PHARMACEUTICO- ANALYTICAL STUDY OF ASHTKATVAR TAILA USING THE CONCEPT OF KAAL MARYADA

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ABSTRACT

Rasa Shastra and Bhaishajya Kalpana is the basic science of Ayurvedic pharmaceutics. Now a days Ayurvedic preparations are commonly used and have become very popular. Sneha Kalpana is described in Bhaishaja Kalpana and it is found to be commonly used in day to day Ayurvedic practice. Sneha Kalpana is one of the important procedures among secondary preparations. But the importance of Kaalmaryada in Sneha preparation is less highlighted. Acharya Sharangdhara specified that Guda, Taila and Ghrita preparations should not be completed within one day in order to attain special properties to the preparations. Different time duration of Paka depends on the nature of Drava Dravyas used in the preparation. A research work to focus on importance of time duration in Sneha Kalpana is a need of this hour. Present study is designed to put more focus on theoretical aspects of time duration. As it is mentioned in our Classics that using Takra, Dadhi as Drava Dravya with Sneha should be completed within 5 nights and same principle is followed to ascertain the time duration comparatively in 3 samples of Ashtkatvar Tail i.e. 2 nights, 3 nights & 5 nights. Evaluation will be carried out on the basis of Physico-Chemical parameters. Even though pharmaceutical observations indicates that Oil attains more viscosity as time duration increased, Other Analytical parameters supports sample C (Within 5 nights). Here I conclude...
that all the Analytical parameters support the Sneha which is prepared with Takra and Dadhi within 5 nights shows significant results.

**KEYWORDS:** Kaal Maryada, Samskara, Drava Dravya Sneha Kalpana, Ashtkatvar Taila, Analytical parameters.

**INTRODUCTION**

Rasa shastra and Bhaishajya Kalpana is the branch of Ayurveda which deals with herbal and herbo-mineral drugs for therapeutic use. Bhaishajya Kalpana explains various methods of processing a drug to make the drug more palatable, rich with potency, pleasing with good odour, colour, etc and long-lasting to improve the shelf life of the preparation. It is based on the concept of Panchavidha Kashaya Kalpana.[1] The five basic forms of formulations the primary Kalpana viz. Swarasa, Kalka, Kwatha, Hima and Phanta and the Secondary Kalpanas viz. Ksheera Paka, Sneha Kalpana, Sandhana Kalpana, Churna, Vati, Leha etc.

Sneha Kalpana includes Ghrita Kalpana and Taila Kalpana.[2] It is a pharmaceutical process to prepare oleaginous medicaments from the Sneha Dravya, Kalka Dravya, Drava Dravya viz. Kwatha, Swarasa, Dugdha, Takra, Gomutra, Kanji, or Water, etc. Gandha Dravya (perfuming agents) is taken in a specific ratio and subjected to a unique heating pattern with a specific duration. The active principles present in the drugs are transferred into the Sneha (Ghrita or Oil) during the pharmaceutical process. The Sneha present in the formulation acts as both medicine and vehicle for transportation of active principles of the drug to various sites of treatment. Sneha Kalpana can be administered through various modes viz. Pana, Abhyanga, Nasya, Basti, Karna Purana, Tarpana, etc. as per the ailment and requirement.

Acharya Sharangadhar has emphasized that Ghrita, Taila & Guda should not be completed in one day as these Kalpana becomes “USHIT” (Stelled) and develop specific qualities.[3]

Further Acharya has given fix days for the Sneha Kalpana Paka by preparing specific liquids like, Ksheer in - Two Nights, Swaras in -Three Nights, Dadhi, Takra, Arnaal etc. in -Five Nights.[4] Now a days in busy schedule it is tedious job for the pharmacy to carry out for such a long time period Paka, so in this study attempts should be made to evaluate the effect of Kaal in the formulations.

Though our classics have given wide references regarding the Sneha Paka Lakshans, its method of preparation, the time duration of the preparation as well as the number of days
required for the preparation are less highlighted. The Time duration for preparing Taila also depends on Drava Dravya, so it has become necessary to assess the importance of Kaal prakarsha, explained in the classics through Physico-chemical analysis. Since both of these above said points are necessary for bringing out a classical product, this study has been taken up.

Here Ashtkatvar Taila is selected for the study. Ashtkatvar Taila is herbal preparation which is indicated as internal use (Orally) in Gridhrasi and Urugrah diseases.

