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PHARMACEUTICO-ANALYTICAL STUDY OF SINDHURADYA TAILA

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ABSTRACT

Analytical Study of *Ayurvedic* preparations is the need of present scientific era. Though *Ayurvedic* drugs are time tested and have been used successfully in the management of various ailments. Now a days there is a need to prove their safety, efficacy, quality to the scientific world through various analytical parameters. *Sneha kalpana* is par excellent than other dosage forms due to advantages like extraction of active principles in to *taila*. *Sneha Kalpana* is a dosage form that can be administered both internally as well as externally. *Sindhuradya taila* is an important formulation mentioned in *Rasa tarangini* for the management of *Vicharchika*, *Pama*. An attempt has been made in the present study to prepare *Sindhuradya taila* and standardize it through analytical parameters like organoleptic properties, refractive index, acid value, saponification value, iodine value, loss on drying for developing standards.

KEYWORDS: Analytical Standardization, *Sindhuradya taila*, Saponification value, HPTLC.

INTRODUCTION

Rasa shastra and *Bhaishajya kalpana* is a branch of *Ayurveda* that focuses on various aspects of preparation of medicines. It is known to establish a change in the qualities or properties of the drug either by inducing a new property or improving the existing one and finally making the drug safe and effective.

Standardization of *Ayurvedic* formulations is an important step for the establishment of

biological activity, consistent chemical profile or quality assurance of the product. In the present study, *Sindhuradya taila* was prepared by referring to the method described in the *Rasa Tarangini 21/132-164.* and further studied organoleptically, Physico chemically and chromatographically for developing standards.

MATERIALS AND METHODS

The process was carried out in two steps:

1. Pharmaceutical Study
2. Analytical Study

Procurement of raw materials

Sarshapa taila and *Haridra* were collected from local market Tirupati.

Arka patra were collected from herbal garden, *S. V. Ayurvedic* college, TTD, Tirupati. It was thenidentified macroscopically and studied for important botanical characteristics.

Giri Sindhura, Tuttha were collected from Chennai market.

Pharmaceutical study

Drugs	Quantity
Sarshapa taila	1 litre
Kalka dravya	
Arka patra	120 g
Girisindhoora	90 g
Haridra	120 g
Tuttha	1 g
Jala	4 litres

- As per the reference, *Sindhuradhya taila* was prepared with *Sarshapa taila*, *kalka* prepared out of *Haridra*, *Arka patra*, *Girisindhura*, *Tuttha*.
- *Tuttha shodhana* was done by *Bhavana* with lemon juice for 2 *yama*, *Girisindhura Shodhana* was done by *Bhavana* with *Ardraka Swarasa* and *Matulunga Swarasa* for 3 days.
- *Sarshapa taila* was taken in a wide mouthed vessel and placed over the heating device on moderate fire. *Kalka* of the above mentioned drugs was added to *Sarshapa taila*.
- *Jala* was added to *taila*, and the contents were stirred well
- To prevent the spillage of *taila* due to overflowing, a wide-mouthed large vessel wastaken for the preparation.

- The colour of *taila* changed from the light green to dark green after *paka*
- The heating was continued till the *Kharapaka lakshana* were obtained
- The foam was observed when *taila paka* completed. *Kalka* is hard, rough to touch and doesn't yield any *sneha* on pressing.
- Then the contents were filtered through a clean cloth to obtain *Sinduradhya taila Sinduradya taila* was transferred into bottles.

RESULTS

Table No. 1: Showing the results of various practicals done in the preparation of *Sindhuradyataila.*

	Name of the practical	Initial Weight(g)	Final weight(g)	Gain/Loss in weight(g)
1.	*Arka patra kalka nirmana*	500	505	Gain 5
2.	*Haridra churna nirmana*	500	480	Loss 20
3.	*Tuttha Shodhana*	50	55	Gain 5
4.	*Girisindhura shodhana*	500	510	Gain 10

Table no. 2: Showing the result of preparation of *sindhuradya taila.*

S. No	Name of the practical	Initial quantity of taila	Final quantity of taila	Loss in weight
1.	*Sindhuradya taila*	2000ml	1600ml	400ml

Analytical study

Organoleptic tests

Organoleptic tests help in providing basic information about drugs. This generally includes tests that can be done by one's sensory organs and the quality of material can beinferred up to a limited extent.

