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A Review on *Pottali Kalpana*

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ABSTRACT

Pottali Kalpana is a consolidated form of mercurial preparation which incorporates the *Pota Bandha Parada*. *Pottali* is a type of preparation which is emerged as a result of *Parada Murchana*. *Murchana* is a procedure in which mercury is ground thoroughly with other herbo-mineral drugs to make it therapeutically efficient. *Pottali* is a highly potent, concise form of medicament which depicts maximum potency in low dosage form. The peculiarity of *Pottali* lies in its typical shape, form and preparatory methods. The present article gives a review on different preparatory procedures, types mentioned in various classical text books, dosage, mode of administration and significance of *Pottali Kalpana*.

Key words: *Pottali Kalpana*, *Pota Bandha*, *Murchana*.

INTRODUCTION

Ayurveda has used metals and minerals in therapeutics since time immemorial and *Rasasastra* is the specialised branch which deals with the preparation of such medicines. Mercury being the drug of prime importance in this science it is named as *Rasasastra*. *Parada* (Mercury) is subjected to various *Shodhana* procedures before adding in to various formulations. The act of imbuing definite therapeutic properties in purified mercury in any of the compound formulations (with or without Sulphur) through various pharmaceutical procedures is known as *Murchana*.^[1] In this process mercury is ground well with specified drugs in a *Khalwa* till it disappears. This *Murchana* is different from the *Murchana Samskara*

explained in *Ashta Samskaras* of mercury.

Murchana

In *Murchana*, mercury is subjected to thorough grinding to make the compound visibly devoid of free mercury globules and to alleviate the disease mentioned. *Murchana* is generally divided into two types - *Sagandha Murchana* and *Nirgandha Murchana*.^[2]

Sagandha Murchana - is the grinding of mercury thoroughly with Sulphur and other compounds for sulphuric mercurial preparations. *Nirgandha Murchana* is the grinding of mercury with drugs other than sulphur for non-sulphuric mercurial preparations. Depending on the method of preparations these *Murchana* procedures can be further classified as *Sagni* (subjected to heating) and *Niragni* (without heating). The *Sagni Murchana* can be further classified as '*Antardhuma*', '*Bahirdhuma*' and '*Nirdhuma*' depending on the method adopted.^[3] In *Antardhuma Murchana*, the suitable medicinal drugs are taken in a *Mrtkapata Kachakupi* (mud smeared glass bottle) and the mouth of the bottle is closed prior to heating in *Valuka Yantra* while in *Bahirdhuma Murchana* the mouth of the *Kacha Kupi* is kept open.

In *Murchana* mercury emerges in the form of *Khalwiya* (mercury is ground with other drugs in a

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mortar), *Parpati* (thin flakes of mercuric sulphide), *Pottali* (consolidated form of mercury compounds), and *Kupipakwa Rasayana* (mercurial compounds prepared by heating in glass bottles).

Among these, *Pottali Kalpana* is not so common in clinical practice. The significance of *Pottali* lies in its specific preparatory method and wider range of therapeutic utility. A review on various aspects of *Pottali Kalpana* are discussed here.

Pottali Kalpa

The word *Pota*, *Potta*, *Pottam*,^[4] means binding together, gathering, concising, consolidating. Such a consolidated form of medicament is called *Pottali*.

The *Pottali Kalpana* is widely known for its specific method of preparation, unique end product, optimum potency, smaller dosage and larger therapeutic applicability. In this *Kalpa*, *Pota Bandha*^[5] of *Parada* is incorporated in which *Kajjali* (HgS) is melted and poured on wide green leaves and pressed to form thin flakes. The end product of *Pottali Kalpa* is a hardened bolus.

History

Apart from the other *Murchita Kalpas* of *Parada*, *Pottali Kalpana* was developed to further minimise the form of prepared medicine, which facilitates easy carrying and fast acting. The *Pottali Kalpa* was first described by Nithyananda Siddha of 12th century A.D. In 13th century references of *Pottali Kalpa* were available in *Sarngadhara Samhita*. From 14th century onwards maximum number of *Pottali Kalpanas* were available in the classical text books.

