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A Comparative Analytical Study of *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita*

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ABSTRACT

Ghrita Kalpana is the class of formulations which is mainly intended to imbibe both fat soluble and water soluble phytoconstituents of the raw drugs into *Ghrita* which is indicated as a wonderful base. *Ghrita* is known for its specific property of *Samskarasyanuvartanat*¹. *Ghrita Kalpana* is also known for its wide therapeutical actions including properties like *Rasayana*, *Medhya* etc. In the context of preparation of *Ghrita kalpana*, *Acharyas* have explained various *Dravadravyas*² like *Ksheera*, *Kashaya*, *Mamsarasa* which has to be added along with the *ghrita* while processing. *Ksheera* is a *drava dravya* which is used to potentiate the formulations when *Rasayana* or *Medhya Karma* is required. At the same time, it is important to consider the analytical parameters meant for standardisation of the final product as it is the direct indicator of the product stability. Analytical study for Standardisation of *Kalyanaka ghrita* and *Ksheerakalyanaka Ghrita* were carried out as per classically established organoleptic characters and modern analytical parameters. The results obtained were compared and it was observed that the values were similar for Refractive index, specific gravity, acid value, unsaponifiable matter and pH.

KEYWORDS

Kalyanaka Ghrita, *Ksheerakalyanaka Ghrita*, *Analytical Parameter*



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INTRODUCTION

Ghrita Kalpana is the class of formulations which is mainly intended to imbibe the fat soluble and water soluble phytoconstituents of the raw drugs into *Ghrita* which is indicated as a base. *Ghrita* is known for its specific property of *Samskarasyanuvartanat*¹. *Ghrita Kalpana* is also known for its wide therapeutic actions including properties like *Rasayana*, *Medhya* etc. In the context of preparation of *Ghrita kalpana*, *Acharyas* have explained various *Dravadravyas*² like *Ksheera*, *Kashaya*, *Mamsarasa* which has to be added along with the *ghrita* while processing. *Ksheera* is a *drava dravya* which is used to potentiate the formulations when *Rasayana* or *Medhya Karma* is required.

*Kalyanaka Ghrita*³ is extensively used for the treatment of various *Manasika vyadhi* like *Chittodhvega*, *Unmada*, *Apasmara* and other broad spectrum of diseases. *Ghrita Kalpana* holds an important place in the aspect of mental health. The ingredients of *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita*⁴ is the same except the ratio of water and addition of milk to *Ksheerakalyanaka ghrita* while processing. *Gokshira*⁵ is said to possess actions like *Rasayana*, *Alakshmi ghna*, *Medhya*, *Balya* which is

very essential for chronic diseased conditions.

The main advantages of *Sneha Kalpana* is its ability to imbibe both water soluble and fat soluble phytoconstituents. In the context of *Sneha Kalpana*, *Acharya* has explained various *drava dravya* which might have been considered after scrutinizing its potentiation action and the ability to dissolve certain phytoconstituents. *Goksheera* is the most commonly added *drava dravya* other than *kashaya* or water. With the advancement in technology, many procedures and tests were introduced for evaluation of properties and quality of Ayurvedic drugs. These tests can be indicated as a step for standardisation of the final product.

OBJECTIVES

- Assessment of organoleptic characters of *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita*.
- Physico-chemical evaluation of the two samples-*Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita* on the following parameters:
 - a. Refractive index
 - b. Specific gravity
 - c. Acid value
 - d. Saponification value
 - e. Iodine value



f. Unsaponifiable matter (%)

g. ph

SOURCES OF DATA

The study of the organoleptic characters and various physic-chemical analysis were carried out at S.D.M Centre for Research in Ayurveda and Allied Sciences, Udupi.

METHODOLOGY

The raw drug required for the preparation of *Ghrita Murchana*, *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita* were collected from the SDM Ayurveda Pharmacy, Udupi and were identified as genuine samples by Head, Department of Rasashastra and Bhaisajya Kalpana. Preparation of *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita* was carried out in the laboratory, Department of Rasashastra and Bhaisajya Kalpana, S.D.M College of Ayurveda, Udupi. *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita* were prepared according to the reference given in *Charaka Samhita* and *Chakradatta* respectively.

The analytical parameters of *Kalyanaka Ghrita* and *Ksheera Kalyanaka Ghrita* is assessed by evaluating Specific gravity, Refractive index at 25⁰ Celsius, Iodine value, Saponification value, pH, Acid value, Unsaponifiable matter estimation, Chromatography(HPTLC) as per standard procedure mentioned in protocols⁶.

Analysis of both samples were carried out at Sri Dharmasthala Manjunatheshwara Centre for Research in Ayurveda and Allied Sciences, Udupi.

