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CASE REPORT

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GHRITA KALPANA – CURRENT ISSUES AND POSSIBLE ALTERNATIVES SRUTHI SANKAR P.¹ SUBIN V.R.²

ABSTRACT:

Ghrita-kalpana has an inevitable role among Ayurveda treatment modalities. Ghrita used in ancient times was produced from cattle raised organically. Authors of Ayurveda had mentioned the attributes of Ghrita based on the dairy practices of those times. Ghrita-kalpana used in current practice may not be equivalent to that explained in classic texts of Ayurveda. Nowadays cattle are kept away from their natural habitat and fed on artificial feeds. The quality of milk and milk products from such cattle have become a matter of concern. Apart from this bioaccumulation/biomagnification of antibiotics, synthetic growth hormones, pesticides etc. from fortified cattle feeds, increased rate of adulteration, mixing of various milks together, addition of coloring agents, different methods of preparation are some factors affecting the safety of Ghrita. In case of unavailability of genuine bovine products other alternatives for Ghrita need to be explored. One such alternative for Ghrita was mentioned in the text *Bhojana Kutuhalam*. Among the six-yoga explained, one yoga is devoid of any bovine content. Hence, this yoga was selected and prepared in the kitchen of Panchakarma department of VPSV Ayurveda college hospital, Kottakkal. HPTLC was done at CMPR and QC laboratory, Kottakkal. Phytochemical analysis was done at R and D Arya Vaidya Sala, Kottakkal. The findings even though inconclusive may be a first step in the direction of exploring possible alternatives for *Ghrita*.

Key words: Artificial ghee, Ghrita-kalpana, BhojanaKutuhalam, Analytical study

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INTRODUCTION:

Ghee has an integral relation with Indian socio-cultural systems. As a diet, it is the richest source of edible fat and has so many health benefits. Ghee, the clarified fat/butter, has a high calorific value and forms a rich source of dietary energy. It also contains anticarcinogens. Moreover, it acts as a vehicle for fat soluble vitamins. It is also interesting to note that it only contains 0.2% to 0.4% of cholesterol. Even though it is one of the costliest edible fats used in India, it is used widely in Indian cuisine.

Ayurveda, the science of life, considers the body in its healthy and disease states. In Ayurveda, ghee is called as ghrita or sarpi. There are different types of ghrita, according to the animal origin. Go-ghrita (cows' ghee) is normally taken as ghrita, and its diverse usages can be found in Ayurveda. Among the four types of sources of fats told in Ayurveda, viz., ghee, taila (oil), vasa (muscle fat) and majjja (bone-marrow), ghee is superior due to its properties like samskara anuvartana (power to assimilate effectively the properties of other substance) and avidahitwad (doesn't cause burning sensation)^[1]. Besides it is agni deepana (which strengthen digestive system), delicious, and *satmya* (congenial/ conducive) for everyone since childhood. In therapeutic usage, it is mainly used in diseases of vata*pitha* origin ^[2]. Ghee is used both externally

and internally. Internally it is used for *sodhana, samana* and *brimhana* purpose. It is also an ingredient in various formulations used *for Nasya, Vasti, Dhoopana, Gandoosha, Kabala, Dhara, Lepa, Tarpanam and Aschotanam etc*^[3].

Ayurveda explains two types of ghrita, i,e ksheerotha ghrita (ghrita obtained from direct milk by churning without fermentation) and dadhyutha ghrita (traditional method or obtained from butter produced by churning curd after fermentation of milk) ^[4]. The differences in method of preparation also affect the attributes of ghrita. The indications of two types of ghrita are also different. Ayurveda pharmaceuticals are using ghee which is available in the market. It is similar to that of ghrita obtained from milk through direct cream method. The presence of solid fats and free fatty acids in less quantity has been reported in studies on desi ghee (traditional method) ^[5]. This raises a concern about its use in medicinal preparations as far as suitability is concerned.

Nowadays industrialization, globalization, and population explosion in India lead to increased demand of resources including dietary items. The ghrita mostly from dairy farm products, is available in the market today. Since it is one of the costliest edible oils used all over India, it is highly prone to adulteration with other cheaper oils and fats. Common adulterants are vegetable/plant oils, animal body fats, hydrogenated vegetable oil (dalda) etc. The adulteration of ghee can start at the stage of milk itself. Nowadays diary industries are collecting mixture of milk from different varieties of cow or from buffalo. Properties of buffalo milk different from that of cow's milk. Buffalo milk is *gurutara* (heavy to digest) and *seetatamam* (cold potency) than cow's milk ^[6]. Ghee made from this mixture of milk will not give the desired effect.

