ORIGINAL ARTICLE

Physicochemical evaluation of himasagara taila

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Abstract

Context: Taila is considered as the drug of choice in vata vikaras. Taila can be used both internally and externally. Sneha is prepared in three different pakas (processed oil) - mrdu (first stage of processed oil), madhyama (second stage of processed oil), and khara (third stage of processed oil) for administration in different condition. Himasagara taila is good for vata disorders and is mentioned in Bhaishajya ratnavali. **Aims:** The aim of the study was to analyze the physicochemical parameters of himasagara taila. **Materials and Methods:** Himasagara taila was prepared in the Department of Rasashastra and Bhaishajya Kalpana, Amrita School of Ayurveda as per the reference. The obtained product was subjected to organoleptic and physicochemical analysis. **Results:** Physicochemical parameters obtained are loss on drying - 0.45%, refractive index at 30°C = 1.468 and at 40°C = 1.464, acid value - 8.95 mg/g, free fatty acid 4.5018%, saponification value 218.39 mg/g, ester value - 209.45 mg/g, unsaponifiable matter - 3.62%, peroxide value - 8.55 meq/kg, specific gravity at 30°C 0.915, and viscosity at 30°C (by Brookfield viscometer) - 54 cp. **Conclusions:** The values obtained after analysis were found to be within the permissible limits of general taila kalpana. The obtained values can be taken as standard parameters for future preparation.

Key words: *Analytical parameters, Bhaishajya Kalpana, himasagara tailam, Sneha Kalpana*

INTRODUCTION

Taila Kalpana (oil formulation) is a pharmaceutical process ensures the transformation of active therapeutic properties of ingredients into oil. Sneha Kalpana helps to extract both fat soluble and water soluble active principles from the raw material. Himasagara taila mentioned in Bhaishajya Ratnavali Vatavyadi chikitsa.[1] It is used in various neuro-muscular conditions. It reduces the burning sensation of the body. The standard parameters of himasagara taila are not mentioned in Ayurveda Pharmacopoeia of India. Analytical parameters help to bring the uniformity of finished products. The aim of the study is to analyze the physicochemical properties of himasagara taila.

SUBJECTS AND METHODS

Collection of Plant Material

The raw materials are collected from the garden of Amrita School of Ayurveda and authenticated sources.

Preparation of the Drug

Himasagara taila was prepared in the Department of Rasashastra and Bhaishajya Kalpana, Amrita School of Ayurveda in the prescribed ratio [Table 1]. All the raw materials were washed and dried properly. The drava dravya (liquid media) was collected from the following ingredients, i.e., juices of Shatavari kanda, Vidari kanda, Kushmanda, Amalaki, Salmali's root, Banana tree's root and trunk, decoction of Gokshura, Coconut water, and Sesame oil. Cow's milk (3 L) was added to the above-mentioned ingredients. The Kalka prepared out of red Sandalwood, Tagara, Kushta, Manjishta, Sarala, Jatamamsi, Saileya, Madhuyashti, wood powder of Darunakhi, Haritaki, Khatasi, Pitika patra, Kundurushka, Nalika, Lodhra, Musta, Tvak, Ela, Patra, Nagakesara, Lavanga, Jatikosha, Madhurika, Sati, Sweta Chandana,

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Table 1: Ingredients of Himasagara taila

