2
8	*Shuddha Gandhaka*	0.3
9	*Svarna Tantu*	-

METHODS

Method of preparation of *PGP* is divided into 3 stages.

1. *Purva Karma:*
    a. *Shodhana* of *Shankha, Muktha Sphota, Kaparda, Godanti*
    b. *Marana* of *Shankha, Muktha Sphota, Kaparda, Godanti*

Shodhana: Swedana method of *Shodhana* was adapted for above mentioned drugs. Required quantities of drugs were taken in *Khalva yantra* and were pounded into small pieces. Later *Pottali* was prepared and subjected to *Swedana* using *dola yantra* with *Jambeera swarasa*. Temperature, duration and observation during the procedure were mentioned in Table no 2. After *Svanga sheeta* it was washed using warm water and taken for further *Marana* procedure.

Table no.2 Showing Observations during *Shodhana*

Weight of *Ashodhita Dravya* (G)	Qty of *Jambeera Swarasa* used (ltr)	Duration (hr)	Temp (min-max ^{0}C)	Weight after *Shodhana* (G)	Observations

Shankha - 98	6	12 (6AM-6PM)	*Agni* 28^0C-310^0C	*Drava dravya* 23^0C-90^0C	*Pottali* 28^0C-100^0C	83	Sour smell *Jambeera rasa* was evident throughout the procedure, Colour of *drava dravya* changed to brown, *Shankha* was brittle, Colour of *Shodhita Shankha* was greyish and was rough to touch and were easily breakable.
Mukta Sphota-50	2	3 (6 AM – 9AM	26^0 C - 250^0 C	22^0 C-80^0 C	28^0 C-90^0 C	55	Sour smell *Jambeera* rasa was evident throughout the procedure, Colour of *drava dravya* changed to light brown, Outer layer of *Shukti* was eroded and were easily breakable.
Kaparda – 50	2	3 (9 AM – 12PM	26^0 C - 250^0 C	22^0 C-80^0 C	28^0 C-90^0 C	45	Shiny layer over *Kaparda* was not present and was rough to touch
Godanti -50		1.5(12PM-1.30 PM)	25^0C-200^0C	23^0C-67^0C	25^0C-82^0C	48	After *Shodhana Godanti* was light in weight and brittle

Table no.3 Showing Observations during *Marana*

Sl. No	Name of the Shodhita drug	Quantity (g)	1stPuta (muffle furnace)	2nd Puta	3rd Puta
1	*Shankha*	83	Temp – 500^0C Colour – Greyish white Weight – 75g Form – coarse powder	Temp – 500^0C Colour – Greyish white Weight – 74g Form- Fine powder	*Bhavana* with *Kumari swarasa* was done & *chakrikas* were prepared and dried Temp – 500^0C Colour – White Weight – 69g Form – *Bhasma*
2	*Mukta Sphota*	55	Temp – 500^0C Colour – Greyish white Weight – 43g Form – coarse powder	Temp – 500^0C Colour –white Weight – 42g Form –Fine powder	*Bhavana* with *Kumari swarasa* was done & *chakrikas* were prepared and dried Temp – 500^0C Colour – White Weight – 41g Form – *Bhasma*
3	*Kaparda*	45	Temp – 500^0C Colour –White Weight – 38gm Form – coarse powder	Temp – 500^0C Colour –White Weight – 32gm Form –Fine powder	*Bhavana* with *Kumari swarasa* was done & *chakrikas* were prepared and dried Temp – 500^0C Colour –White Weight –30g Form – *Bhasma*

4	*Godanti* (Ref – Rasamruta)	48	*Bhavana* with *Nimba swarasa* and *chakrikas* were prepared and dried Temp – 500^0C Colour –White Weight – 36g	*Bhavana* with *Nimbu swarasa* and *chakrikas* were prepared and dried Temp – 500^0C Colour –White Weight – 38g	*Bhavana* with *Nimbu swarasa* and *chakrikas* were prepared and dried Temp – 500^0C Colour –White Weight – 34gm Form – *Bhasma*

PRADHANA KARMA

- Drugs mentioned in table no. 1 were taken in specified quantity. At first *Rasa sindura* was added followed by *S.Gandhaka churna* and all other *Bhasmas* were mixed homogenously.
- *Bhavana* was done using *Kumari Swarasa* for 1 *yama* and made into *Shikharakara Pottali*, dried in shade for 3 days
- *S.Gandhaka churna* was spread over four folded silk cloth. *Pottali* was placed and wrapped the cloth by using thread.
- Prepared *Pottali* was hanged in a rod and placed in *Musha* containing molten *gandhaka* and this was placed in *Valuka yantra*. The level of the *Gandhaka* was maintained in *musha* throughout the procedure.
- Procedure was carried out for 5 hours and obtained *Siddha lakshanas*.
- Observations were noted and are mentioned in table.

