



COMPARATIVE STUDY OF PHARMACEUTICAL, PHYSICO-CHEMICAL ANALYSIS OF SHATAVARI GHRIT PREPARED WITH MURCHITA AND AMURCHITA GHRITA

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Abstract :

The name "Shatavari" translates to "a woman who possesses 100 children," [1] which refers to its rejuvenating effect on female reproductive organs and its ability to balance Pitta and Vata doshas. Shatavari Ghrita is useful in treating gastric disorders and has benefits for the male reproductive system as well [2].

"**Sneha Kalpana**," which is a preparation made by combining Kalka dravya (herbal paste), sneha dravya (fats / oily substances), and Drava (liquid substances) [3].

This mixture is boiled until it achieves specific qualities known as "Sneha Siddhi Lakshna." Ghrita formulations, including Shatavari Ghrita, fall under the category of Sneha Kalpana.

Sneha is a term used to describe **four types** of substances, namely Ghrita (ghee), Taila (oil), Vasa (muscle fat), and Majja (bone marrow) [4]. Among these, Ghrita is considered the best because it has the unique ability to incorporate the properties of other drugs it comes in contact with while retaining its natural qualities.

There are 13 different references to **Shatavari Ghrita** in various Ayurvedic texts. This formulation is commonly indicated for conditions such as Raktapradara (excessive bleeding), Shukradosha (disorders of semen), Artava dosha (menstrual disorders), Amlapitta (hyperacidity), Vatarakta (gout), Raktapitta (bleeding disorders), and Mutrakruchra (painful urination).

The ingredients of Shatavari Ghrita include Murchita Ghrita; Shatavari Mula Swarasa (juice of Shatavari roots), Shatavari Mula Kalka (fine powder of Shatavari roots), Go-Dugdha (cow's milk) and Jala (water).

Bhaishajyaratnavali mentioned *Murchana* to be performed on *Snehas* before subjecting *Sneha* to be medicated [3]. Murchita Ghrita is prepared by combining six commonly available drugs: Haritaki, Bibhitaki, Amalaki, Musta, Haridra, NimbuSwarasa, Ghrita, and Jala (Water).

The purpose of the present study was to prepare Shatavari Ghrita and analyse it using various parameters such as organoleptic (attributes perceived by the senses), physico-chemical (physical and chemical properties). This

analysis aims to establish a difference between Shatavari gharit Prepared with two methods i.e Shatavari Ghrith prepared With murchit ghrith and with amurchit Ghritha.

In conclusion, the study shows that Shatavari Ghritha can be easily prepared and that the Ghritha (clarified butter) incorporates the properties of the ingredients used. This establishes a range of parameters to assess the quality and therapeutic effectiveness of Shatavari Ghritha in a standardized manner.

Keywords: Shatavari, Sneha Kalpana, Shatavari Ghritha, Raktapradara, Raktapitta

Introduction:

The term “Sneha Kalpana” is composed of two words: “Sneha,” which means fat or fatty material, and “Kalpana,” which refers to the pharmaceutical process of medicaments. The substance called Sneha Dravya, or fatty material, possesses certain qualities such as being heavy (Guru), unctuous (Snigdha), slow in digestion (Manda), fine (Suksma), soft (Mrdu), and liquid (Drava).

In the context of Ayurveda, Ghritha (ghee) is included as a type of Sneha Dravya within the Sneha Kalpana category. Other Sneha Dravyas include Taila (oil), Vasa (muscle fat), and Majja (bone marrow). However, Ghritha is considered the supreme Sneha Dravya due to its exceptional ability to effectively assimilate the properties of other substances it comes into contact with while retaining its own beneficial qualities.

In Ayurvedic pharmacopeia, medicated Ghee preparations are made by boiling or cooking them with various herbs, decoctions, or juices. Shatavari Ghritha is highlighted as an important formulation within this context.

