ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Research Article

COMPARATIVE STUDY OF PHYSICO-CHEMICAL ANALYSIS OF *CHANGERI GHRITA* PREPARED WITH *MURCHITA* AND *AMURCHITA GHRITA*

Gayatri Nandkumar Patil[1]*, Pramodini Sachin Patil[2], Mahesh Inamdar[3]
*[1]Assistant Professor, [2]Professor and HOD, RSBK Dept, Loknete Rajarambapu Patil Ayurvedic Medical College, Islampur.
[3]Professor and HOD, Annasaheb Dange Ayurved Medical College, Ashta, India.

Article info

Article History:
Received: 22-01-2023
Revised: 09-02-2023
Accepted: 20-02-2023

KEYWORDS:
Changeri ghrita, Murchana, preparation, physico-chemical analysis.

ABSTRACT

Changeri ghrita is a medicated ghee formulation, mentioned in *Grahani rog chikitsa*. *Sneha murchana* is a procedure prior to *Snehapaka*. *Snehapaka* and *Murchana* bring changes in *Sneha.* **Materials and Methods**: Two batches of *Changeri ghrita* prepared using *Murchita* and *Amurchit ghrita*. Prepared *Ghrita* subjected to physico-chemical analysis. **Result and Discussion:** Specific gravity increased in *Murchita ghrita*. Refractive index, viscosity, saponification value, iodine values were increased. While acid value is decreased. Peroxide value is slightly increased. Unsaponifiable matter remains unchanged. There was change in organoleptic properties after *Murchana.* Physico-chemical changes have been occurring except in unsaponifiable matter and congealing point. Peroxide was present in both samples of *Amurchit* and *Murchit Changeri ghrita*. Saponification value was increased in *Murchit Changeri Ghrita* **Conclusion:** It can be concluded that antioxidants were added during *Murchana. Murchana* maintains stability of lipid preparation and offer good health impact, increases palatability.

INTRODUCTION

Snehapaka means a process to prepare oleaginous medicament with the use of *Kalka, Kwath* and other liquid media in specific proportion by subjecting to heating for certain duration to fulfill certain parameters. Medicated *Snehas* are prepared using certain properties of drugs so that the active principle in drug can dissolve in *Sneha* media.

Sneha siddha (fat soluble) drugs have better pharmacokinetic action in comparison to other dosage forms because of the lipoid nature of the biomembranes, as lipid soluble substances readily permeate into the cell.

Bhaishajyaratnavali mentioned *Murchana* to be performed on *Snehas* before subjecting *Sneha* to be medicated.[1] Bhaishajyaratnavali is first to recommended about *Murchana* process.

Access this article online	
Quick Response Code	
	https://doi.org/10.47070/ijapr.v11i2.2675

Changeri ghrita is described in classics for treatment of *Grahani, Arsha, Mutrakruchra, Pravahika* and *Gudabhransha*. [2] Clinical studies regarding efficacy of *Changeri ghrita* in diseases like *Grahani* and *Arsha* have been proved. But no pharmaceutico-analytical study is been conducted yet related to *Changeri ghrita*. Hence present study is undertaken based on analysis. Hence this research work is carried out on pharmaceutical and physico chemical analytical study of *Changeri ghrita* prepared using *Murchita* and *Amurchita ghrita.*

AIM

To study comparatively, physico-chemical analysis of *Changeri Ghrita* prepared by using *Murchita* and *Amurchita ghrita*.

OBJECTIVES

1. To study pharmaceutical and physico-chemical analysis of *Changeri ghrita* prepared using *Murchita ghrita.*
2. To study pharmaceutical and physico-chemical analysis of *Changeri ghrita* prepared using *Amurchita ghrita.*
3. To compare the physico-chemical analysis of *Changeri ghrita* prepared using *Murchita* and *Amurchit ghrita.*

MATERIAL AND METHODS

Ghrita Murchana

1) Ingredients [3,4]

Table 1: Ingredients of *Ghrita Murchana*

S No.	Ingredients	Quantity
1	*Haritaki*	156 g
2	*Bibhitaki*	156 g
3	*Amalaki*	156 g
4	*Haridra*	156 g
5	*Musta*	156 g
6	*Mahalunga*	156 g
7	*Goghrita*	2500 g
8	Water	10 liter

Procedure

a. *Ghrita* is taken into the vessel and heated upto temperature 90°C.
b. *Kalka* prepared was added to *Ghrita* slowly.
c. Water added to *Ghrita* in 1:4 proportions and mixture stirred well using spatula.
d. Mixture heated on mild to moderate heat till water evaporated completely.
e. Heating stopped when *Ghrita* become moisture free and *Snehasiddhi lakshana* were observed. *Varti Pariksha- Kalka* when rolled between fingers it attained *Varti* form. It was soft, blackish brown colored. *Agni pariksha*- No crackling sound when put on fire. Prepared *Murchit ghrita* was filtered by using two layered cotton cloth.

