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Quality standards of *Palasha Kshara Gritha* with reference to different vessels

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ABSTRACT

This article attempts to clear the dogma that exists in the preparation of *Kshara Ghrita* with reference to its critical final stage of *Siddhi Laxanas. Palasha Kshara Ghrita* (PKG) prepared from the *Kshara* of *Palasha* (*Grewia asiatica*) mentioned in Rasa Tarangini, which is indicated in the treatment of *Granthi* (tumor) is taken for the study. The present article is an extract of all the observations made during the pharmaceutical study of PKG. All these observations will be of great help when we go for large scale production. The study has tried to establish the ratios of *Dravadravyas* with *Kshara*, besides addressing the type of vessels appropriate in such preparations. After preparation of sample in different vessels, these were subjected to analytical study using relevant analytical parameters to find out any difference. During pharmaceutical process Copper vessel was found appropriate on the lines of pharmaceutical preparations. The analytical report of samples reveals no much difference in the parameter findings except pH of PKG 7.00, 9.91 and 9.46 in the vessels such as copper, iron and mud pot respectively. The particle size of *Kshara* was in between 429.7 to 667 nm under 15.00KV magnification 7.5 KX and EDAX report of *Phalasha Kshara* under 400 µm potassium Wt% 40.05 and Oxygen is Wt% 39.12. Under 50 µm potassium Wt% 48.91 and Oxygen Wt% 33.40. Under 70 µm potassium Wt% 27.90 and Oxygen Wt% 37.78. As per this study copper vessel is found better for PKG than Iron and Mud pot for assessment of end process and also on analytical parameter.

Key words: *Sneha Kalpana, Kshara, Ghrita, Siddhi Laxana, Palasha Kshara Ghrita (PKG), Ratios, Vessel.*

INTRODUCTION

From ancient period, people use *Kshara* (alkalis) for their day today activities like cooking and washing clothes. In India umpteen references are available for the medical use of *Kshara* as early as *Garauda Purana* (the first millennium BCE). The use of *Kshara Taila* is indicated in the treatment of *Badhirya* (deafness) in *Garuda Purana*. But it is in Samhita period, clear description about *Kshara*, method of preparation and its therapeutic properties for both external and internal use is seen; even methods of establishing the right strength of *Kshara* is specified.

In *Samhitas* and many of *Rasa Garnthas* mentioning for various *Ksharas* can easily be found, and in addition unique formulations using *Kshara* as an ingredient for therapeutic use is also mentioned. Admits of one such description, the *Kshara Taila's* indications are given but lacks the method of preparation. Perhaps there might be some specialization branch that dealt such preparation. *Kshara* application was entrusted to specialized person and it called as *ksharatantra*[1] as mentioned in *Gulma-Chikitsaadhikara* of *Charaka Samhita*.

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Preparation of *Palasha Kshara Ghrita* (PKG) is explained in Rasatarangini, under *Kshara-Kalpana* for *Granthi-Rogas.* To prepare PKG is a challenge in itself. Usually a pharmaceutical procedure on the lines of routine *Sneha Kalpana Vidhi* ends in wasted preparation. The ingredients used are special by itself as alkalis are used in the processes. Moreover, the proportions (ratios) of the components (*Drava-Dravya*) used are not specified. The other constrains that this formulation offers is the selection of *Bhajana* (vessel). *Bhajana* plays an important role for preserving raw drug, during pharmaceutical process and also to preserve the end product. To study all such influencing variables in a scientific method as a representation for *Kshara Ghrita Kalpana* under *Sneha Kalpanas* was initiated and the finding are presented in this article. This effort of establishing SOP's to be followed may generally get applied to all such preparations in which *Ksharas* are used in *Ghrita Kalpanas*.

Aims and Objectives

1. To identify the variables that influences the process of *Ghrita Kalpana* with *Phalasha Kshara.*
2. To decide the ideal ratio of *Drava-Dravya* and the suitable vessel for the preparation of PKG.