Bhaishajyaratnavali mentioned Murchana to be performed on Snehas before subjecting Sneha to be medicated. Bhaishajyaratnavali is first to recommend about Murchana process [3]. Still it was sought that what murchana of ghritha changes the nature of Ghritha and how medicated ghritha prepared with Murchit Ghrith (saturated fats) impart changes to it. Cow's milk and Cow's Ghrith itself has medicinal properties and when it is treated with medicinal drugs its property enhances

Properties of Cow's milk in Ayurveda

Cow's milk is slightly slimy (which causes moistening in channels of dosha, dhatu and mala), unctuous, heavy, rasayana, alleviates intrinsic haemorrhage, cold, sweet in taste. (Su.Su.45/50-51) [5]

Properties of Cow Ghee [6]:-

High Smoke Point: Cow's ghee has a high smoke point, which means it can be heated to relatively high temperatures without breaking down or producing harmful compounds. This makes it suitable for cooking methods like frying, sautéing, and deep-frying.

Rich Flavor: Ghee has a rich, nutty flavour that enhances the taste of foods it's used in. The process of clarifying butter removes milk solids and water, leaving behind a concentrated buttery flavor.

Nutritional Composition: Ghee is primarily composed of fat, but it also contains small amounts of vitamins A, D, E, and K. It is also a good source of fatty acids, including both saturated and unsaturated fats.

Lactose and Casein Removal: The clarifying process removes most of the lactose and casein (milk proteins) from butter, making ghee suitable for individuals who are lactose intolerant or sensitive to dairy proteins.

Long Shelf Life: Due to its low moisture content and lack of milk solids, ghee has a longer shelf life compared to butter. When stored properly in a cool, dark place, ghee can last for several months without refrigeration.

Digestive Benefits: Ghee is thought to promote healthy digestion by stimulating the secretion of stomach acids, aiding in the breakdown of food. Some people use ghee to alleviate digestive discomfort.

Moisturizing and External Use: Ghee is not only consumed as food but is also used topically in certain cultures for moisturizing and healing purposes. It's applied to the skin, lips, and even used in some traditional cosmetic practices.

The medicated Ghee mentioned in ayurveda pharmacopeia are prepared by boiling or cooking them with drug, decoction or juice etc. Shatavari Ghrita is important formulation which is mentioned in various text books like Bhaishajya Ratnavali [2], Chakradatta [7], etc in context of different diseases. It is prepared with Murchita ghrita by adding the Kalka of the different herbs and along with water and milk, Swarasa etc in it .

Shatavari is a very important plant, which is used in many diseases in Ayurveda[1]. Traditionally this plant is used as a reproductive tonic. It is also used traditionally for increasing lactation, treating gastric ulcers, dyspepsia, piles, diabetes and regulates sexual behaviours etc. Shatavari has been mentioned in Ayurvedic text like Charaka Samhita, Susruta Samhita and Astanga Samgraha. Kashyapa Samhita has evidently stated that shatavari promotes maternal health and noted its meticulous use as a galactagogue. Acharya Sushruta⁷ has also mentioned Shatavari as Vata-Pitta Shamaka. Shatavari is used in Ayurveda to balance Pitta and Vata, but can increase Kapha due to its Guru nature. Its bitter and sweet taste has a cooling effect on the system and is also used as a Rasayana.

AIM

To study comparatively, pharmaceutical, physico-chemical analysis of Shatavari Ghrit prepared by using Murchita and Amurchita ghrita.

OBJECTIVES

- To study pharmaceutical and physico-chemical analysis of Shatavari Ghrit prepared using Murchita ghrita.
- To study pharmaceutical and physico-chemical analysis of Shatavari Ghrit prepared using Amurchita ghrita.

MATERIALS AND METHODS:-

Two batches of Shatavari ghrit were prepared using Murchita and Amurchit Ghrita. Prepared Ghrita subjected to pharmaceutical physico-chemical analysis.

The following table shows the different references of Shatavari Ghrita mentioned in the classics.