Date of beginning- 30/8/18
Date of completion- 30/8/18
Duration- 8 hour 15 minute

Ingredients

Heating of Mixture& layer of froth

Varti* of *Kalka

Murchita ghrita

Preparation of *Changeri ghrita* using *Murchita ghrita*

Table 2: Ingredients of *Changeri Ghrita*

S.No.	Ingredients	Quantity
1	*Shunthi* (*Zingiber officinalis*)	9. 6 g
2	*Pippali* (*Piper longum*)	9. 6 g
3	*Pippalimoola* (Root of *Piper longum*)	9. 6 g
4	*Gajapippali* (*Scindapsus officinalis*)	9. 6 g
5	*Chitrak* (*Plumbago zeylanica*)	9. 6 g
6	*Gokshur* (*Tribulus terristris*)	9. 6 g
7	*Dhanyak* (*Coriandrum sativum*)	9. 6 g
8	*Bilva* (*Aegle marmelos*)	9. 6 g
9	*Patha* (*Cissampelos pareira*)	9. 6 g
10	*Yavani* (*Trachyspermum ammi*)	9. 6 g
11	*Murchit Ghrita*	768 g
12	*Changeri swaras*	3. 072 litre
13	*Go-dadhi*	3. 072 kg

Procedure

a) *Murchita ghrita* taken in vessel and kept on gas stove on mild heat.
b) Then increments of *Kalka* added slowly to *Ghrita.*
c) Then *Changeri swaras* and *Go-dadhi* were added to *Ghrita* with continuous stirring to mix the contents simultaneously.

d) Mixture is allowed to boil for 4 hours and heating stopped. Vessel kept closed with cloth *Ghritapaka* continued for 3 days. [5]
e) After *Snehasiddhi* tests[6] are positive, *Varti Pariksha- Kalka* when rolled between fingers it attained *Varti* form. It was soft, blackish brown colored. *Agni pariksha*- No crackling sound when put on fire heating stopped and *Ghrita* filtered in another vessel and weighed.
f) After cooling, it is transferred to bottle labelled with *Amurchit changeri ghrita* sample no 1.
Sample 2 and Sample 3 were prepared with same procedure.

Date of Beginning – 10/9/18
Date of Completion – 13/9/18
Duration – 9 hour 55 minutes


Ingredients


Heating of Mixture


Layer of froth


Varti* of *kalka

Changeri ghrita* prepared with *Murchita ghrit

Preparation of *Changeri ghrita* using *Amurchita ghrita*

Procedure

a) *Amurchita/*plain *Ghrita* taken in vessel and kept on gas stove on *Mandagni*.
b) Then increments of *Kalka* added slowly to *Ghrita*.
c) Then *Changeri swaras* and *Go-dadhi* were added to *Ghrita* with continuous stirring to mix the contents simultaneously.
d) Mixture is allowed to boil for 4 hours and heating stopped. Vessel kept closed with cloth.
e) *Paka* continued for 3 days.

After *Snehasiddhi* tests are positive, heating stopped and *Ghrita* filtered in another vessel and weighed.
After cooling, it is transferred to bottle labelled with *Amurchit changeri ghrita* sample 1.
Sample 2 and Sample 3 were prepared with same procedure.

Date of Beginning – 20/9/18
Date of Completion – 23/9/18
Duration – 10 hour 05 minutes


Ingredients


Heating of Mixture


Layer of froth


Varti* of *Kalka

Changeri ghrita* prepared with *Amurchita ghrita

Physico-chemical analysis [6,7] of all the samples was done in laboratory

RESULTS

Pharmaceutical Observations

Prepared *Murchita ghrita* obtained was 2320gm i.e., loss of 180gm soft oily in consistency, dark yellow colour, bitter and astringent in taste with characteristic turmeric odour. Temperature pattern during *Murchana* before heating was 29°C, after heating was 120°C, during process 85°C, at the end point 70°C.

