



Physico-Chemical Analysis of Murchita and Amurchita Shadanga Ghrita

Negi L^{1*}, Sharma U², Yadav Y³ and Sharma K⁴

¹MD Scholar, P.G. Department of Rasa Shastra & Bhaishajya Kalpana, Uttarakhand Ayurved University, India

²Associate Professor, P.G. Department of Rasa Shastra & Bhaishajya Kalpana, Uttarakhand Ayurved University, India

³Assistant Professor, P.G. Department of Rasa Shastra & Bhaishajya Kalpana, Uttarakhand Ayurved University, India

⁴Professor and H.O.D., P.G. Department of Rasa Shastra & Bhaishajya Kalpana, Uttarakhand Ayurved University, India

*Corresponding author: Laxmi Negi, PG Department of Rasa Shastra evam Bhaishajya Kalpana, Uttarakhand Ayurved University, Rishikul Campus, Haridwar, India, Tel: 07895183081; Email: dr.laxminegi09@gmail.com

Research Article

Volume 7 Issue 4

Received Date: June 05, 2023

Published Date: October 05, 2023

DOI: 10.23880/jonam-16000415

Abstract

Background: Contagious diseases are the most common cause of death globally and Atisaar is one of them. More than 1 billion cases and at least 4 million deaths per year are attributed to diarrhoea worldwide. Ayurvedic literature has numerous uninvestigated medicines, Shadanga Ghrita is one of those classical herbal formulations used in the management of Atisaar, mentioned in the famous text Chakradatta. Preparation of this oleaginous dosage form is described as Sneha Kalpana, done by subjecting Ghrita to a particular pattern of heat-treated with 1/4th part *Kalka* (paste) and 4th part of Kwatha (decoction) of the respective drugs in equal proportion. Till date, no research work has been done on the study of Shadanga Ghrita. So the present study was planned to evaluate the Physio-Chemical analysis of Shadanga Ghrita with and without Murchana.

Aim and Objective: Aim was to prepare the sample of Shadanga Ghrita with & without Murchana and to evaluate both the formulations through pharmaceutical and analytical parameters.

Material and Methods: Murchana of Ghrita was done as per Bhaishajya Ratnavali Jwara-rogadhikaar & Shadanga Ghrita was prepared as per Sharangdhar Samhita.

Result: All the Physico-chemical parameters of both the samples are within the reference range

Conclusion: Murchita Shadanga Ghrita is better than Amurchita Shadanga Ghrita due to better taste, odor, low viscosity, high saponification & high peroxide value.

Keywords: Shadanga Ghrita; Murchana; Atisaar; Sneha Kalpana

Introduction

Sneha Kalpana (lipid preparations) is one of the commonly prescribed Ayurvedic dosage forms used in day-to-day practice. Ghrita and Taila are the most common varieties of Sneha described in classical Ayurvedic texts.

Even though the Murchana procedure is not mentioned in Samhita Granthas but it has been described in Chakradatta [1] that the Murchana process is the first step towards any Sneha Paka process but here is just mentioned about the word Murchana. Later on, it has been detailed described in Bhaishajya Ratnavali [2] that before the preparation of

medicated Ghrita, Murchana Samskara is done to remove the impurities, Amadosha (unripe or unmetabolized food material) and Gandhdosha (bad odor) present in the Ghrita. Ghrita also attains qualities like change in color and odor and it also ensures the up-gradation of therapeutic properties in medicated ghee. Without Murchana, Ghrita is expected to become rancid [3]. Therefore to obtain expected results and standard qualities, Ghrita Murchana is required in addition to its physical and chemical stability along with therapeutic efficacy.

Although Ghrita Kalpana is unpopular for the treatment of Atisaar but during the Samhita period, it was very popular Kalpana for treating Atisaar. There are 34, 14 and 15 Ghrita- based formulations mentioned in Charaka Samhita [4], Sushruta Samhita [5] and Ashtanga Hridaya [6] respectively for the treatment of Atisaar. The eminent Acharya Chakrapanidatta [7] had depicted Shadanga Ghrita for the treatment of Atisaar (Diarrhoea). Here with reference to the Murchana Sanskar which was not applied by any aforesaid Acharya's, so an effort was made to observe the effect of Murchana Samskara of Ghrita (Shadanga Ghrita) by comparing it with Amurchita Ghrita based on authenticated analytical parameters.

Aims and Objectives

- To prepare the sample of Murchita and Amurchita SG.
- To analyze the variations expected after Murchana (processing of Ghrita)
- To compare the analytical parameters of Amurchita and Murchita SG.