RESULTS

The results obtained after assessing the organoleptic characters (Table 1) and analytical parameters of two samples (Table 2) are tabulated below

Table 1 Organoleptic Characters of Kalyanaka Ghrita and Ksheerakalyanaka Ghrita

S. No.	Parameters	K.G	K.K.G
01.	Colour	Dark Yellow	Dark Yellow
02.	Odour	Characteristic odour of ghrita	Odour of milk in the ghrita was appreciable
03.	Taste	Kashaya tikta	Kashaya tikta
04.	Appearance	Liquid	Liquid
05.	Consistency after cooling	Unctuous semi-solid and granular	Unctuous semi-solid and granular

Table 2 Results of Analytical Parameters Discussion

Parameter	Results n = 3 %w/w	
	Kalyanaka ghrita	Ksheerakalyanaka ghrita
Refractive index	1.45894	1.45794
Specific gravity	0.9589	0.9188
Acid value	9.93	7.18
Saponification value	263.27	272.50
Iodine value	30.83	37.21
pH	5.45	7.26
Unsaponifiable matter (%)	0.88	0.78

A. Organoleptic characters (Table 1)

a. Colour: The colour of both *Kalyanaka Ghrita* and *Ksheerakalyanaka Ghrita* was



brownish yellow. After cooling, it attained light yellow colour.

b. Odour: *Kalyanaka Ghrita* had the characteristic odour of ghrita but *Ksheerakalyanaka ghrita* slightly differed as the odour of milk processed in *Ghrita* was appreciable.

c. Taste: *Kashaya Tikta*.

d. Consistency-Unctuous, semisolid and granular.

B. Physico-chemical parameters

a) Specific Gravity:

Specific gravity designates the active constituents in the given sample. The existence of dissolved constituents in *Sneha* will change its specific gravity. So it is considered as an important factor for analysing medicated *Snehas*. It can be presumed that due to the process of *Murchana* more active principles may get dissolved in the finished product leading to high therapeutic efficacy.

Specific gravity is more for *Kalyanaka Ghrita* when compared to *Ksheerakalyanaka Ghrita* which indicates the presence of solutes present in given quantity of *ghrita* (Table 2)

b) Refractive Index:

The R_f index measurement is used for qualitative as well as quantitative analysis and for its structural study. It is an intrinsic property of a substance which is used in estimating identity and purity of a chemical.

It is also useful in quality control analysis of commercial products and for identifying unknown substance. The consistency of the media and solutes present in the media brings the difference in the refractive index.

Refractive index of *Kalyanaka ghrita* and *Ksheerakalyanaka ghrita* indicates the active constituents present in the sample (Table 2). Refractive index of both *Kalyanaka ghrita* and *Ksheera Kalyanaka ghrita* is observed to be almost the same value.

c) Determination of Saponification value:

Medicated ghee with high saponification value has an enhanced absorption. The number of $-COOH$ group determines the quantity of alkali required to saponify the given sample. The fats containing short chain fatty acids can imbibe more $-COOH$ groups per gram than long chain fatty acids. This will imbibe more alkali and hence will have higher saponification number. Short chain fatty acids are documented as a vital fuel source for colonocytes principally in the distal colon. Short chain fatty acids are easily absorbed which may provide a protective effect.

Saponification value is more for *Ksheerakalyanaka ghrita* compared to *Kalyanaka ghrita* (Table 2). Hence *Ksheerakalyanaka Ghrita* will be having enhanced absorption due to the addition of



Ksheera into it when compared to *Kalyanaka Ghrita*.

d) Iodine value:

Iodine value is the measure of degree of unsaturation of fat. As the iodine number increases, more will be the bonds of the unsaturated fatty acid present. When more Iodine gets attached, the Iodine value will increase and the product will become more reactive and slightly stable and increasingly vulnerable to oxidation and rancidity.

Iodine value is comparatively less for *Kalyanaka Ghrita* when compared to *Ksheerakalyanaka Ghrita* (Table 2). More unsaturated fatty acids bonds are present in the *Ksheerakalyanaka Ghrita* which may affect its stability and shelf life.

e) Determination of Acid value:

Acid number designates the amount of R-COOH groups in a chemical compound such as in fatty acids etc. Acid value designates free fatty acid present in *ghrita*. Free fatty acid profile affects the shelf life, flavour and the stability of the *ghrita*. Acid value is showing greater value for *Kalyanaka ghrita* when compared to *Ksheerakalyanaka Ghrita* which indicates that during the process of *snehapaka*, hydrolysis of *ghrita* takes place, which may be stimulated by the reaction of the triglycerides in the *ghrita* with the active principles present in *Kalyanaka Ghrita*

resulting in glycerine and free fatty acids (Table 2).

f) Determination of Unsaponifiable matter:

The unsaponifiable matters of oil are components that is unable to form soaps when merged with NaOH. Unsaponifiable matter is the non-fatty matter which is compound other than glycerides and fatty acids that remain soluble in the fat. Unsaponifiable matter is comparatively less for *Ksheerakalyanaka Ghrita* when compared to *Kalyanaka Ghrita* which may have an impact on its shelf life (Table 2).

g) pH

It expresses the acidity or alkalinity of a solution on a logarithm scale on which 7 is neutral, lower values are more acidic and higher values are more basic. The pH of *Ksheerakalyanaka ghrita* is less acidic when compared to *Kalyanaka ghrita* which may be due to the addition of *Ksheera* to it (Table 2).

CONCLUSION

On analysing the end products, it was found that both the preparations were having semisolid granular consistency. *Ksheerakalyanaka Ghrita* had a characteristic odour of *Ghrita* mixed with *Ksheera* after processing. In the comparative analytical study of both



Kalyanaka Ghrita and *Ksheera Kalyanaka Ghrita* the values were similar in case of parameters like Refractive index, specific gravity, acid value, unsaponifiable matter and pH whereas Saponification value and Iodine value showed marked differences which may be because of the addition of 4 parts of milk to *Ksheerakalyanaka* while processing it.



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