S. No	Kalka Dravya	Drava Dravya	Indication	Amount	Reference
	Jivaka, Risabhaka, Meda, Mahameda, Kakoli, Ksira Kakoli, Draksha, Yashtimadhu, Mudgaparni, Masha Parni, Vidari, Raktachandana	Shatavari Svarasa, Cow Milk	Raktapitta, Vatarakta, Ksina Sukra, Anga Daha, Siro Daha	1 Tola	Bhaishajya Ratnavali,

There are generally three essential components required for the preparation of Ghrita ; pharmaceutical

1. Kalka (a fine paste of the drug or drugs) – 1 part.
2. Sneha dravya (ghrita) – 4 parts.
3. Drava (a liquid which may be one or more as Kashaya, Swarasa, Dugdha etc.) - 16 parts.

It includes the following steps

- A. Collection of the drug
- B. Authentication of the raw drugs
- C. Murchana of Go-Ghrita
- D. Preparation of Shatavari Ghrita

A. Collection of the drug –

The raw drugs required for the preparation of medicine were procured from Teaching Pharmacy of Rasa Shastra & Bhaishajya Kalpana department of Ch.Devi Lal College of Ayurveda , Jagadhri. 135001 Haryana. on 16-08-2023.

B. Authentication of Raw Drugs – The Authentication of all the raw drugs was done at the Department of Dravyaguna, Rasa Shastra & Bhaishajya Kalpana department of Ch.Devi Lal College of Ayurveda , Jagadhri. 135001 Haryana..

C. Preparation of Murchana of Go –Ghrita

Ingredients-

1. Haritaki- 25 gms
2. Bibhitaki- 25 gms
3. Amalaki- 25gms
4. Musta- 25gms
5. Haridra- 25gms
6. Nimbu Swarasa- QS (80 ml)
7. Ghrita- 600 ml
8. Jala- 2400 ml

D. Preparation of Shatavari Ghrita

A. Preparation of Kalka for Ghrita Murchana –

Haritaki, Bibhitaki, Amalaki, Musta and Haridra were taken 25 g each and made coarsely powdered in Khalva Yantra and converted in fine powder with the help of mixer grinder. The particles of fine powder were of the sieve size number (80 -100), 80 ml of Nimbu Swarasa was taken for making the Kalka into a bolus form. Total quantity of Kalka taken was 187.5gms

B. Ghrita murchana [8]:

Even though the Murchana procedure is not mentioned in Samhita Granthas. Later granthas like BhaishajyaRatnavali, etc has specific information on the Murchana procedure. Amadosha may be considered as unwanted components in the raw Ghrita, like intermediate chemical constituents, dissolved gases, adulterants, plant toxins and moisture present in raw Ghrita or developed due to long time storage. Dourgandha (Foul Smell) may be caused due to the long term storage of the Ghrita, before the preparation it is ensured that only pure and potent Ghrita is taken for Siddha Ghrita preparation. Through the process of Murchana the capacity of the Ghrita to absorb the active components of the drug is increased. Murchana helps in maintaining the necessary ratio of unsaturated and saturated fats suitable for human physiology.

C. Process of Ghrita Paka with Murchit Ghrit –

A stainless steel vessel was kept over LPG stove and mild flame was maintained during the process. Murchita Ghrita (250ml) was taken in the vessel and for Drava Dravya 500 ml Kwatha and 500 ml Godugdha was mixed to the Ghrita. Kalka was added to the mixture. The proportion (Kalka: Sneha: Drava Dravya) was 1/4: 1: 4. The whole mixture was stirred till it becomes homogenous. The mixture was boiled until all Sneha Siddhi Lakshanas appeared.

The total time was taken for Paka of Ghrita 3 hrs 18 mins. The prepared Ghrita was filtered through a clean cloth, obtained quantity was 200 ml. Ghrita was packed in an air tight glass bottle after cooling. The obtained Ghrita was used to prepare Shatavari Ghrita.