S. NO.	Parameter	Observtion
1.	Colour	Dark green
2.	Odour	Strong characteristic
3.	Touch	Unctuous
4.	Appearence	Viscous liquid

Physico-chemical tests

Physico chemical tests deal with the primary physical and chemical properties of a sample, which can hint about the internal molecular behaviours at different natural conditions. It help in understanding the stability of a drug when it is stored for a long time. Ash test give an idea about organic or inorganic chemical nature of the sample. Extrative value tests help in inferring the presence of various bio active molecules like lipids and protiens, due to their

differential solubility nature in water and alcohol.

Analysed at: CENTRAL RESEARCH FACILITY, KAHER'S SRI B. M. Kankanwadi Ayurveda Mahavidyalaya, Belagavi, Karnataka
Analysis date: 1/01/21.

A. Refractive index[1]

Definition

The refractive index (η) of a substance with reference to air is the ratio of the sine of the angle ofincidence to the sine of the angle of refraction of a beam of light passing from air into the substance. It varies with the wavelength of the light used in its measurement.

Result: The refractive Index at 40˚ c of Sindhuradya taila is 1.479ή

B Acid value[2]

Definition

Acid value is defined as the number of milligrams of Potassium hydroxide required to neutralize the free fatty acids present in one gram of fat.

Result: The acid value of the drug is 3.236 v/w.

C. Saponification value[3]

Definition

Saponification value is defined as the amount of potassium hydroxide (KOH) in milligrams required to saponify one gram of fat or oil under the conditions specified.

Result: The Sponification value of the drug is 173.5mg/g.

D. Iodine value[4]

Definition

The Iodine value is defined as the number of grams of iodine absorbed by 100gof fat.

Significance: It indicates the degree of unsaturation of a fat or oil.

Result: The Iodine value of *Sindhuradya taila* is 81.12% v/w, indicating acidic nature.

E. Loss on drying[5]

Definition

Loss on drying compares the weight of product sample before and after drying.It refers to loss of any volatile material from the sample.

Result: Loss on drying of *Sindhuradya taila* is 0.196%v/w.

3. High performance thin layer chromatography (HPTLC)

High performance thin layer chromatography (**HPTLC**) is an enhanced form of thin layer chromatography (TLC). A number of enhancements can be made to the basic method of thin layer chromatography to automate the different steps, to increase the resolution achieved and to allow more accurate quantitative measurements.

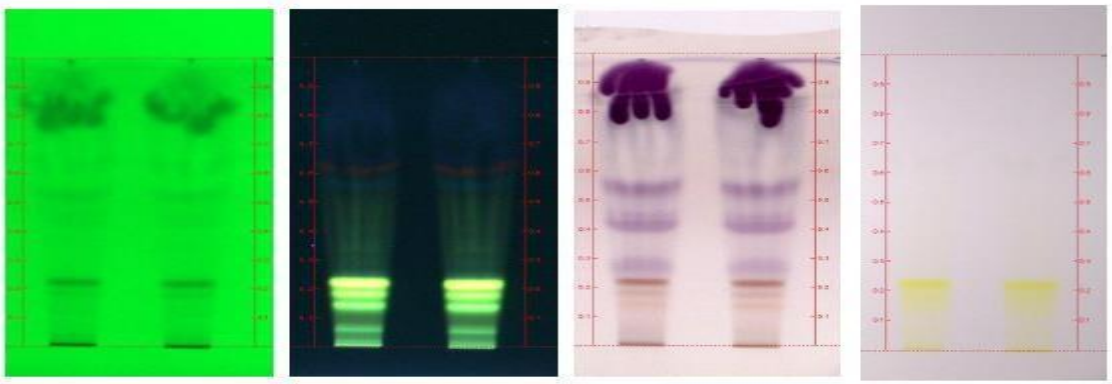
Automation is useful to overcome the uncertainty in droplet size and positionwhen the sample is applied to the TLC plate by hand. One recent approach to automation has been the use of piezoelectric devices and ink jet printers for applying thesample.

