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Tamragarbha Pottali - A Compact Drug Formulation in Ayurveda Rasasastra

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Abstract: ***Pottali Kalpana is one among the pharmaceutical preparations of Rasaushadhis. Among them Gandhaka Dravitha Pottali which is prepared by boiling the molded medicinal drug in Gandhaka for a considerable period of time requires the most attentive preparation strategy .Tamragarbha Pottali is a Gandhaka Dravitha Pottali. The present work details about the method of preparation of Tamragarbha Pottali which is an altered form of actual reference from the book RasayogaSagara. A guideline for the preparation of Tamragrabha Pottali has been anticipated with the observations recorded during the course of Paaka. The most crucial part in the process is to preserve the molten consistency of Gandhaka .This was made possible by sustaining the temperature. The temperature was gradually elevated not exceeding more than 200 degree Celsius for more than half of the procedure duration. On subsequently passing the second half of time period, the temperature was gradually increased beyond 200 degree Celsius. Physico-Chemical analytical assessments are required to evaluate the compositions of final product. The final must be a complex of Copper- Mercury- Sulphur. The method of administration of Tamragarbha Pottali is by rubbing in an even stone and prepared into a paste preferably with honey or plain ghee or medicated ghee. This dosage form is supposed to be very potent in therapeutic efficacy owing to the rapid absorption and distribution of its ingredients. The drug molecules of optimum concentration are reduced into a subtle form by the application of slow progressive heat.***

Keywords: Pottali Kalpana, Gandhaka DravithaPottali, Tamragrabha Pottali, Rasayoga Sagara

1. Introduction

Rasasastra [*Rasa+Sastra* (Science)] is the science of practicing Herbo- mineral compounds in treating a disease. The term '*Rasa'* implies processed mercury, processed metals processed minerals and certain herbal drugs. The prudent use of these compounds in different disease conditions have proved their efficacy in treating many challenging diseases. For introducing in a living body,these drugs should be made into suitable formulations.As a result theycould easily pass through the pharmacokinetic stages of drug, namely absorption, distribution, metabolism and excretion. *Pottali Kalpana* is one such formulation method, where the compound drugs are converted into a compact form. While going through classical *Rasasastra* works, there are multiple *Pottali Kalpanas*, based on different preparation methods and formulation states. It can be either be prepared by boiling in molten *Gandhaka* (Sulphur) until it reaches a compact form (which can be designated as *Gandhaka Dravita Pottali* (eg; *Tamragrabha Pottali*) [1] or it can be prepared by filling the drugs inside a *Varatika*(Oyster shell) or *Shankha* (Conch shell) and subjected to incineration *(eg: Lokanatha Rasa)* [2] *Pottali* can be prepared by mere grinding. The drug in a suitable medium till the compound attains a fine powder state (*eg: HamsaPottali*) [3] *Pottali Kalpana* keeps a big hand over other formulations through its Nano toMicro sized ingredients and thereby increased potency.

2. Materials and Methods

Among the varied methods of *Pottali*preparation described, *Gandhaka Dravita Pottali Kalpanas* requires most attention.This might be because of the various factors like long duration of grinding, molding of *Pottali*, *Paaka* of *Pottali* in highly inflammable nature of *Gandhaka*, maintenance of an air free environment during preparation, administration of slow and controlled heat for *Paaka*. The present work is thus a guideline for the preparation of *Tamragarbha Pottali* and observations recorded during the course of *Paaka*.

Ingredients

The reference of *Tamragarbha Pottali* from RasayogaSagara (A compilation work dealing with various Mineral Herbomineral and Metallic formulations) was taken into consideration. A slight alteration was made where the addition of *Swarna*in the form of a *Tanthu* (thread) was mislaid. The method of preparing *Gandhaka Dravitha Pottali* has been elaborated in the book *Rasamrita* by YadavjiTrikamji Acharya, where he gives an example of *Hemagarbha Pottali* preparation [4]. Similar creation principle may been seen in the preparation of *Rasagarbha Pottali* described by *Himsagara Chandramurthyji* [5]. In the aim of preparing a Pottali the following ingredients of prescribed quantity were the used.

Table 1: *Ingredients of Tamragarbhapottali*

S.No	Ingredients	Quantity
1.	*Tamra Bhasma* (incinerated Copper metal for medicinal use)	23.0gm
2.	*Samaguna Parada Gandhaka Kajjali* (a compound prepared by grinding equalquantity of purified Mercury and purified Sulphur)	2.3gm
3.	*Sudha Gandhaka Sookshma Choorna* (Purified powder of Sulphur)	0.6gm
4.	*KumariSwarasa(Aloe barbadensis miller)*	Q.s

Asudha (Impure) *Gandhaka* was used as the medium for preparing *Pottali*. The above mentioned quantity of *Tamra Bhasma, Kajjali* and *Sudha Gandhaka Choorna* was grinded in*KhalwaYantra*(Grinding stone) using *Kumari Swarasa* for a period of 50 hours. After the process of grinding the entire

mass became smooth, soft and with a similar consistency of wet clay. The mass was then molded into a shape with dome profile on the apex and flat figure on the base. This is the shape of *Pottali*. The molded mass was then dried in shade. The dried *Pottali*was covered in a single layer off-white colored silk cloth. The covered Pottali was tied in the center of a glass rod. A small mud pot of about 15 cm length and 8 cm diameter was taken for preparing *Pottali*. To this pot crystals of *Gandhaka* was added till 2/3 of capacity. This is mounted on a *Valuka Yantra* (Sand apparatus), fixed firmly in sandwith care [6]. The entire group is kept over a gas stove and mild fire was given. A pyrometer probe was placed adjacent to the outer surface on middle of the pot .A gradual increase in temperature was given. Once the*Gandhaka* started melting, more quantity was added on gradually till the melted *Gandhaka* completely occupies the *Pottali*. The following were the observations noted during the process with respect to gradual change in temperature.