Table no.4 Showing Observations of *PGP*

Time	Given heat in ^{0}C	Temp. of *Gandhaka Drava*	Temp. of *Valuka*	Form & Colour of *Gandhaka Drava*	Observation
10.00AM	170^0C	26^0C	47^0C	Yellowish Powder	-
10.30 AM	270^0C	81^0C	157^0C	Yellowish	Fumes were observed
11.00 AM	399^0C	120^0C	212^0C	Yellowish orange in colour,	Molten *Gandhaka* with fumes
11.30 AM	220^0C	107^0C	136^0C	Orange yellowish	Molten *Gandhaka* with fumes
12.00PM	217^0C	100^0C	123^0C	Yellowish dark orange	Added *Gandhaka* again in powder form
12.30PM	368^0C	103^0C	105^0C	Dark orange	Liquification of *Gandhaka*
1.00 PM	353^0C	114^0C	140^0C	Brownish colour	Strong smell of *Gandhaka* was noticed
1.30 PM	353^0C	126^0C	152^0C	Light Brownish colour	*Gandhaka* was in molten state
2.00 PM	242^0C	128^0C	140^0C	-	-
2.30 PM	244^0C	115^0C	138^0C	Turned to more darker	Smell of *Gandhaka* became stronger
3.00 PM	199^0C	110^0C	133^0C	Dark brownish in colour	Strong smell with fumes, *Siddha lakshana* of *Pottali* were observed.

RESULT

Prepared PGP was analyzed by Powder X-Ray diffraction. XRD patterns revealed the presence of calcite forms of Calcium Carbonate and Mercury sulfide.

DISCUSSION AND CONCLUSION

Pottalirahasya is the chapter which is explained in *Rasayogasagara* in detail. Though there are different methods of *Pottali kalpanas*, this chapter mainly concentrates

on *Garbha Pottalis* which are prepared by *Gandhakadrava paaka* method. Main intention of this method is to attain *Soushthavata* (to allure patients by its colour), to rectify *guna rahitya of Aoushadha* in *alpa samaya*, and *Aoushadha kshaya* during preparations. *Pravalagarbha Pottali* is one such preparation where *Gandhaka dravapaka* method is adopted which includes *Sudhavarga dravyas*. *Godanti bhasma* being a main ingredient and other ingredients are *Pravala bhasma, Shankha bhasma, Muktha sphota bhasma and Pita kaparda bhasma. S.Parada* and *S.Gandhaka* are also present in smaller quantity. *Rasasindura* was taken instead of *Parada Bhasma* as it is mentioned as *Pratinidhi dravya* by *Yogaratnakara*. *Swarna tantu* was omitted because of the economical reason. Temperature of *Gandhakadrava* was maintained throughout the procedure (<200^0 C) to avoid charring of *Gandhaka* which might impact the *paaka* of *pottali* also may cause toxicity. The XRD analysis of PGB showed the compound is in calcite form. This Calcite is a carbonate mineral and most stable polymorph of Calcium carbonate and has better absorption than other forms when ingested orally.

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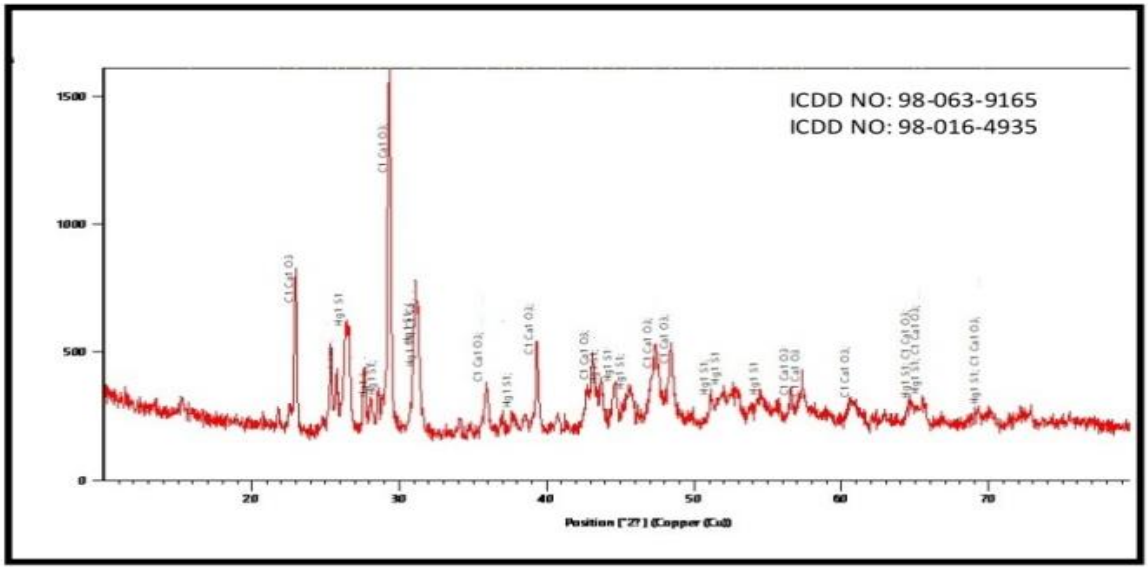
IMAGES



From right side

1. Raw materials of PGP
2. Ingredients of PGP
3. Dried Pottali after Bhavana
4. Pottali in silk cloth
5. Paaka in Valukayantra
6. Final product
7. XRD analysis