Material and Methods

Pharmaceutical Study

Procurement of raw material: Raw drugs required for the preparation and *Murchana* of *Ghrita* were collected from the local market of Haridwar and identified in the Department of Dravyaguna Vigyanam, (Brochure No. DG/RC/UAU-73, 04/05/2022) at Rishikul Campus Haridwar and Pharmacognostical lab of Gurukul Kangari University, Haridwar. To reveal the importance of Murchana Samskara in Ghrita preparation, two samples of Ghrita were prepared. One was Murchita SG i.e., Sample A and the second one was Amurchita SG i.e., Sample B.

Preparation of Murchita Shadanga Ghrita

Murchana of ghrita [8]: The main aim of the Murchana process is to remove the Ama Dosha (unripe or unmetabolized food material) and Durgandhata (bad odor) from the raw Gou-Ghrita. Ghrita Murchana was done with Amalaki (*Emblica*

officinalis Gaertn), Haritaki (*Terminalia chebula* Retz), Bibhitak (*Terminalia bellirica* Roxb), Haridra (*Curcuma longa* Linn), Musta (*Cyperus rotundus* Linn), and Matulunga (*Citrus medica* Linn) Swaras. The above mentioned Murchana drugs except Matulunga (*Citrus medica* Linn) were dried in sunlight till dryness and then coarse powder (10-40 mesh size) of these ingredients, each 70 gm have been prepared and then 70 ml Matulunga (*Citrus medica* Linn) Swaras (Juice) was added. Then whole material was transferred into Kharal for making the Kalka. To start the Murchana process, Gou-Ghrita (1.152 kg) was taken into a stainless steel container and heated on Mridu Agni (mild temperature 50-90°C) [6] and then Kalka (paste of Drugs) and four times water was added to it, for proper Sneha Paka. The total mixture of Ghrita, Kalka and water was processed on mild heat till Madhyama Paka. During the whole procedure, the material was stirred continuously to avoid burning and sticking Kalka to the bottom of the container. This process was completed in 13 hours 45 minutes and has been used for the preparation of Murchita SG.

For preparing the formulation Shadanga Ghrita, 768 gm of Murchita Ghrita was taken and subjected to mild heat. Then, 192 g of Kalka containing Kutaj (*Holarrhena antidysenterica* Wall), Daruharidra (*Berberis aristata* DC), Pippali (*Piper longum* Linn), Shunthi (*Zingiber Officinalis* Rosc), Katuka (*Picrorhiza kurroa* Royle ex Benth), Laksha (*Laccifer lacca* Kerr.) each 32 g and 3.072 L Kwatha of same ingredients were added to it. The mixture was stirred continuously to avoid adhering ingredients to the bottom of the vessel. The heating was accomplished for 9 hours and 40 minutes, till the Sneha Siddhi Lakshanas [9] appears i.e. formation of Varti (Sneha Kalka becomes wick-like, when rolled between Thumb & index finger). No crackling sound was produced when it was sprinkled over fire. Foam has been subsided and specific color, odor and taste of ingredients were observed. Then, the vessel was taken out from the stove and the contents were filtered through a doubled-fold clean muslin cloth. 520 ml of Murchita Shadanga Ghrita was obtained and it was stored in a clean, dry and air-tight glass container after self-cooling.

Preparation of Amurchita Shadanga Ghrita [8]

In a stainless steel vessel, 768 gm of Gou-ghrita was taken and subjected to mild heat. Then, 192 gm of Kalka having aforesaid ingredients, each 32 g and 3.072 L Kwatha of same drugs were added to it. The mixture was stirred continuously to avoid sticking and burning ingredients to the bottom of the vessel. The heating process was carried out for 9 hours and 15 minutes, till the Sneha Siddhi Lakshana (a feature of completion of the process of medicated Ghrita) appeared. Then the vessel was taken out from the fire and the contents were filtered through a double-fold clean muslin cloth. The total yield of Amurchita Shadanga Ghrita was 480 gm and

was stored in a clean, dry air-tight glass container after self-cooling.

Analytical Parameters

The samples of Murchita and Amurchita SG were

subjected to analysis as per the references available in the API [10] such as Description, odor, taste, specific gravity, Moisture content, Viscosity, Acid value, Peroxide Value, Refractive index, Iodine value, Saponification value, Heavy metal analysis and Microbial load estimation.

Observations & Results

Sr.No	Test Parameters	Murchita SG	Amurchita SG
1	Description	Yellowish green colored semi-liquid ghee	Greenish yellow colored semi-liquid ghee
2	Odor	Characteristic	Characteristic
3	Taste	Characteristic	Characteristic
4	Specific Gravity	0.919	0.918
5	Moisture content by KF	0.89%	0.91
6	Viscosity by Ostwald @ 40 0c	11.32 cP	19.89 Cp
7	Acid Value	0.84	0.93
8	Peroxide Value	15.51	15.53
9	Refractive index	1.451	1.449
10	Iodine value	33.18	37.68
11	Saponification value	211.8	212.96

Table 1: Physicochemical characters of Murchita and Amurchita Shadanga Ghrita.