Table 2: Time to Time events in the procedure with respect to temperature

Time	Time in duration	Temperature in degree celsius	Observation
9.35 am	At the time of commencement	38	
10.10 am	After 30 minutes	80	
10.35 am	After 1 hour	114	*Gandhaka* started melting
11.05	After 1 hour 30 minutes	172	Bubbles started liberating from the *Pottali*
11.35	After 2 hours	193	Pottali was completely immersed in melted *Gandhaka*
12: 05	After 2 hour 30 minutes	200	
12.10	After 2 hour 35 minutes	200	Consistency of melted *Gandhaka* became more thick
12.35	After 3 hour	197	
1.05	After 3 hour 30 minutes	198	
1.35	After 4 hours	184	
2.05	After 4 hour 30 minutes	209	
2.35	After 5 hours	222	
3.05	After 5 hour 30 minutes	230	
3.35	After 6 hours	245	
4.05	After 6 hour 30 minutes	276	
4.25	After 6 hour 50 minutes	286	Observed the darkening of melted*Gandhaka*
4.35	After 7 hours	290	Blackish brown coloured melted *Gandhaka*
4.43	After 7 hours 8 minutes	291	*Pottali* was taken out from the pot.

Stages involved in preparation of *Tamragarbha Pottali*

Figure 1: *TamraBhasma,Kajjali*, *Gandhaka*were grinded in *KumariSwarasa* and molded into *Pottali* weighing 21.47gm

Figure 2: To the initially filled *Gandhaka*, the *Pottali* tied in a glass rod was mounted, fixed in *ValukaYantra* and heated in a gas stove.

Figure 3: *Gandhaka* started melting. More quantity of *Gandhaka* was added gradually.

Figure 4: *Pottali* was withdrawn out of molten*Gandhaka* after attaining optimum *Paka*

Figure 5: End product – *Tamragarbha Pottali* weighing-19.15gm

Figure 6: Honey like consistency of molten *Gandhaka*

Figure 7: Method of administering *Pottali* - by rubbing in an even stone.

3. Discussion

The method of preparing *Gandhaka Dravitha Pottali* is attentive. Theprime reason for this attention is the highly inflammable character of *Gandhaka*. In the midst of variation, the melting point of Sulphur can be taken between 110-115.2 degree Celsius [7] [8] and boiling point is about 444 degree Celsius [9]. The most essential part in the procedure is to maintain the molten consistency of Sulphur which in turn is made possible by sustaining the temperature. Gradual addition of *Gandhaka* was meant to prevent its spilling during melting. The temperature was gradually raised not exceeding more than 200 degree Celsiusfor more than half of the procedure duration. Here the principle of preparation is in fact Swedana(Sudation), where gandhaka acts as the *Dravadravya* (liquid medium). The molded metallo- mineral ingredients should undergo a gradual processing inside the molten Sulphur. The escape of Sulphur is minimum but instead it invades the entire ingredients. The chemical reaction may also involve oxidation. Physico-Chemical analytical assessments are required to evaluate thecompositions of final product. Even then it must be a complex of Copper- Mercury- Sulphur. The temperature was gradually increased beyond 200 degree Celsius subsequently passing the second half of time period. This is meant to have an advanced processing of the ingredients whereby it stick toa more compact form. The particle size of the end product must be subtle by reason of excess grinding and heat process. There was a lessening of 2.32 gm in the final product .The method of administration of *Pottali* is by rubbing in an even stone which is then made into a paste preferably with honey or plain ghee or medicated ghee. The dose of *Pottali*in general is fixed based on the factors like age of the patient, strength of the patient, strength of the disease. The dose isthen organized through the number of rotations in the stone. The dose of *Tamragarbha Pottali* according to classical reference is Half *Ratti* to One *Ratti*[10] (In metric equivalence is 62.5 mg to 125 mg). The General indication of *Tamragarbha Pottali*is *Kapha* predominant *Tridoshaja* diseases [11], Diseases of Respiratory system, Senile debility due to weakness of tissue systems, diseases related to altered metabolism, diseases related to GIT [12]. Thus it may act on *PranavahaSrotas*, *RasavahaSrotas*, *AnnavahaSrotas.Anupana*(Adjuvant) for *Tamragarbha Pottali* is either ginger juice, honey or any other medium suitable for the disease condition [13]. Thus a medication of subtle dimensions may be administered into the body which can certainly exhibit a resultant therapeutic action.

4. Conclusion

Pottali Kalpanas are ideal formulations which are molded in a compact way for easy administration and fast drug delivery. *TamragarbhaPottali*, which is a *Gandhaka Dravitha*type of *Pottali* was prepared containing *Tamra Bhasma*, *Kajjali* and *Gandhaka*. The procedure was carried out cautiously in a secure space.Attention was given in accelerating the temperature to avoid the burning of molten Sulphur. The ingredients became firm and condensed by experiencing a heat process in the molten *Gandhaka*. The product obtained is supposed to be a complex of *Copper- Mercury- Sulphur*. The maximum temperature raised was 291 degree Celsius. This dosage form is supposed to be very potent in therapeutic efficacy due to the rapid absorption and distribution of its ingredients. The drug molecules of optimum concentration are reduced into a subtle form by the application of slow progressive heat. Thus in spite of the patience and attention given during the preparatory process, *Tamragarbha Pottali* is effective in managing the diseased related to *Kapha Pradhana Doshas*, where *Karmas* like *Lekhana, Srotosodhana,and Rasayana* are exhibited.

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