In Shatavari Ghrita Paka, first Murchana of Ghrita has to be done then collected and warmed in the Sneha Patra by applying gentle heat. Then the Kalka and Drava Dravya to be used are added and the whole contents are boiled together till the water portion get evaporated and Ghrita becomes free from froth.

There is confirmative tests for completion of Sneha Paka [8]-

- 1) Sneha Kalka attains perfect wick shape when rolled between thumb and index figure.
- 2) If a part of Sneha Kalka is put into the fire, no sound is produced indicating the loss of moisture in it.
- 3) Foam disappears during completion of preparation.

Preparation of *Shatavari Gharit* using *Amurchita ghrita*

Procedure

A stainless steel vessel was kept over LPG stove and mild flame was maintained during the process. Murchita Ghrita (250ml) was taken in the vessel and for Drava Dravya 500 ml Kwatha and 500 ml Godugdha was mixed to the Ghrita. Kalka was added to the mixture. The proportion (Kalka: Sneha: Drava Dravya) was 1/4: 1: 4. The whole mixture was stirred till it becomes homogenous. The mixture was boiled until all Sneha Siddhi Lakshanas appeared.

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In Shatavari Ghrita Paka, first Murchana of Ghrita has to be done then collected and warmed in the Sneha Patra by applying gentle heat. Then the Kalka and Drava Dravya to be used are added and the whole contents are boiled together till the water portion get evaporated and Ghrita becomes free from froth.

Result :

Analysis of Murchita Ghrita

No.	Test of Analysis	Value
	Description	Dark yellow creamy soft mass
1.	Specific Gravity	0.9218 gm/ml
2.	Refractive Index	1.452
3.	Viscosity	37.65
4.	Saponification value	231.2
5.	Acid value	0.70
6.	Peroxide value	Absent
7.	Iodine value	34.0
8.	Unsaponifiable matter	0.38
9.	Congeaing point	22-20°C
10.	Loss on Drying at 105°C	0.25%
11.	pH	6.98

Organoleptic findings

Organoleptic characteristics for various sensory character like colour, taste and odour was carefully noted down.

Result of organoleptic Character

No.	Test of Analysis Parameters	Value	
		Shatavari Ghril prepared using Murchit Ghrita	Shatavari Ghril prepared using Amurchit Ghrita
1.	Colour	Yellow	Yellow
2.	Odour	Characteristic	Characteristic
3.	Taste	Pungent	Pungent

Pharmaceutical Evaluation

Physico chemical parameters of Shatavari Ghril like Refractive index, Specific Gravity, Rancidity, Acid Value, Saponification value, Iodine Value and Peroxide value were assessed. Detail are being given in Table

Analysis of Samples of Shatavari Ghrith prepared using *Murchit Ghritha*

Test of Analysis		Sample
Description		All samples - Yellowish green creamy soft mass
1	Specific Gravity	0.9256gm/ml
2	Refractive Index	1.4532
3	Viscosity	37.29
4	Saponification value (mg)	245.8
5	Acid value (mg)	4.8
6	Peroxide value	2.19
7	Iodine value (mg)	34.16
8	Unsaponifiable matter (mg)	0.39
9	Congealing point	22-20°C
10	Loss on Drying at 105°C	0.32%
11	pH	4.76

Analysis of Samples of Shatavari Ghrith prepared using *Amurchit Ghritha*

Test of Analysis		Mean value
Description		All samples were Light green creamy soft mass
1	Specific Gravity	0.9246gm/ml
2	Refractive Index	1.4330
3	Viscosity	38.0
4	Saponification value (mg)	224.26
5	Acid value (mg)	4.97
6	Peroxide value	2.67
7	Iodine value (mg)	29.5
8	Unsaponifiable matter (mg)	0.39
9	Congealing point	22-20°C
10	Loss on Drying at 105°C	0.23%
11	pH	4.100

Comparative Analysis of Shatavari Ghrith prepared using *Murchita* and *Amurchita ghritha*