S.No	Heavy metals	Murchita SG	Amurchita SG	Possible limit
1	Lead	Not detected	Not detected	10 ppm
2	Cadmium	0.004 ppm	0.004 ppm	0.3 ppm
3	Mercury	0.001 ppm	0.002 ppm	1 ppm
4	Arsenic	0.014 ppm	0.018 ppm	3 ppm

Table 2: Heavy metals Analysis of Murchita and Amurchita Shadanga Ghrita.

S.No	Parameters	Murchita SG	Amurchita SG	Limit As Per API
1	Total microbial plate count (TPC)	25 cfu/g	52 cfu/g	105 cfu/g
2	Total Yeast and Mould Count (TYMC)	Absent	Absent	103 cfu/g
3	Staphylococcus aureus	Absent	Absent	Absent / g
4	Salmonella sp.	Absent	Absent	Absent / g
5	Pseudomonas aeruginosa	Absent	Absent	Absent / g
6	Escherichia coli	Absent	Absent	Absent / g

Table 3: Microbial load estimation of Murchita and Amurchita Shadanga Ghrita.

Discussion

Ghrita Kalpana is an Ayurvedic lipid-based preparation in which Ghrita is boiled with prescribed Drava (liquid media) & Kalka (fine paste of herbs) so all the lipid soluble active ingredients transferred into it. Even though the Murchana

procedure is not mentioned in Samhita period, later Granthas like Bhaishajya Ratnavali, etc. have specific information on the Murchana procedure. Murchana process causes the removal of Amadosha which inhibits lipid peroxidation and incorporated anti-oxidant properties for augmentation of the medicinal properties of the medicated Ghrita. These

Murchana herbs are rich sources of polyphenolic compounds such as gallic acid, chebulinic acid, ellagic acid, flavonoids and tannins, hence helps in protection against oxidative damage as they have been proven to show free radicle scavenging potential [11] and helps in maintaining the necessary ratio of unsaturated and saturated fats suitable for human physiology. Initially, 1.152 kg of Gou-Ghrita was taken for Murchana process, After Murchana process 1.030 kg of Murchita Ghrita was obtained and 768 gm of this Murchita Ghrita was taken for the preparation of sample A, while 768 gm of Gou-Ghrita was taken for the preparation of sample B. After preparation, the obtained quantity was 520 gm and 480 gm respectively for sample A and sample B. Total duration of the heating process required for Murchana of Ghrita was 13 hours 45 minutes for four days. Total quantity of raw material used in Murchana process was 420 gm *Kalka*, and 4.608 l water. The total duration of the heating process required for the preparation of Shadanga Ghrita was 9:40 hrs for sample A and 9:30 hrs for sample B. The total quantity of raw material used in Shadanga Ghrita was 768 gm Murchita Ghrita, 192 gm *Kalka Dravya*, 3.072 L *Kwatha* in sample A and 768 gm plain cow ghee, 192 gm *Kalka Dravya* and 3.072 L *Kwatha* in sample B.

The organoleptic study of Murchita and Amurchita SG showed greenish-yellow color, characteristic taste, odor, yellowish-green and greenish-yellow color respectively, as mentioned in table 1.

Viscosity is a property of a liquid, which is closely related to the resistance to flow. The viscosity of Ghrita is inversely proportional to the rate of absorption i.e., it increases with a decrease in the rate of absorption. The viscosity of Murchita SG is 11.32 cP and Amurchita SG is 19.89 cP. Murchita SG is less viscous, which means its rate of absorption is rapid and absorbs into the gut easily and fast in comparison to Amurchita SG.

The Moisture content of the Ghee sample was determined by the KF method, for Murchita SG it was 0.89 % and for Amurchita SG it was 0.91%

The presence of dissolved substances in Sneha is expected to change its specific gravity. Hence, it is considered to be an important parameter for analyzing medicated Sneha. In this study, the solvent is Ghrita and the solute refers to the extraction of active principles from the Ghrita. The specific gravity of Murchita SG is slightly higher in comparison to Amurchita SG, which indicates the extraction of active principles during the Murchana process.

The Refractive index is an intrinsic property; hence, it is used in determining the identity and purity of a substance. The consistency of the media and solutes present in the

media brings the difference in the refractive index. Hence, it is an important parameter for differentiating the Sneha's. There is no difference in the refractive index value of both samples.

The acid value indicates the free fatty acids in the Ghrita sample. The free fatty acid is responsible for the Rancidity of the compound. Higher free fatty acid makes them more rancid. Less percentage of free fatty acids or no free fatty acids lowers the chance of the rancidity of the compound. The acid value of Murchita SG is less in comparison to Amurchita SG which means Murchita SG has less chance of rancidity, & thus has an increased life span and therapeutic value. Hence, the Murchana process might be the reason for the prerequisite for all oily formulations.

