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Physicochemical Standardization of Lekhan Basti

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Abstract:

Background: Ayurvedic Panchakarma formulations especially *Basti* preparations are highly specific according to the disease conditions. Moreover, classical texts have specified quantities of each content as per the *Doshik* predominance. Thus final prepared product is having a specific physicochemical characteristic which may alter with the bio availability of the active principles, functional properties, retention time etc. of the *Basti*. *Lekhan Basti* is one such formulation advised specially in *Medoroga*. **Materials and Methods:** The present study has been designed to standardized this formulation physicochemical analysis of *Lekhan Basti*. **Results and Conclusion:** According to Standardized physicochemical data of *Lekhan Basti* its Specific Gravity, Density, Refractive Index, pH, Total Solid Contents, Viscosity and Tannin contents were 1.14, 1.14 g/ml, 1.408, 4.0, 59% w/v, 4.12 and 4.3% w/v respectively.

Key Words: *Lekhan Basti,* Standardization, *Medoroga*, Panchakarma

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Introduction:

Panchakarma has evolved as a promising cure in many diseases. The world is looking towards the *Ayurveda* with great hope and so many queries especially about quality standards of *Ayurvedic* formulations. So many *Basti* preparations are practiced with variety of differences as per the understanding of the practitioners & available classical references. In this situation standardization of these formulations is highly essential to assure the reliability especially in terms of quality, purity, efficacy and safety of the formulation.

Contents of the *Basti* formulation have been specified by all *Acharyas* with a fixed dose as per the *Doshik* dominance or depending upon the drugs used, in various scattered references.

Today *Ayurvedic* science is spreading its wings all over the world where the drug prepations of this system has become the center of global interest. Hence it has become the need of time to standardise *Panchakarma* formulations in terms of physico-chemical parameters for a quality assurance. Also Drug absorption & further kinetics of its components depends upon some physicochemical properties. With this background, present analytical study on *Lekhan Basti* was undertaken with objective to analyze the *Lekhan Basti* by using different physicochemical parameters.

Materials And Methods:

Lekhan Basti[1] was prepared without altering the classical methods and by using authenticated raw material as follows,

Table 1: Contents of Lekhan Basti

Content name	latin name	English/ Chemical name	Quantity(in *Ayurvedokta Mana*)	Quantity(in gm or ml)
Makshika		Honey	3 *Prasrut*	210ml
Saindhava	*Sodii chloridum*	Rock salt	1 *Karsh*	12g
Triphaladya Tail			1.5 *Prasrut*	160ml
Putoyavanyadi Kalka			1 *Prasrut*	96g
Triphala Kwatha			5 *Prasrut*	480ml
Gomutra		Cow urine	10 *Karsha*	120ml
Yavakshara,		Potassium carbonate	1 *Karsha*(all in equal quantity)	12g
Shuddha Shilajit	*Asphaltum punjabinum*	Black bitumen		
Kasis		Ferrous sulphate		
Hingu	*Ferula alliacea*	Asafoetida		
Tuttha		Copper sulphate		

Twelve *Prasruta* is standard dose for *Madhyam* Ayu patient, it generally denotes volumetric considerations and thus twelve *Prasruta* is a fixed quantity if taken every ingredient as per volume. But as per the trend & tradition among now a days practitioners, weight of the ingredients are considered as a standard criteria. But this concept has a practical problem i.e. all the ingredients of the basti in equal volumes differs in their weights due to difference in their specific gravities. Thus contents taken in *Prasruta Mana* by converting them to grams should be done considering their specific gravities then only the weight of the *Basti*

prepared finally will be equal to the weight calculated by converting *Prasruta* to grams.

For this purpose in present study quantities of ingredients in liquid form were determined in grams as follows by considering the specific gravities of the basic component of the formulation:

Principle to convert Grams into Millilitres: Divide the number of grams by the specific gravity of the substance, to obtain the volume in millilitres. [2]

For Honey:

Specific gravity of honey -1.3935[3]

Hence, 1g of honey/1.3935= 0.72 ml

For *Lekhan Basti* the dose decided for honey was 3 *Prasruta* i.e. 288 g,

Therefore, in millilitres it come to be,

288 gram of Honey ×0.72=207.36 ml

Therefore, approximately **210ml** was the quantity taken for 3 *Prasruta* of honey in present study.

For *Triphaladya Tail* :

Til Tail is the basic ingredient of *Triphaladya Tail* hence to calculate an approximate value in millilitres, the specific gravity of *Til Tail* is considered for the required weight of *Triphaladya Tail*.

Specific gravity of Sesame oil-0.922[4] Hence, 1g of Sesame oil/0.922= 1.08 ml For *Lekhan Basti* the dose decided for *Sneha* was 1.5 *Prasruta* i.e. 144 g,

Therefore, in millilitres it come to be,

144g of oil ×1.08=155.52 ml

Therefore, approximately **160ml** was the quantity taken for 1.5 *Prasruta* of *Triphaladya Tail* in present study.

For *Gomutra* (cow urine):

Specific gravity of *Gomutra* -1.045[5]

Hence,

1g of *Gomutra*/1.045= 0.96 ml

For *Lekhan Basti* the dose decided for *Gomutra* was 10 *Karsha* i.e. 120 g,

Therefore, in millilitres it come to be,

120 gram of *Gomutra* ×0.96=115.2 ml

Therefore, approximately **120ml** was the quantity taken for 10 *Karsha* of *Gomutra* in present study. However for *Kwatha*, The water is the basic componant. Though specific gravity of water is different than *Kwatha* but the difference would be negligible in terms of approximation. Hence the conversion is considered same as for water 1gm=1ml.