Chronological description of *Pottali Kalpanas* in various classical text books are as follows,^[6]

SN	Name of the book	Name of author	Pottali preparations
1	<i>Rasa Ratnakara</i> - 12 th Century	Acharya Nithyananda	Ratna Garbha Pottali Sankha Garbha Pottali

2	<i>Rasendra Sara Samgraha</i> - 13 th C.	Acharya Gopala Krishna Bhatt	Ratna Garbha Pottali Lokeshwara Pottali Hemagarbha Pottali Grahani Kaparda Pottali Hamsa Pottali
3	<i>Rasa Prakasha Sudhakara</i> - 13 th C.	Acharya Yashodara	Mriganka Pottali Hemagarbha Pottali (Prathama and Dwitiya) Vajra Pottali Rajamriganka Pottali Lokanatha Pottali
4	<i>Rasa Ratna Samuchaya</i> - 14 th C.	Acharya Vagbhata	Mriganka Pottali Pottali Rasa Vaisvanara Pottali ^[7] Hemagarbha Pottali ^[8] Gandhaka Marda Pottali - 1 & 2 ^[9]
5	<i>Rasendra Chintamani</i> - 14 th C.	Acharya Dhundhukan ath	Ratna Garbha Pottali Hamsa Pottali Lokeshwara Pottali
6	<i>Rasa Chintamani</i> - 14 th C.	Acharya Anandadeva Suri	Lokesa Pottali Laghu Pottali Kancana Pottali Sankha Pottali Hiranya Garbha Pottali Panchamrita

			<i>Pottali</i>
7	<i>Rasavatara - 14th C.</i>	<i>Acharya Manikya Chandra Jain</i>	<i>Mriganka Pottali</i> <i>Ratna Garbha Pottali</i> <i>Lokanatha Pottali</i>
8	<i>Sarngadhara Samhita - 14th C.</i>	<i>Acharya Sarngadhara</i>	<i>Mriganka Pottali</i> <i>Hemagarpha Pottali -1 & 2</i>
9	<i>Bhavaprakasha m - 16th C.</i>	<i>Acharya Bhavamisra</i>	<i>Sankhagarbha Pottali</i>
10	<i>Rasa Kamadhenu - 17th C.</i>	<i>Acharya Chudamani</i>	<i>Ratna Garbha Pottali</i> <i>Mriganka Pottali</i> <i>Hiranya Garbha Pottali</i> <i>Hemagarpha Pottali - 1 & 2</i> <i>Lokeshwara Pottali</i> <i>Lokanatha Pottali</i> <i>Sankhagarbha Pottali</i>
11	<i>Yogaratanakara m - 17th C.</i>	----	<i>Ratna Garbha Pottali</i> <i>Lokeshwara Pottali</i> <i>Hemagarbha Pottali 1,2,3,4.</i>
12	<i>Brihat Yogatarangini - 18th C.</i>	<i>Acharya Trimallabhata</i>	<i>Ratna Garbha Pottali</i> <i>Lokeswara Pottali</i>
13	<i>Bhaishajya Ratnavali-18th C.</i>	<i>Acharya Govinda Das</i>	<i>Ratna Garbha Pottali</i> <i>Lokeshwara Pottali</i> <i>Hemagarpha</i>

			<i>Pottali</i> <i>Hamsagarpha</i> <i>Pottali Hiranya</i> <i>Garpha Pottali</i>
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Methods of *Pottali* preparation

Various methods are adopted for preparing different types of *Pottalis*.

The important methods are;

1. By boiling amidst liquid Sulphur.
2. *Kaparda Poorana / Sukti Poorana* method - filling the drugs inside cowry / oyster.
3. Processed by incineration - *Putapaka* method
4. *Valuka Yantra* method - *Paka* inside *Kacha Kupi* (glass bottle)
5. *Bhavana* - trituration alone.

1. Boiling amidst liquid Sulphur

This method was first introduced by *Yasodhara* in 13th Century in the context of *Vajra Parpati*. *Yogaratanakara* of 18th century and *Krishna Ramabhatt*, the author of *Sidhabheshja Manimala* adopted the same method for preparing *Hemagarbha Pottali*.

The method adopted by Prof. Vasudeva Mulasankar Dwivedi and Prof. Hari Sankara Sharma for the preparation of *Rasagarbha Pottali*, is widely accepted.^[10]

Two parts of Mercury and one part of Sulphur are ground continuously for 3-4 days until *Kajjali Siddha Lakshnas* are attained. The *Kajjali* (black sulphide of mercury) is further triturated with the juice of *Kumari* (Aloe vera). The triturated mass is made in to the shape of betel nut or stout cone like shape or conical mass and dried. This is firmly wrapped with a silk cloth and tied with a thread. The other end is fastened to a stick and this bolus is inserted in to sulphur powder taken in an enamel vessel or bowl. The poultice should be hanging in melted Sulphur without touching the bottom of the bowl. An earthen plate is taken and sand is spread in it in 2cm thickness, upon

which the bowl containing Sulphur powder is kept. The whole apparatus is kept on a stove or hearth and subjected to mild heating. The boiling is continued until the melted Sulphur is turned into sky blue colour. The temperature is maintained just above the melting point of Sulphur (119.20°C) and well below the boiling point (200°C) so that the *Paka* of *Pottali* is appropriate. The heating is usually continued for 1 hour, mean while more *Gandhaka Choorna* (Sulphur powder) may be added to the bowl as its quantity depletes. When the *Pottali* satisfies confirmatory tests, heating is stopped and on self-cooling the poultice is taken out and the external cloth is scrapped out carefully. It is then stored in airtight glass containers.

