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**PHARMACEUTICO- ANALYTICAL STUDY OF KSHEERABALA TAILA
AVARTANA 101**

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ABSTARCT

Introduction: Sneha Kalpana includes ghritha and taila kalpana. Taila kalpana is the only one such kalpana which is used for all four modes of drug administration's like pana, abhyanga, nasya and basti. One of the most important oil formulations in Ayurveda is "Ksheerabala taila" known for its effectiveness in vataja conditions. Avartana is a unique concept having its own advantages and Ksheerabala taila avartana 101 is one among the most prescribed avartita taila being used in many disease conditions. Owing to these an attempt is made in this study to prepare Ksheerabala taila avartana 101 and to analyze its organoleptic and physico-chemical parameters.

Materials and methods: Ksheerabala taila avartana 101 was prepared as per the classics and the quality of it was assessed by organoleptic and physico- chemical parameters.

Observations and Results: A significant colour change was noticed and after 19th avartana in pakasiddhi, ghritha pakasiddhi lakshanas ('phenashanti' was observed instead of 'phenodgama') were observed in contrary to the taila pakasiddhi lakshanas and also increase in the quantity of final filtrate was observed in successive avartana.

Discussion: Ksheerabala taila avartana 101 is a unique preparation concept of avartana which follows different method of preparation and parameters analyzed were discussed.

Conclusion: In the preparation of Ksheerabala taila avartana 101, conversion of liquid consistency into semi solid mass in final filtrate on cooling in successive avartanas is an indication of gradual conversion of milk fat into ghee which was added in the course of preparation. Analytical parameters carried out on Ksheerabala taila avartana 101 can be taken as a reference standard for further research works.

Keywords: Sneha kalpana, Ksheerabala taila, Avartana, Pakasiddhi lakshana, Phenashanti, Analytical parameters

INTRODUCTION

“Necessity is the Mother of Invention”, as it says necessities which appeared in the various areas like dose, route of administration, shelf life period, availability, easy dispensing, palatability, efficacy, etc various upakalpanas like sneha-sandhana-vati-leha etc came into existence. Sneha kalpana is well known among them and is again of two types like ghrita and taila kalpana. Taila kalpana is the only one such kalpana which is used for all four modes of drug administration’s like pana, abhyanga, nasya and basti. Vata, when gets altered the master controller of the body physiology is the taila kalpana which comes to help.

One of the most important oil formulations in Ayurveda is “Ksheerabala taila” known for its effectiveness in various diseases such as arditā (facial paralysis), katishula (low back ache), katigraha (gridhrasi, sciatica), ardhangavata

(hemiplegia), kampavata (parkinson’s disease), sandhigata vata (osteoarthritis), greeva hundana (cervical spondylosis) and other neurological disorders (including degenerative disorders). The name Ksheerabala taila was first mentioned in Sahasrayogam and similar formulations has been mentioned in other classical Ayurveda texts with some different names [1]. In Charaka Samhita, it is mentioned as shatapaka and sahasra paka bala taila [2]. Acharya Sushruta mentioned it as bala taila and shatapaka bala taila. In Ashtanga Hridaya and Bhavaprakasha it is mentioned as shatapaka-sahasra paka bala taila. Chakradutta, Vangasena mentioned as dashapaka bala taila, shatapaka-shasra paka bala taila and Gadanigraha quoted it as dashapaka bala taila. National Ayurvedic Formulary of India and Pharmacopeia Standards of Ayurvedic formulations named as Ksheerabala taila [3].

‘Avartana’ of a sneha is a special pharmaceutical procedure, in which the prescribed quantity of ingredients are added and snehapaka siddhi is carried repeatedly, till the attainment of desired quantity. Avartana concept aims at minimizing the dose, helps in faster drug delivery and bio-transformation. Ksheerabala taila avartana 101 is one among the most prescribed avartita taila being used in many disease conditions. Owing to these, in this present study an attempt is made to prepare Ksheerabala taila avartana 101 and to

analyze its organoleptic and physico-chemical parameters.

MATERIALS AND METHODS

Raw materials required for the preparation of Ksheerabala taila avartana 101 were procured from natural habitat of Mysuru, Karnataka. After collection, proper cleaning and authentication of all the ingredients, Ksheerabala taila avartana 101 was prepared at JSS Ayur Pharmacy of JSS Ayurveda Medical College & Hospital, Mysuru.

Table 1: Details of drugs used in Ksheerabala taila avartana 101 preparation [4]

S. No	Drugs	Quantity	Initial quantity taken	Quantity taken in 101 st avartana
1	Balamula kalka	1/4 part	3.75 kg	5.2 kg
2	Balamula kashaya	4 parts	60 liters	83.2 liters
3	Tila taila	1 part	15 liters	20.8 liters
4	Ksheera	1 part	15 liters	20.8 liters

Method of preparation of Ksheerabala taila avartana 101: Preparation follows the reference as mentioned in the AFI (Ayurvedic Formulary of India).

