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# Pharmaceutical Analytical Study of *Laksha Rasa* prepared in two distinct vessels: Emphasis on Ph variation following sequential filtration

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## ABSTRACT

Primary preparations in Ayurvedic pharmaceuticals have certain *Upakalpana* under each. Preparations which share similar principles with its primary preparation can be considered as its *Upakalpana*. *Laksha Rasa* is an *Upakalpana* of *Kwatha Kalpana*. *Laksha Rasa* preparation was done in two different *Dolayantra* - a mud pot and a steel vessel. To one part of coarsely powdered *Laksha* tied in a *Pottali* and hung in a *Dolayantra*, six parts of water was added and heated on mild fire. It was reduced to 1/4<sup>th</sup> part and was filtered for 21 times. Organoleptic characters and physicochemical parameters were analyzed and on a special note analyze its pH after each filtration. The description of filtering twenty one times might be to reduce the pH of *Laksha Rasa*. From the study it is understood that filtration here plays a crucial role in lowering the pH, thus potentiating it further.

**Key words:** *Laksha*, filtration, pH, *Upakalpana*

## INTRODUCTION

Ayurveda literature is used as authentic reference for any ayurvedic pharmaceutical preparations. Though not considered as a separate branch, is inseparable with any other branches. Basic ayurvedic pharmaceuticals have included primary and secondary preparations.

Primary preparations in Ayurvedic pharmaceuticals have certain *Upakalpana* under each. Preparations

which share similar principles with its primary preparation can be considered as its *Upakalpana*.

*Laksha* is a unique drug of nature and it is the only resin of animal origin.<sup>[1]</sup> It is known since Vedic period in India.<sup>[2]</sup> Lac is a resinous substance obtained from secretion that encrusts the bodies of insect.<sup>[3]</sup> The word lac is derived from Sanskrit word *Laksha*, which means hundred thousand or a lakh. Three lakh insects involve producing 1 Kg lac.<sup>[4]</sup>

*Laksha Rasa* is an *Upakalpana* of *Kwatha Kalpana*.<sup>[5]</sup> Here, an attempt was made to prepare *Laksha Rasa*, analyze its physical chemical parameters, and on a special note analyze its pH after each filtration.

## AIM

Pharmaceutical analytical study of *Laksha Rasa*.

## OBJECTIVES

To prepare *Laksha Rasa*

1. To analyze *Laksha Rasa*
2. To analyze pH of *Laksha Rasa* 21 times after each filtration.

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## MATERIALS AND METHODS

The total work was carried out in two phases as given below-

1. Pharmaceutical study
2. Analytical study

### Pharmaceutical study

#### Procurement of Raw material

The raw material was procured from the department of *Rasashastra* and *Bhaishajya Kalpana*, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

**Slight acidic pH might aid to the rate of absorption here.**

*Laksha Rasa* preparation was done in two different *Dolayantra* - a mud pot and a steel vessel, at same specified quantity at Teaching Pharmacy, Department of *Rasashastra* and *Bhaishajya Kalpana*, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

#### Method of Preparation

One part of coarsely powdered *Laksha* was tied in a *Pottali* and hung in a *Dolayantra* containing six parts of water and heated on mild fire. It was reduced to 1/4<sup>th</sup> part as it is an *Upakalpana* of *Kwatha Kalpana*. Lastly, was filtered for 21 times.<sup>[6]</sup>

- 150g of *Laksha* was pounded into coarse powder.
- Coarsely powdered *Laksha* was spread over a clean kora cloth and tied into *pottali*.
- This was then tied to a stick and dipped in a mud pot containing 2L of potable water, such that *pottali* neither touches the bottom nor the sides of the vessel.
- Heated over a mild fire and reduced to 1/4<sup>th</sup> part.
- Later, *Pottali* from mud pot was taken off and liquid was filtered for 21 times.
- The final filtrate obtained was *Laksha Rasa*.

**Table 1: Ingredient with ratio of *Laksha Rasa***

| Ingredient    | Ratio  | Quantity |
|---------------|--------|----------|
| <i>Laksha</i> | 1 part | 335ml    |
| <i>Jala</i>   | 6 part | 2000ml   |



**Fig. 1: *Laksha***



**Fig. 2: Pounding *Laksha***



**Fig. 3: *Laksha* in kora cloth**



Fig. 4: Dola Yantra



Fig. 5: Laksha Rasa Boiling



Fig.6: Filtering Laksha Rasa

## Analytical Study

### Determination of pH<sup>[7]</sup>

The pH of an aqueous liquid may be defined as, the common logarithm of the reciprocal of the hydrogen ion concentration expressed in grams per liter. The pH meter is used which consists of a voltmeter connected with two electrodes i.e., standard electrode and special electrode. The pH meter is calibrated using 7 and 4

buffer solution. After calibration, sample is introduced and reading is noted.