The reference of Ashtkatvar Taila in Brihattrayi is mentioned only in Charak Samhita.[5] The classics like Chakradatta[6] and Bhaisajya Ratnavali[7] have also mentioned about Ashtkatvar Taila.

**Role of Drava Dravya**

Different types of liquid are used as a Drava Dravya in the preparation of Sneha Kalpana. The Sneha can be processed by using various liquids like water, extracted juice, decoction and many other such liquids.

**Quantity of Kalka depends upon Drava Dravya**

General Sneha Dravya is taken four parts to the Kalka Dravya and Drava Dravya is taken four times to that of the Sneha dravyas.[8]

Kalka : Sneha : Dravya

1 : 4 : 16

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Drava Dravya</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ksheera</td>
<td>2 Nights</td>
</tr>
<tr>
<td>2.</td>
<td>Swaras</td>
<td>3 Nights</td>
</tr>
<tr>
<td>3.</td>
<td>Takra, Arnala etc.</td>
<td>5 Nights</td>
</tr>
<tr>
<td>4.</td>
<td>Kwatha prepared with Mula and Valli</td>
<td>12 Nights</td>
</tr>
<tr>
<td>5.</td>
<td>Vrihidhanya and Mamsa rasa</td>
<td>1 Night</td>
</tr>
</tbody>
</table>

**Table No. 1: Duration of Sneha Paka in different liquid media.**[9]

**Table No.2: Showing the Abbreviations of Different Samples.**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>AT2N</td>
</tr>
<tr>
<td>2.</td>
<td>AT3N</td>
</tr>
<tr>
<td>3.</td>
<td>AT5N</td>
</tr>
</tbody>
</table>
AIMS AND OBJECTIVES OF THE STUDY

Aim: The proposed research aimed to perform the studies on the Standardization of Ashtkatvar Taila.

Objectives: The present study was carried out with the following objectives.
1-To prepare Ashtkatvar Taila strictly on the Classical guidelines.
2-On the basis of Time duration for preparation there will be 3 samples.
   A-Sample will be prepared within 2 nights.
   B-Sample will be prepared within 3 nights.
   C-Sample will be prepared within 5 nights.

Ingredients of Ashtkatvar Taila
"पलाभ्या पिप्पलीमूल नागरजडटक्कवरः।
तैलप्रस्थः समो दर्धना गृध्युस्माहापह:।।"
इत्यषट्कक्षतलें
(Charak chikitsa 27/47)

Preparation
1-Reference-Chakradatta Urushtambh Chi. Prakarana.24/12
2-Ratio of Sneha: Drava dravya-1:8
3-Quantity of water-4 times of Sneha.
4-Type of Sneha Paka- Madhyam Paka
(As per the Classical reference 4 times of water was added for proper extraction of active principles into the Sneha Dravya).

Procedure
- Pure raw materials were weighted and procured.
- Raw materials were properly dried and Yava kuta (coarse powder) was done.
- Kalka was prepared by soaking in water and left undisturbed overnight.
- On next day morning a clean and dry Stainless Steel Vessel was taken with 1000 ml of Tila Taila, heated on mild flame.
- When the foam appeared in Taila, then Kalka Dravya 62.5 gm each (Shunthi and Pippali Mool), 1000 ml. Dadhi, 1000ml. Katvar and 4 ltr, water was added simultaneously. A constant stirring was carried out for homogeneous mixing.
In Sample AT2N – 1st day heating was continued till 1/3rd reduction of Drava Dravya. Then 2nd day again heating was continued till 1/3rd reduction. And 3rd day heating was continued till the Sneha Siddhi Lakshanas appeared.

In Sample AT3N- 1st day heating was continued till 1/4th reduction of Drava Dravya. Similarly on 2nd day and 3rd day, the Drava Dravya was reduced respectively upto 1/4th of its quantity and kept closed with a plate to avoid dust. On 4th day continuing Paka on mild flame with continuous stirring, heating process was continued till the Sneha Siddhi Lakshanas appeared.

In Sample AT5N –1st day heating was continued till 1/6th reduction of Drava Dravya. Similarly on 2nd, 3rd, 4th and 5th day, the Drava Dravyas was reduced respectively upto 1/6th of its quantity and kept closed with a plate to avoid dust etc. On 6th day continued Paka on mild flame with continuing stirring, heating process was continued till the Sneha Siddhi Lakshanas appeared.