The spot capacity (Analogous to peak capacity in HPLC) can be increased by developing the plate with two different solvents, using two-dimensional chromatography. The procedure begins with development of sample loaded plate withfirst solvent. After removing it, the plate is rotated 90° and developed with a second solvent.

RESULT

- At short UV 254nm *Sindhuradya taila* sample was seen and 4 bands wereobserved at Rf values of 0.18,0.23,0.53,0.82 with Green colour intensity.
- At long UV 366nm, *Sindhuradya taila* sample was seen and 7 bands were spotted with different Rf values of 0.07, 0.13, 0.19, 0.22, 0.5, 0.62 and spotted with colour intensities of Flourescent Green, Flouescent Green, FlourescentGreen, Flourscent Green, Red, Blue respectively.
- After derivatisation with sulphuric acid, at UV 520nm there are 7 bands spotted with different colour intensities with Rf values of 0.14, 0.18, 0.22, 0.28, 0.42, 0.54and 0.93, and spotted with colour intensities of orange, Brown, Brown, Violet, Violet, Violet, Violet respectively.
- Densitometric scan at 520nm shows 13 spots, out of which maximum area Of 16.53% is seen with the Rf value of 0.86, 0.82 Next to that with the maximum area of 16.08 is observed with the Rf value 0.63.
- Consecutive maximum areas covered are 16.08%, 7.25%, 6.54% with the Rf values of 0.89,0.82,0.34,0.46 respectively.

Thin Layer Chromatography:



Under Short UV (254 nm) | Under Long UV (366 nm) | Under White light after Derivitisation (520nm) | Under White light at RT (Before Derivitisation)

R_f Table:

λ=254 nm		λ=366 nm		λ=520 nm (Derivitized)	
R_f	colour	R_f	colour	R_f	colour
0.18	Green	0.07	Fluorescent Green	0.14	Orange
0.23	Green	0.13	Fluorescent Green	0.18	Brown
0.53	Green	0.19	Fluorescent Green	0.22	Brown
0.82	Green	0.22	Fluorescent Green	0.28	Viol t
		0.5	Red	0.42	Violet
		0.62	Blue	0.54	Violet
				0.93	Violet

Graph number-Showing peaks @520 nm *Sindhuradya taila*

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	0.0 AU	0.01 Rf	173.1 AU	4.77 %	0.04 Rf	25.6 AU	2400.7 AU	1.57 %
2	0.05 Rf	19.8 AU	0.06 Rf	22.4 AU	0.62 %	0.11 Rf	3.3 AU	558.9 AU	0.36 %
3	0.11 Rf	3.4 AU	0.14 Rf	56.7 AU	1.56 %	0.16 Rf	39.6 AU	1292.1 AU	0.84 %
4	0.16 Rf	40.0 AU	0.18 Rf	97.4 AU	2.68 %	0.19 Rf	78.8 AU	2091.9 AU	1.36 %
5	0.19 Rf	79.9 AU	0.22 Rf	237.5 AU	6.54 %	0.24 Rf	72.0 AU	5785.4 AU	3.77 %
6	0.24 Rf	72.2 AU	0.27 Rf	103.6 AU	2.85 %	0.31 Rf	42.8 AU	4710.5 AU	3.07 %
7	0.34 Rf	49.0 AU	0.40 Rf	263.4 AU	7.25 %	0.46 Rf	02.1 AU	14292.8 AU	9.32 %
8	0.46 Rf	102.2 AU	0.52 Rf	229.3 AU	6.31 %	0.58 Rf	82.1 AU	13724.5 AU	8.95 %
9	0.58 Rf	82.2 AU	0.61 Rf	98.3 AU	2.70 %	0.63 Rf	93.7 AU	4014.4 AU	2.62 %
10	0.63 Rf	93.8 AU	0.81 Rf	584.4 AU	16.08 %	0.82 Rf	46.5 AU	47777.4 AU	31.15 %
11	0.82 Rf	547.9 AU	0.85 Rf	600.5 AU	16.53 %	0.86 Rf	89.2 AU	18736.8 AU	12.22 %
12	0.86 Rf	589.4 AU	0.87 Rf	600.4 AU	16.53 %	0.89 Rf	65.3 AU	14041.6 AU	9.16 %
13	0.89 Rf	565.3 AU	0.89 Rf	566.3 AU	15.59 %	0.99 Rf	5.4 AU	23940.8 AU	15.61 %