### Viscosity<sup>[8]</sup>

The apparatus commonly used for the determination of relative viscosity of a liquid is known as Ostwald viscometer. It has a left-hand limb which is pipette with two calibration marks A and B. A length of capillary tube joins the pipette to a bulb C in the right-hand limb. The time to flow from mark A to B is noted with the help of stopwatch. Same procedure is repeated with distilled water. The time of flow of water is recorded.

### Refractive Index<sup>[9]</sup>

The refractive index of a substance is defined as the ratio of velocity of light in vacuum or air, to that in the substance. Using Abbe's refractometer, refractive index is calculated for the sample. Using dropper on the measurement prism, sample is put and light focus is adjusted for proper illumination then reading is noted.

### Specific Gravity<sup>[10]</sup>

Pycnometer is cleaned and dried carefully in dry air. Empty weight of the same was noted. Then, Distilled water is added to pycnometer, knob is closed to allow the extra liquid to drain out, and weight is recorded. Same procedure is repeated for sample.

### Total Soluble Solids<sup>[11]</sup>

The refractometer is held horizontally and day light plate is open to expose main prism. Two drops of distilled water is placed on the prism. Later, daylight plate is closed lightly so that water spreads across the entire surface of prism. The reading is noted. Similarly, sample is put over the prism and looked through eye piece to see circular field with graduations. When the upper portion becomes blue and lower portion white, value of separation is noted.

## OBSERVATIONS AND RESULTS

**Table 2: Liquid taken and Laksha Rasa obtained in mud pot**

| Liquid | Quantity |
|--------|----------|
| Jala   | 2000     |

|                      |       |
|----------------------|-------|
| Laksha Rasa obtained | 500ml |
|----------------------|-------|

**Table 3: Liquid taken and Laksha Rasa obtained in steel vessel**

| Liquid               | Quantity |
|----------------------|----------|
| Jala                 | 2000     |
| Laksha Rasa obtained | 540ml    |

**Table 4 Observation of pharmaceutical study of Laksha Rasa**

| Observation                                     | Laksha Rasa |
|---|-------------|
| Jala added                                      | 2000ml      |
| Laksha Rasa obtained                            | 500ml       |
| Laksha Rasa after 21 filtrations (mud pot)      | 445ml       |
| Laksha Rasa after 21 filtrations (steel vessel) | 445ml       |

**Table 5: Organoleptic characters of Laksha Rasa**

| SN | Parameters | Result                     |
|----|------------|----------------------------|
| 1. | Colour     | Pinkish Red                |
| 2. | Odour      | Sweet characteristic odour |
| 3. | Appearance | Slightly viscous           |

**Table 6: Physical chemical analysis of Laksha Rasa**

| SN | Parameters       | Result (mud pot) | Result (steel vessel) |
|----|------------------|------------------|-----------------------|
| 1. | Specific gravity | 1.75             | 1.743                 |
| 2. | Viscosity        | 0.21             | 0.21                  |
| 3. | Refractive Index | 1.35             | 1.348                 |
| 4. | T.S.S            | 4                | 4                     |

**Table 7: pH of Laksha Rasa after each filtration**

| SN | Number of Filtration | pH value |
|----|----------------------|----------|
| 1. | 1 <sup>st</sup>      | 5.24     |
| 2. | 2 <sup>nd</sup>      | 5.20     |

|     |                  |      |
|-----|------------------|------|
| 3.  | 3 <sup>rd</sup>  | 4.97 |
| 4.  | 4 <sup>th</sup>  | 5.35 |
| 5.  | 5 <sup>th</sup>  | 4.75 |
| 6.  | 6 <sup>th</sup>  | 5.05 |
| 7.  | 7 <sup>th</sup>  | 5.28 |
| 8.  | 8 <sup>th</sup>  | 5.15 |
| 9.  | 9 <sup>th</sup>  | 5.30 |
| 10. | 10 <sup>th</sup> | 5.22 |
| 11. | 11 <sup>th</sup> | 5.33 |
| 12. | 12 <sup>th</sup> | 5.39 |
| 13. | 13 <sup>th</sup> | 5.34 |
| 14. | 14 <sup>th</sup> | 5.10 |
| 15. | 15 <sup>th</sup> | 4.97 |
| 16. | 16 <sup>th</sup> | 5.10 |
| 17. | 17 <sup>th</sup> | 5.39 |
| 18. | 18 <sup>th</sup> | 5.31 |
| 19. | 19 <sup>th</sup> | 5.30 |
| 20. | 20 <sup>th</sup> | 5.38 |
| 21. | 21 <sup>st</sup> | 4.90 |

#### Pharmaceutical observation

- Initially, *Pottali* even without hanging to the stick floated for about 60min, later on as *Laksha* started to melt and water boiling, had to have the support of a stick to hang.
- Colour changed from transparent pink to pinkish red as the heating continued.
- It became slightly thick liquid at the end of the preparation.
- Throughout the preparation, *Laksha Rasa* gave off a sweet aroma.