	Shatavari Ghrith prepared using <i>Murchit Ghritha</i> (Mean value)	Shatavari Ghrith prepared using <i>Amurchit Ghritha</i> (Mean value)
Description	Yellowish green creamy soft mass	Light green creamy soft mass
Specific Gravity	0.9256gm/ml	0.9246gm/ml
Refractive Index	1.4532	1.4330
Viscosity	37.29	38.00
Saponification value (mg)	245.8	224.26
Acid value (mg)	4.82	4.97
Peroxide value	2.19	2.67
Iodine value (mg)	34.16	29.5
Unsaponifiable matter (mg)	0.39	0.39
Congealing point	22-20°C	22-20°C
Loss on Drying at 105°C	0.32%	0.23%
pH	4.76	4.100

DISCUSSION

Pharmaceutical study

1. *Shatavari Ghrit* prepared with *Murchit ghrita* *Murchita ghrita* heated then *Kalka*, *Changeri swaras* and *Dadhi* were added to *Goghrita* in proportion.

The *Ghrita paka* was continued for 3 days with daily heating for 4 hours on mild heat.

Observed for *Snehasiddhi lakshan* and then filtered.

2. *Shatavari Ghrit* prepared with plain *Ghrita*.

Plain *Goghrita (Amurchita)* heated then *Kalka*, *Changeri swaras* and *Dadhi* were added to *Goghrita* in proportion. The *Ghrita paka* was continued for 3 days with daily heating for 4 hours on *Mandagni*.

Observed for *Snehasiddhi lakshan* [8] and then filtered.

Analytical study of samples of *Shatavari Ghrit* prepared with *Murchita* and *Amurchita ghrita* was done. [9]

The specific gravity of *Murchita Shatavari Ghrit* was 0.9256gm/ml and that of *Amurchit* was 0.9246gm/ml.

The Refractive Index of *Murchita Shatavari Ghrit* was 1.4532 and that of *Amurchit* was 1.4330. An increase in the refractive index of *Shatavari Ghrit* prepared using *Murchita ghrita* indicates an increase in its density. It is due to the dissolution of bio-constituents in *Murchitaghrita* and *Shatavari Ghrit* prepared using *Murchitaghrita*. It also suggests an increase in the degree of unsaturation indicating the essential role of unsaturated fatty acids on the health of an individual, especially in reducing cholesterol and Low-density lipoprotein levels (LDL).

The viscosity of *Murchita Shatavari Ghrit* was 37.29 and that of *Amurchit* was 38.00. There is a slight difference. A fluid with relatively high viscosity may appear to be solid.

Saponification value indicates breaking of oil into glycerol and free fatty acids by treatment with alkali. The higher Saponification value both in *Murchitaghrita* and *Shatavari Ghrit* prepared using *Murchita ghrita* (245.8mg) compared to *Amurchita Shatavari Ghrit* 224.26mg indicates the content of low molecular weight fatty acids. It suggests that the increased low molecular weight fatty acids content is much beneficial in the absorption. That is rate of absorption of *Ghrita* increases. This suggests benefit of *Murchana sanskara* on *Ghrita* as degree of unsaturation increased. Saponification value of both *Murchita ghrita* and *Shatavari Ghrit* prepared using *Murchita ghrita* were higher than *Shatavari Ghrit* prepared using *Amurchita ghrita*. Thus efficacy of drug was increased.

Acid value decreased acid values in *Murchita Ghrita* and *Shatavari Ghrit* prepared using *Murchita Ghrita* 4.82mg compared to 4.97mg in *Amurchit Shatavari Ghrita*. It indicates that *Murchana* helps to control amount of free fatty acids, and decreases degree of rancidity. This avoids undesirable effects in *Ghrita* increases shelf life.

Iodine value of *Shatavari Ghrit* prepared using *Murchita ghrita* (34.16mg) was higher than *Amurchita ghrita* and *Shatavari Ghrit* prepared using *Amurchita ghrita* (29.5mg).

