



IJAPC

Volume 11 Issue 2,
2019

www.ijapc.com

2350-0204

GREENTREE GROUP PUBLISHERS



Physicochemical Analysis of *Indukanta Ghrita*

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ABSTRACT

Sneha kalpana is one of the main formulations which come under secondary *kalpana* in which *sneha dravyas* are used as the base ingredient. *Ghrita kalpana* comes under *sneha kalpana*; it is a formulation in which certain drugs are processed with *ghrita* and the active component of the ingredients are incorporated in *ghrita*. *Indukanta ghrita* is a polyherbal formulation mentioned in *Sahasrayoga* which is coming under *sneha kalpana*. The ingredients present are *Puthika*, *Devadaru*, *Vilwa*, *Kashmari*, *Agnimantha*, *Patala*, *Syonaka*, *Brihathi*, *Kanthakari*, *Gokshura*, *Saliparni*, *Prishniparni*, *Pippali*, *Pippalimoola*, *Chavya*, *Chitraka*, *Nagara*, *Saindhavalavana*, *Ksheera* and *Ghrita* as the ingredients. In this study *Indukanta ghrita* was prepared as per classical reference and physicochemical analysis was done. The analytical parameters that were done include organoleptic characters, loss on drying, acid value, peroxide value, saponification value, specific gravity, refractive index, iodine value, and viscosity. The results obtained were Loss on Drying- 0.53%, Acid value- 2.52 mg/g, Peroxide value- Nil, Refractive index- 1.4552, Iodine value- 34.7, Viscosity-1043cp, Saponificationvalue- 205.8mg/g, Specific gravity- 0.916. From the present study it can be concluded that all the values of the analytical parameters were falling under the range of *ghrita kalpana*.

KEYWORDS

Indukanta ghrita, *Sneha kalpana*, *Ghrita kalpana*, Physicochemical analysis, *Ghrita*



Greentree Group Publishers

Received 25/07/19 Accepted 08/08/19 Published 10/09/19



INTRODUCTION

Ayurvedic formulations are in use since ancient period for different disease conditions. *Bhaisajya Kalpana* is a branch of *Ayurveda* which deals with the manufacturing of these *ayurvedic* formulations. These *ayurvedic* formulations have been divided into *Ahara kalpana* and *Aushada kalpana*. The *aushada kalpanas* are divided into Primary *kalpanas* and Secondary *kalpanas*. Primary *kalpanas* are called *Pancavidha Kashaya kalpana*, the secondary *kalpanas* are derived from these primary *kalpnas*. The *Pancavidha kashaya kalpana* includes *Swarasa, Kalka, Kwatha, Hima, and Phanta*. The *secondary kalpana* include *Avaleha, Ghrita, and Taila* etc.

Sneha kalpana is one of the main formulations which come under secondary *kalpana* in which *sneha dravyas* are used as the base ingredients. These are used externally and internally for *pana, abhyanga, vasti and nasya*. The *sneha dravyas* include *sarpi, taila, vasa and majja*. The *sneha dravya* which are mainly used for the medicinal preparation are *sarpi and taila*. The fat soluble components of the drugs get dissolved in the *ghrita or taila*.

Ghrita kalpana is a preparation in which certain drugs are processed with ghee and

the active component of the ingredients are incorporated in the ghee. It is one of the *kalpana* coming under *sneha kalpana*.

*Indukanta ghrita*¹ is a polyherbal formulation. It is mentioned in *Sahasrayoga*. This is mainly indicated in *vatarogas* and many other common diseases like *jwara*, etc. It contains 20 ingredients mainly *Putika, Devadaru, Dasamoola, Pippali, Pippalimoola, Cavya, Citraka, Nagara, Saindhavalavana, Ksheera, Ghrita* as the ingredients.

In this study *Indukanta ghrita* will be prepared as per the classical reference. As *ksheera* is present as an ingredient the *ghrita* will be prepared by two days and its physicochemical analysis will be done.

MATERIALS AND METHODS

Procurement of drugs

The ingredients present in *Indukanta ghrita* are *Puthika, Devadaru, Vilwa, Kashmiri, Agnimantha, Patala, Syonaka, Brihathi, Kanthakari, Gokshura, Saliparni, Prishniparni, Pippali, Pippalimoola, Chavya, Chitraka, Nagara, Saindhava lavana, Ksheera and Ghrita*.

All the raw drugs were purchased from local market and were authenticated.