Table 3: Correlation of *Siddhi lakshana* with Temperature and Duration for 3 samples of *Changeri Ghrita* prepared with *Murchita Ghrita*

Siddhi lakshan	Temperature in (°C)			Duration (Hrs. min.)		
	Sample 1	Sample 2	Sample3	Sample 1	Sample 2	Sample 3
Phenshanti	75	78	75	9hr 25min	9hr 30min	9hr 36min
Shabdaheen	73	77	74	9hr 36min	9hr 41min	9hr 48min
Vartivatsneha kalka	71	75	71	9hr 52min	9hr 56min	9hr57min
Gandha-varna-rasotpatti	70	74	70	9hr 55min	9hr 50 min	9hr 55min

Table 4: Organoleptic tests of *Changeri ghrita* prepared using *Murchita ghrita*

	Sparsha	*Rupa*	*Rasa*	*Gandha*	Duration	Weight (gm)	
						Before	After
Sample 1	*Shlakshna, Mrudu*	*Peetabh Hareet*	*Amla Tikta*	Characteristic	9hr 55 min	768 g	644 g
Sample 2	*Shlakshna, Mrudu*	*Peetabh Hareet*	*Amla Tikta*	Characteristic	10 hr	768 g	660 g
Sample 3	*Shlakshna, Mrudu*	*Peetabh Hareet*	*Amla Tikta*	Characteristic	10 hr	768 g	642 g

Table 5: Correlation of *Siddhi lakshana* with Temperature and Duration for 3 samples of *Changeri Ghrita* prepared with *Amurchita Ghrita*

Siddhi lakshan	Temperature in (°C)			Duration (Hrs. min.)		
	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Phenshanti	75	73	77	9hr 30min	9hr 30min	9hr 36min
Shabdaheen	74	70	75	9hr 36min	9hr 32min	9hr 48min
Vartivatsneha kalka	72	68	74	9hr 59min	9hr 56min	10hr 5 min
Gandha-varna-rasotpatti	70	66	70	10 hr 5 min	9hr 58min	10 hr 10 min

Table 6: Organoleptic tests for *Changeri ghrita* prepared using *Amurchit ghrita*

	Sparsha	*Rupa*	*Rasa*	*Gandha*	Duration	Weight (gm)	
						Before	After
Sample 1	*Shlakshna Mrudu*	*Shwetabh Hareet*	*Amla, Tikta*	Characteristic	10hr 5 min	768 g	651 g
Sample 2	*Shlakshna Mrudu*	*Shwetabh Hareet*	*Amla, Tikta*	Characteristic	9hr 58min	768 g	648 g
Sample 3	*Shlakshna Mrudu*	*Shwetabh Hareet*	*Amla, Tikta*	Characteristic	10 hr 5 min	768 g	655 g

Analytical Observations

Table 7: Analysis of *Murchita ghrita*

No.	Test of Analysis	Value
	Description	Dark yellow creamy soft mass
1	Specific Gravity	0.9218gm/ml
2	Refractive Index	1.4531
3	Viscosity	37.61
4	Saponification value	232.6
5	Acid value	0.75
6	Peroxide value	Absent
7	Iodine value	34.9

8	Unsaponifiable matter	0.38
9	Congealing point	22-20°C
10	Loss on Drying at 105°C	0.25%
11	pH	6.98
12	TLC (Rf value)	0.55

Table 8: Analysis of Samples of *Changeri ghrita* prepared using *Murchit Ghrita*

Test of Analysis		**Sample 1**	**Sample 2**	**Sample 3**	**Mean**
Description		**All samples - Yellowish green creamy soft mass**			
1	Specific Gravity	0.92gm/ml	0.925gm/ml	0.926gm/ml	0.9256gm/ml
2	Refractive Index	1.4531	1.4532	1.4534	1.4532
3	Viscosity	37.1	37.59	37.2	37.29
4	Saponification value (mg)	245	245.4	247	245.8
5	Acid value (mg)	4.80	4.84	4.84	4.8
6	Peroxide value	2.2	2.18	2.18	2.19
7	Iodine value (mg)	34.9	33.7	33.9	34.16
8	Unsaponifiable matter (mg)	0.39	0.38	0.40	0.39
9	Congealing point	22-20°C	22-20°C	22-20°C	22-20°C
10	Loss on Drying at 105°C	0.31%	0.32%	0.34%	0.32%
11	pH	4.8	4.6	4.9	4.76

Table 9: Analysis of Samples of *Changeri ghrita* prepared using *amurchita ghrita*

	Test of Analysis	**Sample 1**	**Sample 2**	**Sample 3**	**Mean value**
	Description	**All samples were Light green creamy soft mass**			
1	Specific Gravity	0.926gm/ml	0. 925gm/ml	0.923gm/ml	0.9246gm/ml
2	Refractive Index	1.4331	1.4332	1.4329	1.4330
3	Viscosity	38.1	37.9	38	38.0
4	Saponification value (mg)	224	223.80	225	224.26
5	Acid value (mg)	4.96	5.09	4.93	4.97
6	Peroxide value	2.66	2.68	2.67	2.67
7	Iodine value (mg)	29.6	29.51	29.4	29.5
8	Unsaponifiable matter (mg)	0.40	0.39	0.38	0.39
9	Congealing point	22-20°C	22-20°C	22-20°C	22-20°C
10	Loss on Drying at 105°C	0.25%	0.23%	0.21%	0.23%
11	pH	4.19	4.16	4.12	4.159

Table 10: Comparative Analysis of *Changeri ghrita* prepared using *Murchita* and *Amurchita ghrita*

	***Changeri ghrita* prepared using *Murchit Ghrita* (Mean value)**	***Changeri ghrita* prepared using *Amurchit Ghrita* (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
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	4.159

DISCUSSION

Pharmaceutical study

1. *Changeri ghrita* 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. *Changeri ghrita* 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* and then filtered.