- Sneha Paka was continued until Sneha Siddhi Lakshanas were obtained.
- Material was filtered with cotton cloth immediately (in warm state).
- Finally, all 3 samples of Ashtkatvar Taila were obtained.
- Prepared Ashtkatvar Taila was stored in well closed and clean container.
- Finally, 749.29 ml, 745.79 ml & 741.04 ml Ashtkatvar Taila was obtained.

Table No. 3: Comparative Observations of Three Batches of Ashtkatvar Taila.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Parameters of observation</th>
<th>AT2N</th>
<th>AT3N</th>
<th>AT5N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Days of heating</td>
<td>3 Days.</td>
<td>4 Days.</td>
<td>6 Days.</td>
</tr>
<tr>
<td>2.</td>
<td>Total heating duration</td>
<td>09 hrs.07 min.</td>
<td>09 hrs.34 min.</td>
<td>10 hrs.06 min.</td>
</tr>
<tr>
<td>3.</td>
<td>Initial volume of Tila Taila in ml</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
</tr>
<tr>
<td>4.</td>
<td>Initial weight of Tila Taila in gm</td>
<td>952 gm.</td>
<td>952 gm.</td>
<td>952 gm.</td>
</tr>
<tr>
<td>5.</td>
<td>Initial volume of Go-Dadhi in ml</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
</tr>
<tr>
<td>7.</td>
<td>Initial volume of Katvar in ml</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
<td>1000 ml.</td>
</tr>
<tr>
<td>8.</td>
<td>Initial volume of Katvar in gm</td>
<td>1020 gm.</td>
<td>1020 gm.</td>
<td>1020 gm.</td>
</tr>
<tr>
<td>9.</td>
<td>Initial volume of Water in ml</td>
<td>4 Litre (4000 ml)</td>
<td>4 Litre (4000 ml)</td>
<td>4 Litre (4000 ml)</td>
</tr>
<tr>
<td>10.</td>
<td>Initial volume of water in gm</td>
<td>3820 gm.</td>
<td>3820 gm.</td>
<td>3820 gm.</td>
</tr>
<tr>
<td>11.</td>
<td>Initial volume of Kalka in gm</td>
<td>62.5 gm.</td>
<td>62.5 gm.</td>
<td>62.5 gm.</td>
</tr>
<tr>
<td>12.</td>
<td>Temperature observations(°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Initial Temp. of Taila</td>
<td>24.2°C</td>
<td>24.2°C</td>
<td>24.2°C</td>
</tr>
<tr>
<td></td>
<td>• Temp. when Taila got moisture free</td>
<td>108.6°C</td>
<td>109.3°C</td>
<td>109.3°C</td>
</tr>
</tbody>
</table>
- Temp. at the time of addition of Kalka. 97.7°C 96.4°C 97.4°C
- Temp. after adding Kalka and at the time of addition of Go-Dadhi. 57°C 57.6°C 58.3°C
- Temp after adding Go-Dadhi and at the time of addition of Katvar. 54.3°C 55.2°C 55.96°C
- Temp after adding Katvar and at the time of addition of water. 48.2°C 48.03°C 50.5°C
- Temp. after adding Water. 41.3°C 44.3°C 43.3°C
- Temp. at which boiling of Taila started. 93.4°C 94.3°C 95.4°C
- Temp. after one hour of starting of Taila boiling. 96.6°C 96.5°C 96.6°C
- Temp. at the time of Mridu Paka stage. 94.7°C 95.3°C 94.4°C
- Temp. at the time of phenodgama in Oil. 95.5°C 95.9°C 95.2°C
- Temp. at the time of Madhyama Paka stage. 97.1°C 96.7°C 97.3°C