Drug	Botanical name	Family	Parts used	Quantity
Satavari	*Asparagus racemosus*	Liliaceae	Tuber	750 ml
Vidari kanda	*Ipomoea digitata*	Convolvulaceae	Tuber	750 ml
Kushmanda	*Benincasa hispida*	Cucurbitaceae	Fruit	750 ml
Amalaki	*Emblica officinalis*	Euphorbiaceae	Fruit	750 ml
Salmali	*Salmalia malabarica*	Bombacaceae	Root	750 ml
Gokshura	*Tribulus terrestris*	Zygophyllaceae	Fruit	750 ml
Coconut	*Coccus nucifera*	Liliaceae	Fruit water	750 ml
Tila taila	*Sesamum indicum*	Pedaliaceae	Seed	750 ml
Kadali	*Musa paradisiaca*	Musaceae	Root	750 ml
Rakta Chandana	*Pterocarpus santalinus*	papilionaceae	Heartwood	12 g
Tagara	*Valeriana wallachi*	Valerianaceae	Root	12 g
Kushta	*Saussurea lappa*	Asteraceae	Root	12 g
Manjishta	*Rubia cordifolia*	Rubiaceae	Root	12 g
Sarala	*Pinus roxburghi*	Pinaceae	Heartwood	12 g
Jatamamsi	*Nardostachys jatamamsi*	Valerianaceae	Rhizome	12 g
Muramamsi	*Selinum tenuifolium*	Apiaceae	Root	12 g
Saileya	*Parmelia perlata*	Parmeliaceae	Plant	12 g
Madhuyashti	*Glycyrrhiza glabra*	Fabaceae	Root	12 g
Darunakhi	*Ipomea pestigridis*	Convolvulaceae	Root	12 g
Haritaki	*Terminalia chebula*	Combretaceae	Dried fruit	12 g
Pootika/Khatasi	*Caesalpinia crista*	Fabaceae	Root bark, seed	12 g
Pitika patra	*Salacia reticulata*	Celastraceae	Root	12 g
Kundurushka	*Veteria indica*	Dipterocarpaceae	Gum	12 g
Nalikha	*Pergularia daemia*	Asclepiadoideae	Root	12 g
Lodhra	*Symplocos racemosa*	Symplocaceae	Bark	12 g
Musta	*Cyperus rotundus*	Cyperaceae	Tuber	12 g
Tvak	*Cinnamomum zeylanica*	Lauraceae	Stem bark	12 g
Ela	*Elettertia cardamomum*	Zingiberaceae	Seed	12 g
Patra	*Cinnamomum tamala*	Lauraceae	Leaf, bark	12 g
Nagakesara	*Mesua ferrea*	Calophyllaceae	Flower	12 g
Lavanga	*Syzygium aromaticum*	Myrtaceae	Floral bud	12 g
Jatikosha	*Myristica fragrans*	Myristicaceae	Aril	12 g
Madhurika	*Foeniculum vulgare*	Apiaceae	Seeds	12 g
Sati	*Hedychium spicatum*	Zingiberaceae	Rhizome	12 g
Sweta Chandana	*Santalum album*	Santalaceae	Heart wood	12 g
Granthiparna	*Leonotic nepetaefolia*	Lamiaceae	Whole pant	12 g
Karpura	*Cinnamomum camphora*	Lauraceae	Exudate	12 g

Granthiparna, and Karpura. Then, drava dravya, ksheera, and kalka were taken in a copper vessel which is placed in a stove. The contents were stirred continuously under the mild fire until the attainment of sneha paka lakshanas (processed oil). When it attains Sneha siddhi lakshanas of khara paka[2] (third stage of processed oil), the vessel containing oil was taken out of the fire and filtered through muslin cloth. The collected taila (oil) was measured and stored in an airtight container.

Physico-Chemical Analysis

Physico-chemical parameters such as loss on drying, refractive index, acid value, saponification value, ester value, free fatty acid, peroxide value, unsaponifiable matter, specific gravity, viscosity were mentioned [Table 2] and TLC were determined.

LOD (Moisture Balance Method)

LOD determines the amount of volatile matter drying off from the sample at 110°C.

Refractive Index

R.I at 30°C was checked by Abbe's refractometer. Then, R.I at 40°C was calculated by the formula:

$R=R_1+K\ (T_1-T)$.
R=Refractometer reading to the specified temperature.
R_1=Reading at temperature T_1°C.
K=0.000385 for oils
T_1=Temperature at which R_1 taken.
T=specified temperature (40°C).