#### DISCUSSION

*Laksha* is a resin, which is an ingredient in various formulations indicated in *Bhagna*, *Kshudra Kushta*,

*Pradara* etc. It is a simple, easy to prepare formulations which is primary ingredient for other secondary preparations or is mentioned as one of the ingredients in few *Shaman Yoga*.

*Kwathana* is done here, hence *Laksha Rasa* can be considered as an *Upakalpana* of *Kwatha Kalpana*. Though reduction of water level is not mentioned, being an *Upakalpana* of *Kwatha Kalpana*, *Laksha Rasa* was reduced to 1/4<sup>th</sup> part.

Logic behind Filtering 21 times might be to purify it on each filtration. Firstly, *Laksha* was tied in a *Pottali* and hung instead of directly placing it in a pot. This is to remove the physical impurities and also since it is a resin, if not suspended in *Dolayantra* would stick to the bottom and get charred.

There was 11% loss in *Laksha Rasa* after filtering it for 21 times by both the methods. Filtering these many times might also be a method to remove the minute invisible impurities.

Specific gravity of *Laksha Rasa* prepared in mud pot was 1.75, whereas that prepared in steel vessel is 1.743. This suggests that *Laksha Rasa* is denser than water. The slightly higher value of that prepared in mud pot suggests presence of more solids than the latter one.

Viscosity is an index of a liquid to flow. Higher the viscosity of the liquid, greater is the resistance to flow. In this study during analysis was found that viscosity of *Laksha Rasa* prepared in mud pot and steel vessel was 0.21, with this it can be understood that specific gravity of *Laksha Rasa* is greater than the specific gravity of water. This might be due to the presence of incorporated constituents from *Laksha* into *Laksha Rasa*.

Refractive index indicates the density of the sample comparing to air and liquid media. Refractive index of *Laksha Rasa* prepared in mud pot was 1.344 and that prepared in steel vessel was 1.343. The rise might be due to addition of more active components in mud pot than steel vessel, on reduction.

Total Soluble Solids measure the concentration of soluble solids in the solution. Higher total soluble solid

content in *Laksha Rasa* indicates solubility of more water-soluble active principles. T.S.S of *Laksha Rasa* prepared in mud pot and steel vessel was 4. It is a liquid preparation made from a resinous substance; this may have no much soluble solids in it. Hence, it did not show greater value.

Analytically pH variations were monitored after each filtration step. But it did not have a regular pattern as such, but reduced from 5.24 to 4.90 after filtering it for twenty-one times. *Laksha Rasa* was also prepared in *Dolayantra* made of steel vessel and pH was noted. Even here regular pattern of pH reduction wasn't observed. But it reduced from 4.6 to 3.8, after filtering twenty-one times. pH of *Laksha Rasa* made in *Dolayantra* of mud pot was slightly higher in the acidic pH range, in comparison to that made in steel *Dolayantra*. Change in pH range between two, might be due to *Bhajana Samskara*. Description of filtering twenty-one times might be to reduce the pH of *Laksha Rasa*. Slight acidic pH might aid to the rate of absorption here. Thus, suggesting importance of filtration in the preparation.

## CONCLUSION

*Laksha Rasa*, an *Upakalpana* of *Kwatha Kalpana*, was prepared in *Dolayantra* made of Mud pot, steel vessel and was analyzed for physical-chemical parameters. Preparation completes only after filtering the liquid, twenty-one times. From the study it is understood that filtration here plays a crucial role in lowering the pH. Filtering it for twenty-one times after preparation, purified it further on each and slightly reduced its pH. In total filtration reduced the pH of *Laksha Rasa*, thus potentiating it further and assisting to act appropriately. *Laksha Rasa* prepared in mud pot exhibited retention of more solutes and active constituents than that prepared in steel *Dolayantra*. Owing to the nature of mud, pH was slightly high in acidic range in mud pot compared to the preparation done in a steel vessel. Hence, preparation vessel affects its properties. Obtained result from this study, might be used as a preliminary data for further research works.

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