Confirmatory tests for *Pottali Paka*^[11]

- Colour of boiling Sulphur turns to *Vyomavarna* (sky blue colour)
- The *Pottali* produces metallic sound when gently tapped on empty metallic vessel.
- Initially there will be dull sound and as *Samyak Paka* is attained it turns resonant.

Fig. 1: *Pottali* preparation



2. *Kaparda Poorana / Sukti Poorana* method

At first *Kajjali* has to be prepared by triturating *Parada* (mercury) and *Gandhaka* (Sulphur) for 3-4 days until it attains *Kajjali Siddha Lakshanas*. It is then triturated in a *Khalwa Yantra* (stone mortar) with the mentioned *Bhavana Dravya* (prescribed liquid medium). Mean

while *Kapardika* (cowry) which satisfies *Uttama Lakshanas* (features as per classics) are collected and purified as per classical reference. The drug mass prepared by trituration is carefully filled inside *Shodhita Kapardikas* and the edges of which is sealed with the paste of *Tankana* (borax). It is then properly dried and placed in *Sharava Samputa* (earthen vessel sealed with mud) and subjected to the type of *Putra* (incineration) mentioned in the *Aushada Yoga* (medicinal formulation). After self-cooling the cowries inside the *Samputa* is taken and powdered along with the cowry to obtain the end product. It is then stored in air tight glass containers for further use. Eg: *Lokanatha Pottali*.

The same method may be adopted with *Suktis* (oyster shells) also.

Fig. 2: *Mukta Suktis* filled with drugs.



Fig. 3: Sealed *Suktis* with *Tankana*.



3. Putapaka method - by incineration

After preparing the *Kajjali*, the other drugs mentioned in the *Yoga* is subjected to *Bhavana* with mentioned *Bhavana Dravya* for specified period of time. The drug mass is then made into the shape of *Badara* (areca nut). After drying it is taken inside a *Sharava* which is smeared with *Sudha Choorna* (lime). It is then covered with another *Sarava* of similar size, and subjected to *Putapaka*. On self-cooling the drug is taken out and triturated well. The process is repeated until the end product satisfies *Bhasma Pareeksha*. Eg: *Hiranya Garbha Pottali Rasa*.

4. Valuka Yantra method

The *Kajjali* has to be triturated in a clean *Khalwa Yantra* with the *Bhavana Dravyas* and made into the shape of betel nut or stout cone as specified in the preparation. This bolus has to be dried properly so that it attains desired hardness. A silk cloth of 1 square foot has to be taken and 1 *Tola* (12g) of *Sudha Gandhaka Choorna* is spread in the middle of the cloth. The dried drug mass is placed on this and covered with another 2 *Tolas* of *Sudha Gandhaka Choorna*. It is then tied into a *Pottali* by carefully lifting the four corners of the silk cloth. The *Pottali* is placed in the middle of *Valuka Yantra* or *Lavana Yantra* and heating is done continuously for 3 *Prahara* (12 hours). On self-cooling, the *Pottali* is taken out and the remnants of silk cloth is scrapped out and stored properly in air tight glass containers.

5. Bhavana method

By trituration in specified liquid medium certain *Pottali* like the *Rethorodha Pottali* can be prepared.

Some important Pottali preparations as per classics

Table 2: Some important Pottali preparations

Name of the Pottali	Type of preparation	Main ingredients	Dose	Indication
<i>Hamsa Pottali Rasa</i> ^[12]	<i>Mardana</i> (Grinding)	<i>Sodhita Parada, Gandhaka, Kapardika Bhasma, Sunti, Maricha,</i>	1 <i>Masha</i> (750 mg) <i>Anupana - Maricha Choorna</i>	<i>Grahani</i>