13. Obtained volume of Ashtkatvar Taila in ml. 749.29 ml. 745.79 ml. 741.04 ml.

14. Loss of Taila in ml. 250.70 ml. 254.62 ml. 258.96 ml.

Table No. 4: Sneha Siddhi Lakshana of Taila Paka.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sneha Siddhi Lakshana</th>
<th>AT2N</th>
<th>AT3N</th>
<th>AT5N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sanyav Eve Niryase.</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>2.</td>
<td>Madhye Darvi Vimunchyati.</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>3.</td>
<td>Varti formation.</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>4.</td>
<td>Shabda Hino Agni Nikshipta.</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td>5.</td>
<td>Phenodgama.</td>
<td>+ve</td>
<td>+ve</td>
<td>+ve</td>
</tr>
<tr>
<td></td>
<td>Gandh Varna Rasotpatti.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table No. 5: Showing the Organoleptic Characters of Ashtkatvar Taila.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Organoleptic features</th>
<th>AT2N</th>
<th>AT3N</th>
<th>AT5N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Colour</td>
<td>Orange red colour</td>
<td>Light Brown colour</td>
<td>Brown colour</td>
</tr>
<tr>
<td></td>
<td>Taste</td>
<td>Katu, Amla</td>
<td>Katu, Amla</td>
<td>Katu, Amla</td>
</tr>
<tr>
<td>2.</td>
<td>Odour</td>
<td>Pleasant smell</td>
<td>Pleasant smell</td>
<td>Pleasant smell</td>
</tr>
<tr>
<td>3.</td>
<td>Consistency</td>
<td>Liquid</td>
<td>Liquid</td>
<td>Liquid</td>
</tr>
<tr>
<td>4.</td>
<td>Texture</td>
<td>Oily</td>
<td>Oily</td>
<td>Oily</td>
</tr>
</tbody>
</table>

Analytical study

Analytical data are needed for standardization of any formulation, so it is an important tool for that is needed to evaluate the quality of drugs as well as finished product.
1. **pH Value**

![pH Graph]

**Graph No.01: Showing the value of pH.**

From above, it’s observed that in sample AT2N and AT3N, it is slightly decreased when compared to sample AT5N. So we can infer that by decreasing or increasing the time duration of preparation, there will be changes in the pH. Sneha Kalpana is a preparation which can be used both internally and externally. As very low pH irritates the skin. The pH of all the samples are in acidic range.

2. **Specific gravity**

![Specific Gravity Graph]

**Graph No. 02: Showing the value of Specific gravity.**
Gradually Specific gravity decreased in the sample. Which implies that as duration of heating increased then the specific gravity decreased. So there will be more favorable sample AT5N compare to AT2N & AT3N.

3. Saponification Value

![Saponification value graph]

Graph No.03: Showing the Saponification value.

Saponification value indicates the measure of fatty acid present as esters in given Oil/fat. Medicated oil with high Saponification value will be absorbed easily. Here in sample AT5N Saponification value increased when compared to sample AT2N and AT3N. So it indicates sample AT5N will be absorbed quickly when compared to sample AT2N and AT3N.

4. Acid Value

![Acid value graph]

Graph No.04: Showing the Acid value.
Acid value indicates the amount of free fatty acid present in oil or fat. A high acid value in the oil may lead to early rancidity of the oils.

The acid number is used to quantify the amount of acid present. In this study shows, sample AT2N is having more acid number when compared to sample AT3N and AT5N. There is not much change in the value of sample AT3N and AT5N. At last we conclude that AT5N is better compare to AT2N, & AT3N.

5. Iodine Value

In this study, Sample AT3N is having more iodine number when compared to sample AT2N and AT5N. There is not much change in the values of AT2N and AT5N. So there is a chance of early rancidity in sample AT3N than other two samples.

6. Loss on drying at 105\(^{\circ}\)C (% w/w)
The percentage of active chemical constituents in drugs is mentioned on air dried basis. Hence the moisture content should be determined and controlled. The moisture content should be minimized in order to prevent decomposition of medicament due to chemical change or rancidity. In this study, the reports shows all values of moisture content are very less (<1%w/w) which considered as negligible.

7. Viscosity(cps) (Spindle No.64)

![Graph No. 7 showing the value of Viscosity](image)

Flow property of a liquid is expressed in terms of viscosity. Quantitatively, viscosity is an index of a liquid to flow. The higher viscosity of a liquid, the greater is the resistance to flow. If the viscosity of the liquid preparation is increased, the rate of absorption is decreased. Here in sample AT5N, viscosity is increased than sample AT2N and AT3N. Which indicates that viscosity increases according to increase in time duration of the process. So we can infer that absorption of sample AT5N will be comparatively less when compared sample AT2N and AT3N.

8. Peroxide value

![Graph NO.8: Showing the value of Peroxide Value.](image)
Peroxide value analysis, Kries test etc comprise the best known test in the stability testing of Oils.

Here in sample AT5N, Peroxide value is increased, Peroxide value of AT2N sample also slightly increased but the peroxide value of AT3N sample decreased significantly. Thus it may be concluded that there is no more difference in the stability.