Materials and Methods

Materials

The drug *Palasha* is collected by considering all the criteria's explained in the classical reference like *Agneyarutu*, *Jangaladesha* (summer season and dry land). Cows' Ghee is prepared by collecting cows' milk from villagers. Soft water is used for the pharmaceutical process.

Standardization of raw materials and apparatus used

Before taking raw materials (*Palasha* and *Ghrita*) for pharmaceutical process, they were analyzed as per SOP and compared with API standards. The samples taken for the preparation passed all the parameters mentioned in API. The materials used were wide mouthed mud pot / copper/ iron vessel, measuring cylinder, weighing balance, stainless steel spoon and glass container.

Establishing the ratio

Even though the references of *Kshara Taila* is available in the Gadanigraha, Vangasena and Yoga Ratnakara, the ratio of *Kshara*, *Sneha* and *Ksharajala* is not clear. As per the classical references for *Sneha Kalpana* the ratio between *Kalka, Sneha* and *Drava-Dravya* is 1:4:16.[2] By following the same for *Kshara-gritha* preparations like *Ksharakalka, Sneha* and *Kshara Jala* in the ratio of 1:14:16 will lead to precipitate the combination and the fail to appreciate *Siddhilaxanas*. After many pilot studies the ratio of *Kalka*, *Sneha* and *Drava-Dravya* is 1:4:16 for *Kshara*, *Sneha* and *Jala*. During pilot study the quantity of *Gritha* used in the process is 50ml. This ratio may differ in large scale preparation.

Vessel

As per of rule of *Anuktha Paatra Grahana*, mud pot should be used in all *Kalpanas* by default.[3] But *Abhinnava Chinitamani* has used copper vessel, iron vessel and mud pot for the purpose of *Sneha Kalpana* and he grades these vessels as best, better and good respectively.[4] Considering such reference, the study was taken up in copper vessel, Iron vessel and mud pot to elicit the best vessel for *Sneha Kalpana* having *Kshara* as one of the ingredient.

Pharmaceutical process

As there is no direct reference about the pharmaceutical preparation of PKG, the general method of preparation of *Kshara Taila* was followed as per Cakrapanidatta.[5] Here *Kshara, Gritha* and water are used for the preparation of PKG. The *Kshara* of *Palasha* was prepared as per *Kshara Vidhi Nirmana* according to Susrutha Samhita.[6] The obtained *Palasha Kshara* was taken for the preparation of PKG. All the three ingredients were taken together for the process. Instead of the general *Sneha Siddi Lakshanas,* the *Kshara Taila Siddi Lakshanas* as found in *Vidika Paribhasha Pradeepa*[7] was taken as a reference for preparation.

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PKG is prepared in 3 different samples by changing the vessel for the process.

- PKG prepared in copper vessel.
- PKG prepared in Iron vessel.
- PKG prepared in mud pot

Procedure: The copper and iron vessel was subjected to tap water cleaning. Whereas the new-mud pot was filled with dry leaves and burnt. It was washed with tap water and put to use. Even the place of preparation was cleaned. The clean and dry glass container was kept ready to collect the end product.

The procedure in all the three preparations remained same i.e., *Kshara* as *Kalka* form, *Gritha* and *Jala* as *Drava* was used in 1:4:16 ratio. *Mrudu-Agni* (mild fire) was maintained by keeping it on low flame of a domestic gas stove. The vessel is kept on the fire to remove moister content. Ghee is heated and left to self-cool, *Kshara* and *Jala* is added to the ghee and mixed well. The vessel is kept on the mild fire till the *Siddhi Lakshana*.

Unlike the standards of *Ghrita Siddhi Laxanas*, the *Kshara Gritha Kalpanas* need to be observed as per the reference of *Vaidika Paribhasha Pradeepa*. Wherein, he states *Nasta-Dugda-Sama-Akruthi* (like spoiled milk appearance) and at the end point *Phenodayanishpathi* (the froth that generated shall settles down) were taken as *Siddhi Lakshana*.

