

PHYSICO-CHEMICAL ANALYSIS OF *GANDHARYADI GHRITA*

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ABSTRACT

Background: *Ghrita* is one of the Ayurvedic drugs that contain ghee as the base to dissolve or extract or hold the active therapeutic principles from the ingredients. *Gandharyadi Ghrita* is a medicated ghee formulation, comprises of Gandhari (*Fagonia cretica*), *Jatamamsi* (*Nardostachys jatamansi*) and Go-Ghrita (cow's ghee). In Vaidya sara sangraha, Uttara Khanda Ekadasha prakarana, it is mentioned that administration of *Gandharyadi ghrita nasya* i.e., administered in the form of nasal drops cures *Ardhavabhedaka* (Migraine). In this study, an attempt has been made to standardize the physico-chemical parameters for GG using modern tools. The aim of this study is to develop the pharmaceutical standards of GG and to establish the analytical parameters of GG.

Material and Methods: *Ghrita* is prepared in the GMP-certified KLE Ayurveda Pharmacy, Belgaum, Karnataka, India as per classical method. samples of GG were subjected to the analysis of organoleptic characters and physicochemical parameters such as refractive index, moisture content, acid value, iodine value, saponification value, rancidity value, microbial load, according to the Ayurvedic Pharmacopeia of India, in Ayush-Approved ASU Drug Testing Laboratory, KAHER's Shri B.M. Kankanwadi Ayurveda Mahavidyalaya, Shahpur, Belgaum, Karnataka, India.

Result and Conclusion: Standardization tests done on *Gandharyadi Ghrita* are useful in authentication and ensuring the quality of the same.

Keywords: *Gandharyadi ghrita*, analytical tests, physico-chemical, standardization

INTRODUCTION-

Gandharyadi Ghrita is a polyherbal formulation of Ayurveda representing the group of *Snehakalpa*. In the present study, the *Gandharyadi Ghrita* contained *Gandhari* (*Fagonia cretica*), *Jatamamsi* (*Nardostachys jatamansi*) and *GO- Ghrita* mentioned in *Vaidya sara sangraha*, *Uttara Khanda*, *Ekadasha prakarana* for the treatment of *Ardhavabhedaka* (Migraine) when administered in the form of *Nasya* (nasal drops) [1]. *Snehakalpana* (medicated Ghrita) is a unique oleaginous dosage form used both for topical as well as systemic administration. Quality of the drug is basic need of the era, Analytical tests are helpful to overcome the impurity or substandard of drugs. The standard of quality of any medicine is quite important for the reproducibility of the therapeutic effect. Here in this study *Gandharyadi Ghrita* was prepared and Physico-chemical studies like Refractive index, Acid value, Saponification value, Iodine value and moisture content were carried out as per the WHO guidelines, *Ayurvedic Pharmacopoeia* and *Indian Pharmacopoeia* [2].

MATERIALS AND METHODS –

Procurement of drugs –

Gandhari (*Fagonia cretica*), *Jatamamsi* (*Nardostachys jatamansi*) and *GO-ghrita* were collected from KLEU's GMP Certified Ayurveda Pharmacy, Khasbag, Belagavi, Karnataka. Authentication of the drug and Quality assessment of the drugs is done at AYUSH approved drug testing laboratory, KLEU's Shri BMK Ayurveda Mahavidyalaya, Belgaum.

Preparation of *Gandharyadi Ghrita* -

In the process of preparing *Gandharyadi Ghrita* [3] *Gandhari swarasa* was used as the *drava Dravya* and *kalka* was prepared by using *jatamansi* as per the procedure mentioned in Ayurveda. *Kalka* of *haritaki* (*Terminalia chebula*), *Amalaki* (*Phyllanthus emblica*), *Bibhitaki* (*Terminalia bellirica*), *Musta* (*Cyperus rotundas*), *Matulunga* (*Citrus aurantiifolia*) and *Haridra* (*Curcuma longa*) were being used for *Sneha murchana*. It was processed by moderate heating (around 110°C), till *Sneha siddhi lakshana*, like *sabdahinoagni -nikshipto*, *vartivat Sneha kalka* and so on, were [4] observed. When the *Sneha siddhi lakshana* appeared then the *Ghrita* was filtered. *Gandharyadi ghrita* was prepared in KLEU's GMP Certified Ayurveda Pharmacy, Khasbag, Belagavi, Karnataka (Figure 1-12).



Figure 1: Drava dravya- Gandhari



Figure 2: Kalka dravyas with Murchita dravya

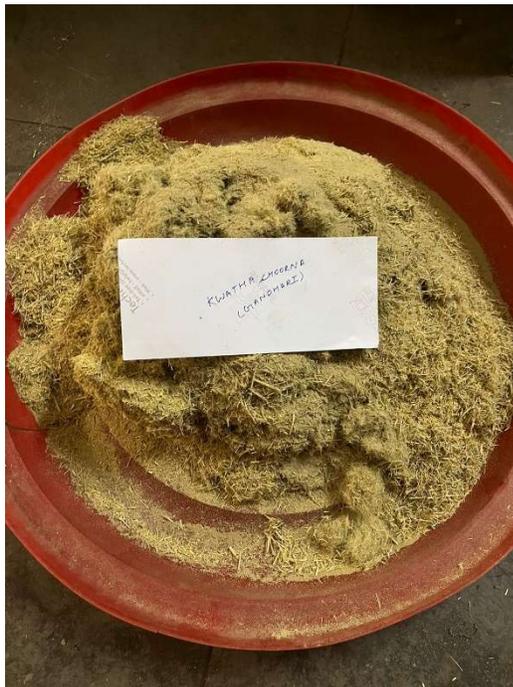


Figure 3: Coarsely powdered Drava dravya



Figure 4: Drava Dravya soaked in water overnight



Figure 5: Drava dravya reduced to one -fourth



Figure 6: Sneha dravya (Go-Ghrita)