Peroxide value is a measurement of several miliequivalents of active oxygen that expresses the amount of peroxide contained in 1000 g of substance. Peroxide value signifies the percentage of oxidation of Ghrita. It helps us to find the stability of the sample. If the peroxide value is more, it shows more oxidation and the chances of attaining rancidity are also more. The peroxide value of Murchita SG is less which indicates that it is more stable in comparison to Amurchita SG.

Iodine value is an identification measure of the degree of unsaturation in oil. The iodine gets incorporated into the fatty acid chain wherever double bonds exist. Hence, the measure of iodine absorbed by ghee gives the degree of unsaturation, i.e., recodification. Iodine value is inversely proportional to the shelflife of Ghrita. Therefore, the shelflife of oil will reduce with the increment in iodine value. The iodine value of Murchita SG is less in comparison to Amurchita SG.

The saponification value is the number of mg of potassium hydroxide required to neutralize fatty acids, resulting from the complete hydrolysis of 1 gm of Ghrita. A high saponification value indicates the presence of fatty acids of lowmolecular weight (molecules are in simple form). A low saponification value indicates that the molecules are in a complex form. Medicated ghee with a high saponification value has better absorption. The saponification value of Murchita SG is high which indicates that it is easily absorbed and digested in comparison to Amurchita SG.

The limit test for heavy metals is designed to determine the content of metallic impurities that are colored by sulfide ions, under specified conditions. Heavy metal analysis reveals the content of lead, cadmium, mercury and arsenic in both samples are absent or negligible in both samples, as mentioned in Table 2, denoting safe for consumption. Microbial load estimation shows a total bacterial count of 25 cfu/g in Murchita SG and 52 cfu/g in Amurchita SG. The total

fungal count was absent for both the samples, denoting the good shelf life of the formulation.

Conclusion

Ghrita Kalpana was very popular for the treatment of Atisaar during the Samhita period. From the above discussions, it may be concluded that all the physio-chemical parameters are within the reference range and the drugs used in the Murchana process attributes good color, aromatic odor and astringent taste. It also helps in increasing the specific gravity due to attributing some constituents in the Gou-Ghrita. Heating of Ghrita during the Murchana process reduces the degree of saturation of Ghrita and enhances the degree of unsaturation which is beneficial for human health by reducing cholesterol and LDL cholesterol. Hence, the medicated Ghrita should be prepared by taking the Murchana process which increases the therapeutic and shelf life of Ghrita.

References

1. Vaidayaprabha TI (2005) In: Sri Chakpanidatt (Ed.), Hindi Commentary on Chakradatta. Chaukhambha Sanskrit Sansthana, Varanasi 67(27): 396.
2. Mishra SN, Siddhiprada Hindi Commentary on Bhaishajya Ratnavali of Kaviraj Govinddas Sen. Chaukhamba Subharati Prakashan, Varanasi 5(1266): 206.
3. Kandibagil VR, Sarashetti RS (2017) Assessment of Significant Role of Murchana Samskara of Ghrita by Physico-chemical analysis. Int J Res Ayurveda Pharm 8(2): 162-165.
4. Thakral KK, Samgrah N, Chandrika N (2017) Hindi Commentary on Sushruta Samhita. Uttartantra, 40: 295-339.
5. Gupt KA, Vidhyotini (2016) Hindi commentary on Astang Hridaya, Nidan Sthan, Atisaar Chikitsadhyay. 9: 480-492.
6. Vaidayaprabha TI (2005) In: Sri Chakpanidatt (Ed.), Hindi Commentary on Chakradatta. Chaukhambha Sanskrit Sansthana, Varanasi 67(27): 396.
7. JiwanpradaSS (2005) Hindi Commentary on Sharangdhar Samhita, Madhyama Khanda, Sneha Kalpana. 4th (Edn.), Chaukhamba Orientalia, Varanasi 9(1): 115.
8. Anonymous, API, (2008) Government of India Ministry of Health and Family Welfare, Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha, Homoeopathy 2(3): 257-258.
9. JiwanpradaSS (2005) Hindi Commentary on Sharangdhar Samhita, Madhyama Khanda, Sneha Kalpana. 4th (Edn.), Chaukhamba Orientalia, Varanasi 9(13): 117.
10. Anonymous, API, (2008) Government of India Ministry of Health and Family Welfare, Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha, Homoeopathy 2(3): 216- 220.
11. Gurav NS, Gurav SS, Sakharwade SN (2020) Studies on Ashwagandha Ghrita with reference to Murchana process and storage conditions. Journal of Ayurveda and Integrative Medicine 11(3): 243-249.