Table 1 “Details of Ingredients Present in *Indukanta ghrita*”

Name of the drug	Botanical Name	Family	Parts used	Quantity
<i>Puthika</i>	<i>Holoptelea integrifolia</i>	Ulmaceae	Stem bark	333g
<i>Devadaru</i>	<i>Cedrus deodara</i>	Pinaceae	Heart wood	333g
<i>Bilva</i>	<i>Aegle marmelos</i>	Rutaceae	Root	333g
<i>Kashmari</i>	<i>Gmelina arborea</i>	Verbinaceae	Root	333g
<i>Agnimantha</i>	<i>Premna integrifolia</i>	Verbinaceae	Root	333g
<i>Patala</i>	<i>Stereospermum suveolance</i>	Bignonaceae	Root	333g
<i>Syonaka</i>	<i>Oroxylum indicum</i>	Bignonaceae	Root	333g
<i>Brihathi</i>	<i>Solanum indicum</i>	Solanaceae	Root	333g
<i>Kantakari</i>	<i>Solanum xanthocarpum</i>	Solanaceae	Root	333g
<i>Goksura</i>	<i>Tribulus terrestris</i>	Zygophyllaceae	Root	333g
<i>Saliparni</i>	<i>Desmodium gangeticum</i>	Fabaceae	Root	333g
<i>Prishniparni</i>	<i>Uria picta</i>	Fabaceae	Root	333g
<i>Chavya</i>	<i>Piper chaba</i>	Piperaceae	Stem	166g
<i>Chitraka</i>	<i>Plumbago zeylanica</i>	Plumbaginaceae	Tuber	166g
<i>Pippali</i>	<i>Piper longum</i>	Piperaceae	Fruit	166g
<i>Pippalimoolam</i>	<i>Piper longum</i>	Piperaceae	Root	166g
<i>Nagara</i>	<i>Zingiber officinale</i>	Zingiberaceae	Rhizome	166g
<i>Ksheera</i>				4l
<i>Ghrita</i>				4l
<i>Saindava lavana</i>	Rock salt			166g



Figure 1. “Preparation of *Kasaya*”

- The *kashaya dravyas* are *Puthika*, *Devadaru*, *Vilwa*, *Kashmari*, *Agnimantha*, *Patala*, *Syonaka*, *Brihathi*, *Kanthakari*, *Gokshura*, *Saliparni*, *Prishniparni*. The drugs are made into coarse powder form.
- The *kalka dravyas* are *Pippali*, *Pippalimoola*, *Chavya*, *Chitraka*, *Nagara*, *Saindhava lavana*. These are made to fine powder form.

- The *sneha dravya* is *ghrita*
- The *drava dravyas* are *ksheera* and *kashaya* made from *putika*, *devadaru* and *dasamoola*.
- The *ghrita* is prepared as per general method of preparation of *Sarangadhara*².
- The *kashaya* drugs were taken in coarse powder form 1 part of *kashaya curna* is taken and 16 parts of water is added and it is reduced to 1/4th part. Thus *Kashaya* is prepared for the preparation of *ghrita*.
- *Kalka* is prepared by taking the drugs and mixing it with little amount of *kashaya* and is made into a paste form.
- The vessel is taken and kept over fire, after the vessel becomes little hot, *ghrita* is added. After the *ghrita* got melted *kashaya*,



ksheera, and *kalka* is added simultaneously and heated in *mandagni* till *sneha sidhi lakshana (madhyama paka)* is obtained. As *ksheera* is used in preparation the preparation is completed by two days³.

- After obtaining *sneha sidhi lakshana*² the *ghrita* is filtered through cloth and stored in airtight container.



Figure 2 “Kalka prepared for *Indukanta ghrita*”



Figure 3. “Preparation of *Indukanta ghrita*”



Figure 4 “Filtration of *Indukanta ghrita*”

Physicochemical Analysis

The physicochemical analysis that are done are

Loss on Drying

Acid value

Peroxide value

Saponification value

Iodine value

Refractive index

Viscosity

Specific gravity

▪ *Loss on Drying*

Loss on drying is the amount of volatile matter present in a sample when it is dried at 105 to 110°C. The volatile matter includes moisture and volatile substances

▪ *Acid value*

Acid value is defined as the weight of KOH in mg needed to neutralize the organic acid in 1g of fat/oil.