Studies also found that non-organic milk tested positive for illegal antibiotics, high levels of growth hormones etc. Pesticides like HCH, DDT, Synthetic pyrethroid and Organophosphate are used extensively in agriculture and are detected in a wide array of grass which is been eaten by animals and residues of theses pesticides are transported to food chain^[7]. There is a risk of getting pesticide residue from ghee through the process of bio accumulation and biomagnification. Moreover, the standards prescribed by the regulatory authorities are in general for ghee and not specifically for cow's ghee. Etiological factors of Snehavyapat are the use of sneha-dravya of inferior quality, adulterated drugs etc. which may result in adverse events. This may adversely affect the outcome of Ayurvedic treatments especially Panchakarma. Therefore, exploring the

possible alternatives to ghrita-kalpana was undertaken.

Upon searching the literature, a reference Bhojanakutuhalam, from written by Raghunatha Suri in 17th AD was found regarding artificial ghee. This text deals with various aspects of food in the perspective of Ayurveda. The author has compiled in a systemic manner all the information available about food right from ancient texts like Charaka Samhita etc., to medieval texts that were available in his time. Thus, it gives extensive information on the history of food science and technology of India. It mentions six formulations under the subsection kritrimaghrita (artifical ghee) [8]. Among that only one yoga is devoid of any bovine product. Rest five formulations contain either milk or ghrita. Hence an attempt was made to pharmacologically analyze one artificial ghee formulation which is devoid of bovine product as a possible alternative for ghee.

MATERIALS AND METHODS

Materials

 Instruments: raw drugs and kitchen utensils

 Table no.1 - Materials for Preparation of

 medicine.^[8]

Drug	Scientific	Part	Amount
	name	used	
Punnaga	Calophyllum	Fruit	72 gm
phalam	inophyllum		
Lasunam	Allium	Bulb	48 gm
	sativum		
Sarkara	Dodecacarb	Purified	72 gm
(C ₁₂ H ₂₂ O ₁	on	fiber	
1)	monodecah		
	ydrate		
Tila	Sesamum	Oil	768 ml
tailam	indicum		

Medicines - Krishnatila taila(gingelly oil), lasuna(garlic),sugar were collected from local market at Kottakkal. Punnagaphala (ripe) was collected from local market at Cherthala.

METHODS:

The pharmaceutical preparation was done in kitchen of Panchakarma Department, VPSV Ayurveda College and Hospital, Kottakkal. It was subjected to pharmaceutical evaluations HPTLC at CMPR, QC Laboratory, Kottakkal.

Sneha kalpana was done by using one part of kalka dravya, four parts of sneha dravya and sixteen parts of dravadravya(liquid medium). This mixture is boiled until "snehasidhi lakshanas" are attained ^[9].

 Kalka: Firstly, sugar was made into powder.
 Then fresh garlic and punnaga phala were made into paste separately. Three of them together were made into paste form by adding a small amount of water thereafter.

- 2) Sneha dravya: Tila tailam (4 parts)
- 3) Drava dravya: Water (16 parts)

Preparation of Artificial grita: Tila taila was heated over *mandagni* till it got evaporated of moisture content. Then three liters of water were added to it, followed by kalka (drugs used as a fine paste) which is made by the above-mentioned drugs by adding enough water to it. After thorough mixing of kalka, the mixer was subjected to heat and stirring was continued for making mridu paka. When the mridupaka snehasidhilakshanas were obtained the vessel was taken out from fire and kept for 1 day. A sample of the same was collected and kept aside. Next day it was again heated over mandagni till snehasiddhi lakshanas were obtained (madhyma paka). That was a complete subsidence of foam and the consistency of kalka became vartivat(wick-like shape), and the sound got subsided while kalkam was shown into fire^[10]. It was observed that the phenopasamam was obtained. Then the vessel is taken out from the fire and filtered by using a clean cloth and collected in a plastic container.