Observation during pharmaceutical preparation

a) During pharmaceutical process, all the three vessels shows the *Phena-Utpathi* (raising of froath) in the beginning and at the time of its end point, *Phena-Nishpathi* along with *Nasta-Dugda-Sama-Akruthi* was observed. *Ghrita* separation was seen properly in both iron and copper vessels, but in mud pot it was hard to identify the separation. It implies the superiority of both iron and copper vessels in the *Kshara Ghrita Kalpanas*.

b) At the end of *Phena-Nishpati* a typical crackling sound was also heard which may be taken as additional point to identify the end of the *PKG.*

In this preparation, after boiling for some time, the shade of *Ghrita* changes to mild greenish colour. The later appearance of froth with mild bubbles and at the endpoint, the bubble size and number will increase. Curdling of *Kshara* with mild crackling sound was observed. Greenish colour will increase with the separation *Ghrita*. Immediately the vessel must be removed from the *Agni* (fire) and *Ghrita* (ghee) is decanted to a glass container.

Standardization

Raw material authentication as per the protocol pharmacopoeia standards of raw material, authentication was done by organoleptic and other parameters like Macroscopy and Microscopic identification. Foreign matter, total ash, acid-insoluble ash, water soluble ash, alcohol-soluble extractive, water-soluble extractive, moisture content (loss on drying), high-performance thin layer chromatography (HPTLC) are the other parameters analyzed. The report of the collected drug matches the standard values. Analytical parameters of prepared oil and Ghee match the pharmacopoeia standards.

Microbial load

As a part of standardization the raw drug *Palasha* is given for microbial load estimation. But, it was more than the accepted value. The reason behind this is the procured drug was dried under the sunlight in open place. In this study, the drug is used in the form of ash to extract the alkaline material, thus microbial load is not having any major role here.

Standardization of end product

pH value of *Palasha Kshara is* 12.27 and *PKG* prepared in copper vessel shows neutral value, whereas the preparation which was done in iron and mud pot is alkali in nature.

Physico-chemical parameters of *Palasha Kshara Ghrita*

There is no much significant change in Refractive index, Acid value, Specific Gravity, viscosity and unsaponifiable matter in the samples (prepared in different vessel). The Saponification value of *PKG* won't show significant difference in three samples (copper, iron and Mud pot). The iodine value is more

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in case of mud pot prepared *PKG* indicating more in unsaturated form when compare to copper and iron vessel.

Particle size assessment

EHT - Accelerating Voltage, WD - Working distance (Distance between objective and lens and a sample), Mag - Magnification.

EDAX report EDAX: Elemental analysis of *Palasha Kshara* Weight % telling about the relative concentration of the element in the sample (because all the elements analyzed are normalized) Ash of the plant mainly contains Potassium and Potassium is one of the alkali metal. The EDAX report of *Palasha Kshara* shows more of potassium and oxygen. In this Sample under 400 µm potassium Wt% 40.05 and Oxygen is Wt% 39.12. Under 50 µm potassium Wt% 48.91 and Oxygen Wt% 33.40. Under 70 µm potassium Wt% 27.90 and OxygenWt% 37.78.

DISCUSSION

During preparation of the *Kshara*, Acharya Sushruta's reference was followed in which volumetric measurement was taken for ash and water in the ratio of 1:6 respectively. If weight and volume is taken for ash and water ratio, the quantity of water may not be sufficient for extraction of *Kshara*. *Kshara* was obtained by boiling the filtered *Kshara Jala* as routine procedure. As the pharmaceutical preparation of *Kshara Ghrita* is not clearly mentioned in text, *Apamarga Kshara Taila* was taken as a reference. Here *Kshara* is considered as *Kalka* and instead of the *Ksharajala* the soft water was used. In many of the references *Ksharajala* is indicated to use as *Dravadravya*, but if *Ksharajala* is taken along with *Ksharakalka* the quantity of *Kshara* will increase and leads to salt formation. After many pilot studies, the ratio has been fixed as 1:4:16 (*Kshara:Sneha:Jala*).