9. Microbiological limit test

<table>
<thead>
<tr>
<th>Sample</th>
<th>E. coli</th>
<th>Salmonella sp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashtkatvar taila prepared within 2 nights Sample 1 (AT2N)</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Ashtkatvar taila prepared within 3 nights Sample 2 (AT3N)</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Ashtkatvar taila prepared within 5 nights Sample 3 (AT5N)</td>
<td>Absent</td>
<td>Absent</td>
</tr>
</tbody>
</table>

DISCUSSION

Sneha Kalpana is one of the most commonly used preparation in day to day life. Among them Taila Kalpana gets a lion share, as it can be used both internally and externally for different therapeutic purposes.

The Sneha Kalpana comprises of Sneha, Kalka and Drava Dravya. Sneha which are glycerides of fatty acids, Kalka which contains many potent therapeutically effective bio-constituents, and Drava like Kwatha, Takra, Dadhi, Kanji etc. which are the prime source of hydroxyl group and also helps in the dissolution of active principles into the Sneha there by enhancing the therapeutic value. Drava itself has high therapeutic importance. Here attempt is made to clear the role of Drava Dravya during Sneha Paka by applying probable thermodynamics.

In context of duration of Sneha Paka ratri (night) word is mentioned which indicates the solubility of active principles needs certain duration. Due to intermittent heating the contact of drug with Sneha and Drava will be more, which will facilitate the extraction of maximum active principles from the drug to the Sneha. Due to increased drug to drug contact, the extraction of active principles will be more. The rationality behind allotment of duration depends mainly on the nature of Kalka Dravya used, nature of the Drava, concentration of Drava etc.
Discussion on Pharmaceutical Study
It is the process which leads to conversion of raw materials into finished product. The fate of the raw drugs totally depends upon process. In process standardization is also need of time so it should be kept in consideration while doing this study.

Processing of Sneha with Kwatha, Arnala, Takra should be completed in 5 nights:
Probably their nature to impart chemical constituents may take longer time period.

Discussion on Analytical Study
The Value of Saponification, Specific gravity, Acid value, Viscosity value and pH are favorable to sample AT5N, which may be due to contact of Taila with Agni and drug was more in Sample AT5N than other two samples.

CONCLUSION
On the basis of facts, observations and results of Pharmaceutical and Analytical studies of the present Research work entitled “Pharmaceutico–Analytical study of Ashktatvar Taila Preparation in Different Time Duration of Paka” the followings Conclusions are drawn:

- Sneha Kalpana is unique procedure where both oil soluble and water soluble’s active principles extracted. Among there, Ghrita and Taila Kalpanas are commonly practiced.
- The study was under taken in three samples with three different time duration by repeating each procedure for three times, in order to get more appropriate mean of the difference of time durations.
- Pharmaceutical procedures reveals that the Taila becomes more viscous, due to increase in time duration. There is not much change in Odour and Taste, due to the usage of same ingredient in each sample. But change in colour is observed, due to variation in time duration of Paka.
- Physico - Chemical parameters describes that Saponification value, Peroxide value and Viscosity are gradually increased from sample to sample, which shows that as the time duration of the preparation increased and then there will be increase in the transfer of active constituents from drug to Oil. Here sample AT5N is having more Saponification value, Peroxide value and Viscosity than other two samples.
- But Viscosity is inversely proportional to the rate of absorption, even though sample AT5N is having more active principles, its rate of absorption decreases when compared to sample AT2N and AT3N.
pH of samples AT2N and AT3N are decreased when compared to sample AT5N. Which signifies that pH varies according to time duration of Paka.

Iodine value of AT5N (111.62) is less than AT2N and AT3N comparatively, which shows AT5N is more saturated than the other sample.

There is not much difference in Acid value of AT3N and AT5N sample but it is less than acid value of AT2N. A high Acid Value in the Oil may leads to early rancidity so AT3N and AT5N are better than AT2N.

Results of Loss on drying of all samples is negligible but if we discuss and conclude it then it shows, moisture content of AT2N (0.11%w/w) is slightly less compare to other samples of Ashtkatvar Taila. That means chances of rancidity are very less compare to AT3N and AT5N.

One should follow different time duration for Sneha preparation depending upon the nature of drugs.

It can be concluded that sample AT5N will be Pharmaceutically & Analytically more significant than Sample AT2N & AT3N, because of its more pH, Saponification value, Peroxide value and Viscosity are gradually increased and with long shelf life, Hence it’s mandatory to follow the classical reference of Kaalmaryada in Sneha Paka depending upon nature of drugs.

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