RESULTS (Pharmaceutical evaluation)

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Table no.2- Organoleptic properties

	1	1
	Mridu pakam	Madhyama pakam
	(Sample A)	(Sample B)
Colour	Greenish brown oil	Greenish brown oil
Appearance	Not clear	Clear, transparent
Presence of sediments	Turbid	Free from sediments
Taste	Tikta rasam Madhura anurasam	Tikta rasam
Smell	Smell of punnaga phala	Smell of punnaga phala

Table no.3- Results of Phyto-chemical analysis

Parameters	Mridupakam	Madhyama pakam	Ghee
			(Traditional method)
Acid value	6.8	6.2	3-6
Saponification value	183.3	194.7	220-232
lodine value	108.8	109.7	26-38
Refractive index	1.467	1.467	1.45

Photographs of preparation:



Figure 1: Crushed punnaga phala and lasuna



Figure 2: Raw materials



Figure 3: Paste of lasuna and punnaga phala



Figure 4: Stage between preparation



Figure 5: End of snahapaka

High Performance Thin Layer Chromatography:

Phytodocumentation of Mridupaka at 366 nm (short wave) mainly 11 major spots and RF values are 0.19, 0.26, 0.30, 0.41, 0.49, 0.55, 0.63, 0.66, 0.75, 0.82 and 0.94. Phytodocumentation of Madhyamapaka



Figure 6: End product

showed 7 major spots and RF values are 0.19,0.26,0.53,0.62,0.76,0.83, and 0.93. For Ghee it showed only 5 major spots and RF values are 0.13,0.19,0.65,0.76, and 0.93. Among that only at a max RF of 0.19 three of the samples got area % that is 2.76%,1.44%, and 1.18% for Mridupaka, Madhyamapaka and ghee respectively.



Figure 7: visualizer document-plate state image information of White RT,366nm,254nm respectively

DISCUSSION

Lack of clarity in the text with respect to the method of preparation of kritrima ghrita was noted as the text only explains six formulations for preparation. Description regarding kritrima ghrita is not explained under *adhikaranam* of milk and milk product. The reason for not explaining the concept of kritrima ghrita in that context is somewhat ambiguous. Detailed methods of preparation, exact indications for kritrima ghrita, its attributes, rasapanchaka, doshaharatva and organoleptic properties were not mentioned. Also, the background for the concept of kritrima ghrita by Raghunath Suri in that era is a matter of debate. It can only be thought that they may have faced some scarcity for milk and milk products, or they have foreseen to happen in future, or to value addition in culinary practice.

Phytochemical analysis, organoleptic analysis and HPTLC profile results of two samples taken at two different paaka/stage along with ghrita in traditional method shows that the prepared artificial ghrita is not similar as that of original ghrita. There is scope for betterment with respect to more pharmaceutical evaluation because these pharmaceutical evaluations may not be enough to conclude that the prepared ghrita is dissimilar from ghrita prepared in traditional method. As the ingredients were collected from the local market at Kottakkal, the quality and attributes of raw materials may have influenced the outcome. Same preparation by using unripe punnaga phala could be prepared and studied. Same ingredients in different proportions, or in different order of mixing could also be studied.

Processes like *Aavartana* may be tried in the preparation to make it into a similar consistency of ghrita. As *Aavartana* procedure to *taila* makes it similar consistency of ghrita. *Phenopasaanthi* observed at the stage of *madhyama paka* may have been mistaken by the researcher. *Phenopasanthi* is one of the indicators in ghrita kalpana when it reaches *madhyama paaka;* whereas *phenodgamam* is the indicator of taila at the stage of *madhyamapaaka* ^[9]. During the preparation of artificial ghrita *phenopasaanthi* was observed it was taken as the criteria as it is the *snehasidhi lakshana* told for ghrita kalpana.

As the prepared artificial ghrita is organoleptically not similar to that of ghrita, its safety and efficacy can only be understood through further studies including animal study. Its external application could also be studied through clinical trials.

CONCLUSION:

Gap of availability and shortage of ghee prepared in the traditional method arises as it is a time consuming and tedious process, thereby leading to several malpractices and adulteration. Ghee which is available in market does not possess the same attributes as suggested by Acharya. There is a chance for failure of treatment or sometimes may lead to unintended drug events while administering such ghee. The dairy industry is a huge industrial sector and hence the challenge to stop malpractice and adulteration is a big one. Implementing rules and regulations in agricultural and dairy farming industry across the country is needed to ensure the safety of ghrita. It is the duty of Ayurveda practitioners to continue updating, seeking other possible alternatives to ghrita, and making sure the quality and safety of ghrita when it is used for therapeutic purposes, especially, Panchakarma. Ayurveda practitioners should also try to use ghrita kalpana using traditional methods wherever possible to get the desired effect and to prevent the side effects.

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