Thus, by calculating this way & taking ingredients the final prepared *Dvadashaprasruta Basti* comes to be of **1000 ml.**

The parameters used for the analysis has been mentioned below:

Physico-chemical parameters:

- Specific gravity
- Density
- Refractive index
- pH
- Total solid contents
- Viscosity
- Tannin contents

Specific gravity[6]**:**

A clean and dry 25 ml capacity Pycnometer was taken and its weight was noted. It was filled with the sample, cleaned properly from outside and the weight was taken at 40°C. Then it was cleaned, rinsed and filled with distilled water, dried from outside and the weight was noted at 40°C. The weight of sample and distilled water was calculated. Then the Specific gravity was determined by dividing the weight of the sample by the weight of the water. Density is calculated by dividing weight of the sample by volume of the sample taken.

Refractive Index[7]**:** Refractive index of a substance varies with temperature. Hence, temperature is to be noted while determining R.I. The R.I. of different samples was measured by using Abbe's Refracto-meter at 40°C. The temperature was maintained at 40°C by circulating warm water.

Determination of pH[8]**:**

25 ml of *Lekhan Basti* was taken in a beaker. pH paper is dipped in the sample & slightly washed with distilled water to note the colour change. The observed colour is matched with standard scale.

Total solid contents[9]**:**

25 ml of *Lekhan Basti* sample was taken in a previously dried and weighed evaporating dish, evaporated on water bath and further dried in an oven at 110°C till constant weight. From the weight of the residue obtained the percentage of total solid content in the sample was determined and expressed as percentage w/v.

Determination of Viscosity[10]**:**

Lekhan Basti is poured in the viscometer so that, it remains below the level marked as 'A'. Then the *Lekhan Basti* is sucked above with mouth beyond level 'B'. Then with pressure of finger it is maintained exactly at level 'B'. Pressure is released completely & time taken by solution to reach up to level 'A' is recorded by stopwatch. Same procedure is repeated trice to get an average value. Same procedure is repeated by using distilled water instead of *Lekhan Basti*.

Viscosity was calculated using following equation,

$$Viscosity = \frac{Average\ time\ taken\ by\ sample \times Density\ of\ the\ sample}{Average\ Time\ taken\ by\ Distilled\ water \times Density\ of\ Distilled\ water}$$

Determination of Total Tannins[11]**:**

Total tannins of the *Lekhan Basti* were determined by using Lowenthal's method improved by Councler , Shroeder, and Procter[12]

Results:

Table 2: Analytical Data Of *Lekhan Basti*

Parameter studied	Values obtained
Specific Gravity	1.14
Density	1.14 g/ml
Refractive Index	1.408
pH	4.0
Total Solid Content	59% w/v
Viscosity	4.12
Tannin content	4.3% w/v

Discussion:

Physicochemical standardization of *Lekhan Basti* is required to reproduce the same clinical or experimental data in every experiment. Moreover parameters like absorption of active ingredients in Basti, selective receptor stimulation, effect on microbial flora etc. depends largely on physicochemical characteristics thus it becomes more important to know what exactly the analytical data is. The density of a solution is the sum of mass (massic) concentrations of the components of that solution. Density defined in a qualitative manner as the measure of the relative "heaviness" of objects with a constant volume. [13] *Lekhan Basti* is found to have relatively high specific gravity & more density due to the effect of combined specific gravities & densities of its contents. Viscosity describes a fluid's internal resistance to flow and may be thought of as a measure of fluid friction. Refractive index is a fundamental physical property of a substance, it is often used to identify a particular substance, confirm its purity, or measure its concentration. Refractive index is used to measure solids liquids, and gases. Most commonly it is used to measure the concentration of a solute in an aqueous solution. [14] Total solid contents represents % by weight of the whole which is non volatile at a definite temperature in an open atmosphere. [15] *Lekhan Basti* is a mixture of many compounds. Its high solid content (59% w/v) & more viscosity (4.12) may be attributed to the incorporation of solid substances like *Ushakadi Gana Prakshepa* & honey (Viscosity of honey[16] 2-10) respectively which adds a maximum part. As many substances are in the solute form constitutes the final product of *Basti* it has low refractive index of 1.408. Tannin content of the *Lekhan Basti* is because of *Triphala* as it is reach in tannins (>30%).[17] pH of the *Basti* is nearly weak acidic,[18] though some substances incorporated in the *Basti* are having basic pH(e.g cow urine

pH=7.4).[19] This is primarily because of reach quantity of *Triphala Kashaya* in the *Basti* the contents of which are acidic (pH of *Emblica officinalis*[20] =2.5-3.8, *Terminalia chebula*[21] =2.5-5.5). Weakly acidic drugs are more readily absorbed from an acid medium. The pH in the colon varies between 5.5 and 7 (slightly acidic to neutral),[22] this weak acidic media in colon may facilitate the drug absorption.

Conclusion:

According to Standardized physicochemical data of Lekhan Basti its Specific Gravity   is   1.14, Density is 1.14 g/ml, Refractive Index is 1.408, pH is 4.0, Total Solid Contents are 59% w/v, Viscosity is 4.12 and Tannin contents are 4.3% w/v.

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