		<i>Pippali, Bhavana - in lime juice</i>		
<i>Lokeshwara Pottali Rasa</i> ^[13]	<i>Kaparda Poorita - Gajaputa</i>	<i>Sodhita Parada, Gandhaka, Swarna Bhasma. Bhavana - Chitraka Swarasa</i>	4 <i>Gunja</i> (500mg) <i>Anupana - Pippali and Madhu</i>	<i>Anga Karshyam, Agnimandham, Pitta Kasa, Kshaya</i>
<i>Hemagarbha Pottali Rasa</i> ^[14]	<i>Kaparda Poorita - Gajaputa</i>	<i>Sodhita Parada, Gandhaka, Swarna Bhasma, Tamra Bhasma Bhavana - Chitraka Swarasa</i>	1 <i>Gunja</i> (125 mg)	<i>Rajayakshma</i>
<i>Hiranyagarbha Pottali Rasa</i> ^[15]	<i>Putapaka method</i>	<i>Sodhita Parada, Gandhaka, Swarna Bhasma, Mukta Phala Bhasma, Sankha Bhasma, Kapardika Bhasma, Bhavana - Nimbuka Rasa</i>	4 <i>Gunja</i> 500 mg. <i>Anupana - Ghrita, Madhu, Maricha Choorna</i>	<i>Mandagni, Grahani, Vishama Jwara, Arshas, Peenasa, Swasa</i>
<i>Ratna Garbha Pottali</i> ^[16]	<i>Kaparda Poorita</i>	<i>Sudha Parada, Gandhaka, Swarna, Rajata, Naga, Loha, Abhraka Bhasma, Mukta, Makshika, Vidruma, Rajavartha, Vaikranta, Gomedhaka, Pushparaga, Sankha Bhasmas Bhavana - Chitraka Swarasa, Nirgundi Rasa</i>	4 <i>Gunja</i> (500 mg) <i>Anupana - Pippali, honey, ghee, Maricha Churna</i>	<i>Kshaya Roga, Sarva Roga Hara</i>
<i>Mriganka Pottali Rasa</i> ^[17]	<i>Gaja Puta</i>	<i>Sudha Parada, Gandhaka, Sankhanabhi. Bhavana -</i>	1 <i>Gunja</i> (125mg)	<i>Rajayakshma</i>

		Goat's milk		
<i>Pottali Rasa</i> ^[18]	<i>Putra</i> (incineration)	<i>Sudha Parada, Gandhaka, Kapardika Bhasma, Loha, Tankana Bhasma Bhavana - Jaya Rasa</i>	2-3 <i>Ratti</i> (125-175 mg)	<i>Grahani</i>

Mode of administration of Pottali

Pottali should be rubbed or scratched for desired number of rotations with *Ghritha*, *Madhu* and made into a paste and taken orally.

In *Rasamruta* it is said that *Pottali* should be rubbed with *Ardraka Swarasa* (ginger juice) or *Nagavalli Swarasa* (betel leaf juice) in *Sannipata* conditions.

In other methods of preparation like *Kaparda Poorita*, the whole medicine is powdered and administered according to the dosage mentioned in the *Yoga*.

Different shapes mentioned for Hiranya Garbha Pottali

In *Rasayoga Sagara*, different shapes have mentioned for the preparation of *Hiranya Garbha Pottali Rasa* namely,

- *Puga Matra Guti / Pugi Bhalena Sadrishya* - shape of areca nut
- *Gutika* - shape of pill
- *Sikhararambhika Karya* - shape of stout cone
- *Varthika* - shape of wick

Standardization parameters for the quality assessment of Pottali Kalpana^[19]

1. Identification - Organoleptic characteristics like colour, shape, odour, consistency, taste
2. Hardness
3. Disintegration time
4. Melting point
5. Loss on drying at 105°C
6. Ash value / acid insoluble ash
7. Water soluble / alcohol soluble extractives

8. Test for heavy metals / toxic elements

9. Assay of elements - Mercury, Sulphur and other compounds

Analytical parameters

XRD

FTIR analysis

DISCUSSION

The procedure of preparing *Pottali* by boiling amidst liquid Sulphur is the most typical method of *Pottali* preparation. In this method continuous monitoring is required. The preparation by filling inside *Kapardika* requires more time, but can be done in different stages. The other methods are comparatively easier. From the chronological arrangement of classical literature it is seen that the *Pottali* preparations became popular after the 13th century. These formulations are not mentioned in *Brihathrayis* (*Charaka Samhita*, *Susrutha Samhita* and *Ashtanga Samgraha*).

CONCLUSION

Pottali can be prepared by using different methods. Each *Yoga* has its own dosage, method of preparation and therapeutic utility. The *Pottali Yogas* are mainly mentioned in *Rajyakshma* and *Grahani Prakaranas*. The formulation facilitates easy carrying and low dosage form. Even though many classical preparations are available, only a few are practiced clinically. More researches are required to be done for analytical and clinical evaluation of *Pottali Kalpanas*.

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