Preparation of Ksheerabala taila:

For the preparation of ksheerabala taila, first balamula kashaya was prepared by taking coarse powder (level of grinding should pass through sieve no.10) of balamula 1 part and 16 parts of water was added which was taken in a vessel and heated in mandagni to madhyamagni till it reduces to 1/8th part. Then balamula kashaya was filtered using a clean cloth.

Then balamula kalka was prepared by taking fine powder (level of grinding should pass through sieve no.85) of balamula 1/4th part and sufficient quantity of water was used to prepare kalka.

Then tila taila was taken in a vessel, to this balamula kashaya and balamula kalka was added followed by ksheera and heated in mandagni to madhyamagni till taila siddhi lakshana appears. Then the final product was filtered through a clean cloth.

Preparation of Ksheerabala taila avartana 101: 1 part of ksheerabala taila was taken, to this 1/4th part of fresh balamula

kalka, 4 parts of balamula kashaya and 1 part of ksheera was added and heating was carried out till taila siddhi lakshana appears. Similarly further avartanas were carried by using preceding taila as a base and adding fresh balamula kalka, balamula kashaya and

ksheera in the prescribed quantity each time and heated till siddhi lakshana and continued till it reaches to 101 avartana. Then finally taila was filtered using a clean cloth and preserved in airtight container.



Fig 1: Preparation of Balamula kashaya



Fig 2: Filtering of Balamula kashaya



Fig 3: Preparation of Balamula kalka



Fig 4: Addition of Balamula kashaya to Tila taila



Fig 5: Addition of Ksheera to Tila taila

Figure 1-5: Preparation of Ksheerabala taila



Fig 6: Preparation of Ksheerabala taila avartana 50



Fig 7: Preparation of Ksheerabala taila avartana 85



Fig 8: Preparation of Ksheerabala taila avartana 101



Fig 9: Filtering of Ksheerabala taila avartana 101



Fig 10: Final product of Ksheerabala taila avartana 101

Figure 6-10: Preparation of Ksheerabala taila avartana 101

Analytical parameters

It includes Organoleptic and Physico-chemical parameters of Ksheerabala taila avartana 101.

Analysis of the following parameters was done following the references available in the CCRAS protocol [5].

Organoleptic characters like colour, odour, taste, consistency and Physico-chemical parameters include specific gravity, loss on drying, etc.

1. Specific gravity :

Significance: The presence of dissolved substances in oil is expected to change its specific gravity. So it is considered to be an important parameter for analyzing medicated oils.

2. Refractive Index:

Significance: The consistency of the media and solutes present in the media brings the difference in the refractive index. So, it is an important parameter for differentiating the oils.

3. Loss on drying at 110°C:

Significance: Higher the moisture contents more will be the % of loss on drying of the substances.

4. Acid Value:

Significance: Acid value of a fat or oil indicates the amount of free fatty acids present in it. The acid number is expressed as the number of milligrams of potassium hydroxide required to neutralize one gram of fat.

5. Saponification value:

Significance: Saponification number or value is the quantity of potassium hydroxide required in mgs to neutralize the acid formed by hydrolysis of fat present in the drug. This also indicates the fat content.

6. Ester Value:

Significance: High ester value indicates the presence of high amount of ester and low molecular weight fatty acid content.

7. Unsaponifiable matter:

Significance: The Unsaponifiable matter consists of substances present in oils and fats

which are not saponifiable by alkali hydroxides and are determined by extraction with an organic solvent after saponification. Higher content of unsaponifiable matter may indicate the presence of mineral oils.

8. Iodine number or value [6]:

Significance: This indicates the unsaturation in organic compounds present in the drug formulations.

OBSERVATIONS AND RESULTS

Table 2: Properties of drugs used in Ksheerabala taila avartana 101 [7]

S. No	Botanical Name	Rasa	Guna	Veerya	Vipaka	Karmukata
Bala	<i>Sida cordifolia</i>	Madhura	Snigdha, Sheeta	Sheeta	Madhura	Rasayana
Tila Taila	<i>Sesamum indicum</i>	Madhura	Tikshan, Vyavayi, Sukshma, Ushna, Sara, Vishada, Guru	Ushna	Madhura	Brihmana, Vrishya, Balya, Shoola prashamana
Ksheera	-	Madhura	Guru, Snigdha	Sheeta	Madhura	Rasayana, Hridya, Jeevaniya

Table 3: Changes observed during the preparation of Ksheerabala taila avartana 101