This also suggests that degree of unsaturation increased after *Murchana*. Unsaturated fatty acids are important in reducing cholesterol and LDL cholesterol levels. Lower iodine value suggests consumption of iodine molecules by free fatty acids.

Loss on Drying of *Murchita ghrita* and *Shatavari Ghrit* prepared using *Murchita ghrita* (0.32%) are more than in *Amurchita ghrita* and *Shatavari Ghrit* prepared using *Amurchita ghrita* (0.23%). This may be due to addition of water in the preparation of *Murchana*.

Peroxide value, of *Shatavari Ghrit* prepared using *Murchita ghrita* was 2.19, while value in *Shatavari Ghrit* prepared using *Amurchita ghrita* was 2.67. As the normal peroxide value ranges in *Ghrita* is below 4, which is within the permissible limit of unrancidification. But more peroxide value signifies its higher tendency for rancidification. In *Shatavari Ghrita*, the chances of rancidity reduce when prepared using *Murchita ghrita*. It suggests benefit of *Murchana*.

Unsaponifiable Matter: Value of *Shatavari Ghrit* prepared using *Murchita ghrita* was nearly equal of *Shatavari Ghrit* prepared with *Amurchita ghrita* which is not significant indicating beneficial for health.

Congeeing Point Both *Shatavari Ghrit* prepared using *Murchita ghrita* and *Amurchita ghrita* had congealing point in the range of 22-20°C, this means that solid phase (crystallization) in *Ghrita* start to occur at this temperature. Amount of water or moisture often lower congealing point, as moisture content in *Shatavari Ghrit* prepared using *Murchita ghrita* was more than *Shatavari Ghrit* prepared using *Amurchita ghrita*, congealing point of *Shatavari Ghrit* prepared using *Murchita ghrita* slightly decreased.

pH Value The average pH value of *Shatavari Ghrit* prepared using *Murchita ghrita* was 4.76 whereas average pH of *Shatavari Ghrit* prepared using *Amurchita ghrita* was 4.100. It indicates that pH of *Murchita ghrita* was more than *Amurchita ghrita*. pH value indicates acidity or alkalinity of solution. Increased pH of *Shatavari Ghrit* prepared using *Murchita ghrita* indicates less H⁺ ION concentration and decreased acidity. Both *Ghritas* were weakly acidic in nature, hence can be dissolved and absorbed easily into gastric media.

CONCLUSION

1. Values obtained from analysis of *Shatavari Ghrita* prepared using *Murchita Ghrita* can be used as standard parameters for *Shatavari Ghrita*.
2. *Sneha siddhi lakshan* occurred clearly and earlier during preparation of *Shatavari Ghrita* prepared using *Murchita Ghrita* than *Shatavari Ghrita* prepared using *Amurchita Ghrita*. *Ghrita* separation from sludge of *Kalka* not clearly seen during preparation of *Shatavari Ghrita* prepared using *Amurchita Ghrita*.
3. *Shatavari Ghrita* prepared using *Murchita ghrita* show physico-chemical changes. There was an increase in specific gravity, Refractive index, saponification value, Iodine value, increased solubility of bio constituents into *Ghrita*, decreased acidity of medium, viscosity, peroxide value. There was no significant change in unsaponifiable matter,

congealing point. Decreased Peroxide value indicates reduced oxidation rate in *Shatavari Ghrita* prepared using *Murchita ghrita* than in *Amurchita ghrita*. It can be concluded that antioxidants were added during *Murchana. Ghrita* becomes beneficial for health decreasing health hazards.

4. From the above discussion, it has been concluded that *Murchana* imparts good colour, pleasant odour and consistency to the medicated *Ghrita*. Hence increases palatability.
5. Physico-chemical parameters provide standard to assess quality and may help to understand pharmacokinetic and pharmacodynamics of *Shatavari Ghrita*.
6. *Murchita ghrita* when used in preparation of *Shatavari Ghrita* may attributes better quality of absorption, metabolism and therapeutic action.

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