Figure 7: Kalka dravya added to Go-ghrita



Figure 8: Drava dravya being added



Figure 9: Continous stiring done on medium flame



Figure 10: Reduction till kalka



Figure 11: Kalka



Figure 12: Filtered sneha

OBSERVATIONS –**Analytical Study –**

To ensure the quality of the prepared Gandharyadi Ghrita, the sample was analyzed to obtain parameters such as organoleptic study, moisture content, acid value, saponification value, iodine value and refractive index, according to the Quality

Control Manual of Ayurveda, Siddha and Unani Medicine (the standard protocol mentioned in books) [5]. The test was done as per the standard pharmaceutical laboratory process given in Appendix 3 (Physical test determination) of the Ayurvedic Pharmacopeia of India [6].

RESULTS-**Table 1: Showing organoleptic characters of Gandharyadi Ghrita**

S. No.	Organoleptic Characters	Results
1.	Colour	Greenish yellow
2.	Odour	Characteristic
3.	Taste	Slight bitter
4.	Touch	Greasy

Table 2: Showing chemical analysis of Gandharyadi Ghrita

S. No.	Physico-chemical Parameters	Results
1.	Acid value	4.216
2.	Saponification value	45.508
3.	Moisture content	0.346%
4.	Iodine value	31.725
5.	Refractive index	1.475

TABLE 3: Microbial Load Estimation of Formulated Gandharyadi Ghrita

Parameters	Total bacterial count (cfu/ml)	Total Yeast and Mould count (cfu/ml)	<i>E. coli</i>	<i>Salmonella SP</i>	<i>Pseudomonas aeruginosa</i>	<i>Staphyococcus aureus</i>
Observation	6 cfu/ml	No growth	Absent	Absent	Absent	Absent

DISCUSSION –**Organoleptic characters-**

The organoleptic characters of Gandharyadi ghrita are mentioned in **Table 1**.

Acid value –

The acid value indicates the free fatty acid (FFA) present in the *Ghrita*, the fatty acid profile affects the shelf-life, flavor, and the stability of the *Ghrita*. Formation of free fatty acid might be an important measure of rancidity for the *Ghrita*. FFA is formed due to

the hydrolysis of triglycerides and may be promoted by the reaction of the *Ghrita* with moisture [7]. The FFA present in the *Ghrita* indicates its identity or purity [8]. High amounts of free fatty acid (Acid Value) favor a decrease in the quality of the *Ghrita*. This indicates that during the process of Snehapaka, hydrolysis of *Ghrita* takes place, which may be promoted by the reaction of the triglycerides in the *Ghrita* with the active ingredients present in *Gandharyadi Ghrita*,

resulting in glycerol and free fatty acids. This shows that quality (nutritive), stability, and shelf life of *Gandharyadi Ghrita* is of standard quality (Table 2).

Saponification value –

Low and high saponification values are indicative of Long-chain fatty acids (LCFAs) and short-chain fatty acids (SCFAs) respectively [9]. Short chain fatty acids are readily absorbed; a greater increase in SCFA production and potentially a greater delivery of SCFAs, specifically butyrate, to the distal colon, may result in a protective effect [10]. *Gandharyadi Ghrita* has a satisfactory saponification value (Table 2), Thus, *Gandharyadi Ghrita* will improve the colonic and systemic health and it is easily absorbed and digested, and plays a protective role.

Moisture content-

It indicates the presence and percentage of moisture in the substance. Higher value of moisture suggests that *ghrita* is more susceptible for getting contaminated. The moisture content in *Gandharyadi ghrita* sample were within permissible limit, indicating that they were free from contamination (Table 2).

Iodine Value-

Iodine values determine the unsaturated fatty material present in the *Ghrita*. It also improves the nutritional status and reduces

systemic inflammation [11]. The higher the iodine number, the more are the unsaturated bonds present in the fat. A high iodine value indicates that the fats are a rich source of polyunsaturated fatty acids that possess health benefits such as regulating blood cholesterol levels [12]. *Gandharyadi Ghrita* has a satisfactory iodine value which be used for quality assessment and standardization of *Gandharyadi Ghrita* (Table 2).

Refractive Index -

Refractive index is the ratio of the velocity of light in a vacuum to its velocity in the substance. More the Refractive index, there will be more concentration of light which facilitates rancidification of *Ghrita* i.e. decomposition of *Ghrita*. The refractive index in *Gandharyadi ghrita* sample were within permissible limit, indicating that some active substances of *Gandhari*, *jatamamsi* and *murchana dravyas* were incorporated into *Go-ghrita* (Table 2).

Microbiological Limit Test-

Microbial load estimation shows total bacterial count and total yeast and mould count. Test for another specific pathogen is negative defined in (Table 3).

CONCLUSION-

It is concluded from above analytical parameters that *Ghrita* is under normal limits as per standards. Hence, the average values of

the analytical parameters may be used for quality assessment and standardization of *Gandharyadi Ghrita*.

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