S. No	Stages of Ksheerabala taila	Initial quantity of taila taken	Final quantity of taila after filtration	Loss/ Gain
1	Ksheerabala taila	15 liters	14.4 liters	0.6 liters
2	Ksheerabala taila avartana 10	14.9 liters	15.1 liters	0.2 liters
3	Ksheerabala taila avartana 30	15.8 liters	16.1 liters	0.3 liters
4	Ksheerabala taila avartana 50	16.6 liters	16.9 liters	0.3 liters
5	Ksheerabala taila avartana 70	17.6 liters	18 liters	0.4 liters
6	Ksheerabala taila avartana 90	18.9 liters	19.4 liters	0.5 liters
7	Ksheerabala taila avartana 101	20.8 liters	21.3 liters	0.5 liters

A significant notable point is that, after 19th avartana in pakasiddhi, ghrita pakasiddhi laksanas ('phenashanti' was observed instead of 'phenodgama') were observed in contrary

to the taila pakasiddhi laksanas and also increase in the quantity of final filtrate was observed in successive avartana.

Table 4: Analytical parameters of Ksheerabala taila avartana 101

S. No.	Properties	Ksheerabala taila avartana 101
1	Colour	Light cream
2	Odour	Characteristic odour
3	Consistency	Semisolid
4	Specific gravity (mg/g)	0.909
5	Refractive Index	1.461
6	Loss on drying (w/w%)	0.834
7	Acid value (mg/g)	4.92
8	Saponification value (mg/g)	106.83
9	Ester value	197.29
10	Unsaponifiable matter (w/w%)	1.76
11	Iodine value	196.83

DISCUSSION

The term Ksheerabala taila denotes that the preparation contains Ksheera, Bala and Taila as the ingredients. The purpose of avartana is to minimize the dose, to carry out faster drug delivery and to achieve bio-transformation on time. Avartana helps in the thermogenic changes in the compounds of the medicament and may help in providing the maximum surface area of absorption and hence maximum bioavailability can be expected and the wide range of simple to complex chemical constituents is possible in such avartana of snehas. In other words, the maximum surface area provided for the active constituents of the formulation may lead into maximum bio-availability of the drugs, in its shortest duration. The varied range of simple to complex constituents may help to maintain the required serum level concentration of the pharmaceutically active principles [8].

During the preparation of Ksheerabala taila avartana 101, temperature gradient should be maintained to obtain proper paka lakshana and duration of paka also varies for each avartana as the quantity of the whole contents differs for successive avartana. As the heating is continued; the separation of oil from the kalka is observed in the inner edges of the vessel in the stage of siddhi lakshana. Colour change also can be appreciated on

successive avartana due to increase in the concentration of bio-constituents of bala and gradual conversion of milk fat into ghee. Different varieties of bala has been explained with respect to types of bala and *Sida cordifolia* variety was taken in this preparation based on the reference. Regarding pakasiddhi lakshana, one interesting phenomenon was observed that till 19th avartana phenodgama lakshana was observed in taila paka, whereas after 19th avartana gradually phenashanti lakshana was found when madhyama paka was attained. This is again suggestive of gradual conversion of milk fat into ghee in succeeding avartanas. Probably 19th avartana onwards most of the oil may get converted into ghee, as the milk fat accumulates in each avartana. Also in each and every avartana there was a gain in volume and weight in the final products. This could be because of the conversion of the milk fat into ghee.

It was observed that the liquid and oily consistency which was stable till 8th avartana gradually converted into partial semisolid consistency on cooling. As further avartana, semi solidness gets increased and it was stable till 14th avartana and after 25th avartana whole final products appeared resembling the consistency which was similar to ghee and there was no liquid consistency on cooling.

This could be because of the gradual conversion of milk fat into ghee that could have changed the consistency in succeeding avartanas.

Physico- chemical parameters like specific gravity of Ksheerabala taila avartana 101 is 0.909 suggesting the conversion of milk fat into ghee. Refractive index denotes the consistency of the final product. Acid value 4.92 is suggestive of complex nature of the end product. Obtained saponification value suggestive of accumulation of milk fat in avartita Ksheerabala taila. Unsaponifiable matter 1.76 may be suggestive of the complex nature of the avartita Ksheerabala taila. Iodine value indicates the degree of unsaturation in the final product. All these parameters are within the standards and suggestive of nature and consistency of the final product Ksheerabala taila avartana 101.

CONCLUSION

Ksheerabala taila avartana 101 is an example of a unique concept of avartana which is mentioned in the classics. Preparation duration and also time required for pakasiddhi lakshana in each avartana varies depending on the final volume of the taila. The conversion of liquid consistency into semi solid mass in final filtrate on cooling in successive avartanas is an indication of gradual conversion of milk fat into ghee which

was added in the course of preparation. The gradual shift from the taila pakasiddhi lakshana ('phenodgama') to ghrita pakasiddhi lakshana ('phenashanti'), suggestive of accumulation of more milk fat in the final product. Analytical parameters carried out on Ksheerabala taila avartana 101 are within the standards and can be taken as a reference standard for further research works.

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