Acid Value

Acid value is the amount of potassium hydroxide in mg needed to neutralize the organic acid present in 1 g of fat/oil.

$$\text{Acid value} = \frac{\text{Titre value} \times N \times 56.1}{\text{Weight of the substance}}$$

FFA% = Acid value×0.503

Saponification Value

Saponification value expressed as the amount of potassium hydroxide in mg required to saponify 1 g of fat/oil.

$$\text{Saponification value} = \frac{(\text{Blank} - \text{titre value}) \times 1.006 \times 28.05}{\text{Weight of the sample}}$$

Ester value=Saponification value−acid value

Peroxide Value

Peroxide value is defined as the amount of peroxide oxygen per 1 Kg of fat or oil and usually expressed in units milli equivalent of active oxygen per Kg of oil (meq/kg).

$$\text{Peroxide value} = \frac{\text{Titre} \times N \times 1000}{\text{Weight of the sample}}$$

TLC

$$\text{Retention factor, Rf} = \frac{\text{Distance travelled by the compound}}{\text{Distance travelled by the solvent}}$$

RESULTS

Evaluation of Organoleptic Characters

Color: Golden yellow, Odor: Characteristic smell, State: Liquid, Taste: NA.

Physicochemical Analysis

Loss on drying - 0.45%
Refractive index at 30°C - 1.468
40°C - 1.464
Acid value - 8.95 mg/g
Free fatty acid - 4.5018%
Saponification value - 218.39 mg/g
Ester value - 209.45 mg/g
Unsaponifiable matter - 3.62%
Peroxide value - 8.55 meq/kg
Specific gravity at 30°C - 0.915
Viscosity at 30°C (by Brookfield viscometer) - 54 cp

TLC [Figure 1]

Mobile phase - Toluene:ethyl acetate (6:4)
Solvent front = 7.8 cm
R_f values = S1 0.33, S2 = 0.653, S3 = 0.73, S4 = 0.80, S5 = 0.858
Spot S1 and S3 show light gray color and S2, S4, and S5 show dark gray color.

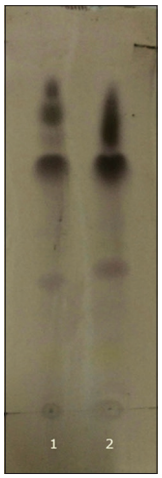

Figure 1: Thin layer chromatography plate of Himasagara taila

Table 2: Physico-chemical parameters of Himasagara taila

Sl. No	Parameters	Values
1	Loss on drying	0.45%
2	Refractive index	At 300C=1.468
3	Acid value	400C=1.464
4	Free fatty acid	8.95mg/g
5	Saponification value	4.5018%
6	Ester value	218.39 mg/g
7	Unsaponifiable matter	209.45mg/g
8	Peroxide value	3.62%
9	Specific gravity at 300C	8.55meq/kg
10	Viscosity at 300C	0.915
	(by Brookfield viscometer)	54cp

DISCUSSION

Loss on drying determines the amount of evaporating material in the sample. It may slightly vary according to different pakas of taila (processed oil) such as mrdu (first stage of processed oil), madhyama (second stage of processed oil), and khara (third stage of processed oil). However; generally, for oil, LOD should be <1. In general, acid value should be <10 meq/kg. More than 10 meq/kg indicates the rancidity of sample. Peroxide value <10 meq/kg is considered as not rancid and that >20 meq/kg is considered as rancid. Saponification depends on the kind of fatty acid present in the oil. Tila taila (sesame oil) has the saponification value in between 188 and 193.[3] Here, the himasagara taila contains milk as one among the drava dravya (liquid media) and which contains ghee in it. Ghee having the saponification value not more than 225.[4] Hence, Himasagara taila a has saponification value of 218.39, shows the presence of fat content. TLC of himasagara taila shows R_f values of 0.33, 0.73 (light gray), 0.653, 0.80, and 0.858 (dark gray).

The values obtained after analysis were found to be a permissible limit of a general taila Kalpana (oil preparation). The obtained values can be taken as standard parameters for future preparations.

REFERENCES

1. Lochan K. Baishajya Ratnavali of Govinda Dasji Bhisagratna. 1st ed., Vol. 2. 26/516-527. Varanasi: Chaukhambha Sanskrit Bhawan; 2006. p. 219.
2. Tripathi B. Sharangadhara Samhita of Sharangadharacharya. 9/14-15. Varanasi: Chaukamba Surabharati Prakashan; 2011. p. p221.
3. AYUSH. The Ayurveda Pharmacopeia of India, Part-I. 1st ed. Vol. 4. New Delhi: AYUSH; 2008. p. 224.
4. AYUSH. The Ayurveda Pharmacopeia of India, Part-I. 1st ed. Vol. 4. New Delhi: AYUSH; 2018. p. 204.

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