DISCUSSION

The pharmaceutical procedures adopted in this study are *Shodhana*, *Churna nirmana*, Preparation of *Kalka* and preparation of *Sindhuradya taila.*

1. ***Shodana* of *tuttha*:** *Tuttha* was subjected to *Shodana* by *Bhavana* with *Jambeera swarasa* for2 *yama*.[6]
2. ***Shodana of girisindhura*:** *Girisindhura* was subjected to *Shodhana* by *Bhavana* with
3. *Ardraka swarasa* and *Matulunga swarasa* for 3 days.[7]
4. ***Churna nirmana:*** *Haridra* was pounded and made in to *churna*.
5. ***Kalka nirmana:*** *Arka patra* were cut in to pieces and *kalka* was prepared by adding *Haridra* toit.

Preparation of *sindhuradya taila*[8]

As per the reference, *Sindhuradya taila* was prepared with *Sarshapa taila*, *Arka patra kalka*, *Haridra churna*, *Girisindhura* and *Tuttha*. *Sarshapa taila* was taken in a wide mouthed vessel and placed over heating device on moderate fire, *kalka* of above mentioned drugs was added to *Sarshapa taila*, *Jala* was added to *Taila* and contents were Stirred well. The colour of *taila* changed from light green to dark green after *paka*. The heating was continued till *Khara paka lakshana* were obtained. Foam was observed when *tailapaka* completes. *kalka* is hard, rough to touch and doesn't yield any *sneha* on pressing. *Khara paka* is good for external application beacause it is devoid of moisture content.Hence it is easily absorbed through the epidermal cells

Then the contents were filtered through a clean cloth to obtain *Sindhuradya taila.*

- Analytical study is an essential part of any research work. It provides us with experimental data (qualitative and quantitative) and makes us know about certainity of our assumptions and prevents from miss interpretations. It provides uswith the complete knowledge of our formulation like identity, size, structure of chemical constituents and physical properties. It hints us about toxic properties of drugs, if any.

Organoleptic tests

- Organoleptic tests of a substance are done with the help of sense organs. It playsa major role when the medicine is ingested orally.

The colour of taila changed from light green to dark green after taila paka.

- Strong Characteristic odour.
- Unctuous on touch of the formulation indicates the proper preparation of *Taila.*

Physico- Chemical tests

Investigating Physico-Chemical systems makes possible to determine the nature of interactions between the components of sample through a study of relationship between sample physical properties and composition.

Significance

- Refractive index indicates the possible chances of rancidity development in oil. Higherthe refractive index higher is the chances of spoilage due to oxidation.
- As the refractive index of *Sinduradya taila* is low, stability of the *taila* is more.
- Acid value is relative measure of rancidity as free fatty acids are normally formed during decomposition of triglycerides. It is one of the important parameters related to the oil quality. A high Acid value indicates the deterioration of oil, which affects its nutritive value.
- As the Acid value is low, the *taila* will not get spoiled soon.
- Loss on drying value determines the quantity of moisture a given sample contains Stability, Shelf life and microbiological safety depend on this value.
- Saponification Value helps to know how many acids (esters and free acids) are contained in a fat or oil. The greater the number of saponification, the more short- and medium-chain fatty acids the fat contains. The saponification value of *Sinduradya taila* shows that *taila* is more stable.
- Iodine value reveals the degree of unsaturation of fats/oils.
- Iodine value of *Sinduradya taila* is 81.12% V/w.

CONCLUSION

Sindhuradya taila is one of the *taila* mentioned for treatment for *Vicharchika*, *Pama*. A detailed method of preparation is available in *Rasa Tarangini*. *Sindhuradya taila* was prepared in lines with Standard operating procedure and subjected to different analysis procedures. The result of analytical study with HPTLC has been proposed as a monograph to identify and check the quality of *Sindhuradya taila*.

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