The *Abhinnava Chintamani* recommends using either of copper, iron or mud pot for *Sneha Kalpana*. Further he also says that copper vessel is best, iron the better and least is the mud pot. The same was found true in this study. The mud pot where in the separation of the *Sneha* is not clear when compared to other two vessel. Also the foam was more in mud pot when compare to other two vessels. Either the use of iron or copper vessel do yield a good amount of *Sneha* when compared to mud pot. In copper vessel the assessment of end product is easy to find including the crackling sound, which was clearly appreciated during preparation.

Analytical parameter of all the three samples were of not much difference except pH. The pH value of *PKG* prepared in copper vessel shows neutral value whereas the preparation which was done in iron and mud pot is alkali in nature. The Saponification value of *PKG* won't show significant difference in three samples (copper, iron and mud pot). The iodine value is more in case of mud pot prepared PKG indicating more in unsaturated form. As per EDAX report of *Palasha Kshara* shows more of potassium and oxygen in its elemental composition.

Table 1: Particle size assessment *Palasha Kshara*

Sample assessed in	EHT	WD	Magnification	Particle size
2µm	15.00KV	9.0mm	7.5 KX	429.7nm-667nm
1µm	15.00KV	9.0mm	17.00 KX	470.04nm-475.4nm
2µm	15.00KV	9.0mm	10.00 KX	741.2nm-739.4nm

Table 2: Results of standardization parameters of *Ghritha*

Parameter	*Results n = 3 %w/w*
	Goghritha
Refractive index	1.45817±0.0
Specific gravity	0.9397±0.0
Viscosity	61.82±0.0
Acid value	1.82±0.17

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Saponification value	131.08±0.81
Iodine value	44.41±4.31
Un-saponifiable matter (%)	2.09±0.09
Peroxide value	0.00±0.00
Rancidity	Fat is not oxidized

Table 3: Results of standardization parameters of *Palasha* bark.

Parameter	***Results n = 3 %w/w***
Loss on drying	17.10±0.003
Total Ash	11.85±0.188
Acid Insoluble Ash	0.0±0.0
Water-soluble Ash	1.19±0.0033
Alcohol soluble extractive value	3.17±0.37
Water-soluble extractive value	9.85±1.35

Table 4: Physico-chemical parameters of *Palasha Kshara Ghritha.*

Parameters	**Results n=3 %w/w**		
	***Palasha Kshara Ghritha* (Copper)**	***Palasha Kshara Ghritha* (Iron)**	***Palasha Kshara Ghritha* (Mud Pot)**
Refractive index	1.45862	1.45812	1.45812
Specific gravity	0.9167±0.00	0.8769±0.00	0.9446±0.0
Acid value	0.55±0.003	0.54±0.0	0.55±0.0
Saponification value	340.12±0.000	323.64±0.008	341.19±0.003
Iodine value	28.45±0.003	33.47±0.005	164.56±0.003
Peroxide value	0.00±0.00	0.00±0.00	0.00±0.00
Un-saponifiable matter	2.46±0.003	3.49±0.003	2.03±0.003
Viscosity	100.99±	100.91±	101.00±

Table 5: pH percentage in different samples (products) prepared in different vessels.

***Phalasha Kshara* pH- 12.27**			
SN	**Vessel**	**pH Value**	**%**
1	PKG Prepared in Copper vessel	7.00	57.04%
2	PKG Prepared in Iron vessel	9.91	80%
3	PKG Prepared in Mud pot	9.46	77.09%

Table 6: Preparation of *Ghritha* in different vessels.

Copper vessel

Foam increasing with more sound and separation of *Ghritha*.

Stage of completion

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Iron vessel

Curdling appearance of *Kshara*; Mild reduction of bubble size.

Stage of completion

Mud Lid

Colour ghee look like green colour

Stage of completion

Conclusion

Ksharayuktha Sneha Kalpanas are unique preparations. They need special considerations during pharmaceutical preparation. *Kshara* as *Kalka*, *Gritha* as *Sneha* and *Jala* as *Drava-dravya* should be taken in the ratio of 1:4:16 respectively if prepared in small quantity. In the preparation of *Palasha Kshara Gritha*, the copper (*Tamra*) vessel plays an important role that reflected in pH value of the prepared *Kshara Gritha*.

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