Acid value=

$$\frac{\text{ml of KOH} \times \text{Normality of KOH} \times 56.1}{\text{Weight of sample in gram}}$$

Weight of sample in gram

▪ *Saponification value*

Saponification value is expressed as amount of KOH in mg required to saponify 1g of fat/oil.

Saponification value=

$$\frac{(\text{Blank-Sample titre}) \times 1.006 \times 28.05}{\text{Weight of sample in gram}}$$

Weight of sample in gram

▪ *Peroxide value*

Peroxide value is the number of milliequivalents of active oxygen that expresses the amount of peroxide contained in 100g of the substance. It was expressed in units of milliequivalents commonly abbreviated as meq.



Peroxide value =

$$\frac{\text{Titre} \times \text{Normality of hypo} \times 100}{\text{Weight of sample in gram}}$$

Weight of sample in gram

▪ *Specific gravity*

Specific gravity is the weight of given volume of a liquid compared with the weight of equal volume of water at the same temperature. Water being the standard for liquids and solids

▪ *Refractive index*

The refractive index of substance with reference to air is the ratio of sine of angle of incidence to sine of angle of refraction of beam of light passing from air into the substance

$$R = R_1 + K(T_1 - T)$$

R = Refractometer reading at the specified temperature

R₁ = Reading at T₁ °C

T₁ = Temperature at which R₁ is taken

T = 40 °C

K = 0.000365 for *ghrita*

▪ *Viscosity*

Viscosity is the measure of resistance to graduated deformation by shear stress or tensile stress.

▪ *Iodine value*

Iodine value is the number of grams of iodine absorbed per 100g of sample.

Iodine value =

$$\frac{(\text{Blank-Sample titre}) \times \text{Normality of hypo} (\text{Sodium thiosulphate}) \times 12.69}{\text{Weight of sample in gram}}$$

Weight of sample in gram

RESULTS

Table 2 “Physicochemical Parameters of *Indukanta ghrita*”

Organoleptic character	Colour-Green Odour-Fragrant State-Ghee like Taste- Bitter
Loss on Drying	0.53%
Acid value	2.52mg/g
Peroxide value	Nil
Refractive index	1.4552 at 40°C
Iodine value	34.7
Viscosity	1043cp
Saponification value	205.8mg/g
Specific gravity	0.916 at 27°C

DISCUSSION

Loss on drying (LOD) indicates the amount of moisture and volatile matter present in the sample. Generally LOD of ghee is less than 1%. Here the LOD is 0.53% which is falling in within the range.

Acid value indicates the presence of free fatty acid present in the sample. The free fatty acid is due to hydrolysis of glycerides by the presence of moisture. The higher free fatty acid value indicates the rancidity of the sample. In the present study the acid value is found to be 2.52mg/g. The value shows the sample is not rancid.

Peroxide value also indicates the rancidity of the preparation. It is the parameter specifying the content of oxygen as peroxide especially hydro peroxide in a substance. It is the measure of oxidation. Generally peroxide value for a non-rancid fat/oil is less than 10meq/kg. In the present



study the peroxide value was found to be nil indicating the *ghrita* is not rancid.

Iodine value indicates the unsaturation level present in the fatty acid, higher iodine value indicates higher presence of unsaturated bonds in the sample. Generally Iodine value of ghee is 30 to 40. In the present study iodine value obtained is 34.7 and is within the range.

Saponification value indicates the amount of hydrolysis of fat or oil. The Saponification value of ghee should not be more than 225⁴. In the present study the obtained saponification value is 205.8g/mg and is within the range.

Refractive index is another quality parameter and is characteristic for a particular oil/fat. It is temperature dependent. The refractive index is determined by Abbes' refractometer. Generally the refractive index of a medicated ghee lies in the range 1.4500 to 1.4600. In the present study the reading obtained is 1.4552 and is within the expected range.

Specific gravity signifies the heaviness of fat and oil. This is also temperature dependent. Specific gravity of fats and oils is generally less than 1. In the present study the reading is 0.916 and is within the expected range.

CONCLUSION

Indukanta ghrita was prepared by taking all the raw materials in prescribed quantity and prepared in the procedure of *sneha paka*. In the present study physicochemical analysis was done by analyzing analytical parameters like Loss on Drying, Acid value, Peroxide value, Specific gravity, Refractive index, Viscosity, Iodine value, Saponification value. All the values of the analytical parameters were found to be within the expected range of a *ghrita kalpana*.



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