Analytical study of samples of *Changeri Ghrita* prepared with *Murchita* and *Amurchita ghrita* was done.

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

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

Viscosity of *Murchita changeri ghrita* was 37.29 and that of *Amurchit* was 38. There is 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 *Murchita ghrita* and *Changeri ghrita* prepared using *Murchita ghrita (*245.8mg) compared to *Amurchita Changeri ghrita* 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 *Changeri ghrita* prepared using *Murchita ghrita* were higher than *Changeri ghrita* prepared using *Amurchita ghrita*. Thus efficacy of drug was increased.

Acid value decreased acid values in *Murchita Ghrita* and *Changeri Ghrita* prepared using *Murchita Ghrita* (4.82mg) compared to 4.97mg in *Amurchit Changeri 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 *Changeri ghrita* prepared using *Murchita ghrita* (34.16mg) was higher than *Amurchita ghrita* and *Changeri ghrita* 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 cholesterols levels. Lower iodine value suggests consumption of iodine molecules by free fatty acids.

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

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

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

Congealing Point: Both *Changeri Ghrita* 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 *Changeri Ghrita* prepared using *Murchita ghrita* was more than *Changeri Ghrita* prepared using *Amurchita ghrita*, congealing point of *Changeri Ghrita* prepared using *Murchita ghrita* slightly decreased.

pH Value: The average pH value of *Changeri ghrita* prepared using *Murchita ghrita* was 4.76 whereas average pH of *Changeri Ghrita* prepared using *Amurchita ghrita* was 4.159. It indicates that pH of *Murchita ghrita* was more than *Amurchita ghrita*. pH value indicates acidity or alkalinity of solution. Increased pH of *Changeri Ghrita* 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.

TLC (Rf value): Average Rf value of *Changeri Ghrita* prepared using *Murchita ghrita* was 0.80 and 0.44. Rf value of *Changeri ghrita* prepared with *Amurchita ghrita* was 0.81 and 0.44. The greater Rf value of

compound, means The larger distance it travels on TLC plate. It determines affinity of the solute to the solvent. Greater Rf means greater affinity of solute to solvent. Rf values were same for both *Ghritas*.

CONCLUSION

1. Values obtained from analysis of *Changeri Ghrita* prepared using *Murchita Ghrita* can be used as standard parameters for *Changeri Ghrita*.
2. *Sneha siddhi lakshan* occurred clearly and earlier during preparation of *Changeri Ghrita* prepared using *Murchita Ghrita* than *Changeri Ghrita* prepared using *Amurchita Ghrita*. *Ghrita* separation from sludge of *Kalka* not clearly seen during preparation of *Changeri Ghrita* prepared using *Amurchita Ghrita*.
3. *Changeri 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 *Changeri 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 *Changeri ghrita*.
6. *Murchita ghrita* when used in preparation of *Changeri ghrita* may attributes better quality of absorption, metabolism and therapeutic action.

Scope

All the ingredients of *Changeri ghrita* have antibacterial activity and antifungal activity, hence *in–vitro* antimicrobial study can be conducted like, Staphylococcus aureus, E. coli, Proteus vulgaris, Bacillus subtilis and antifungal study against Candida albicans, Aspergillus niger. Experimental animal study can be carried out regarding Irritable Bowel Syndrome (IBS), diarrhoea to understand exact mode of action of *Murchita* and *Amurchita Changeri ghrita*.

REFERENCES

1. Shastri Ambikadatta, Govind Das krut Bhaishajyaratnavali with Vidyotini Hindi Comentary, Edited by Bramhashankar Mishra, 18th edition, Varanasi: Choukhambha Sanskrit Sansthan prakashan; 200, 5/1285, p. 185
2. Shastri Ambikadatta, Govind Das krut Bhaishajya ratnavali with Vidyotini Hindi commentary, Edited by Bramhashankar Mishra, 18th edition, Varanasi: Choukhambha Sanskrit Sansthan Prakashan; 2005. 8/559-561, p. 288
3. Chunekar Krushnachandra, Bhavprakash Nighantu, Edited by GS Pandey, Choukhambha Bharati Academy, Varanasi, Reprint 2013, p. no. 75136)
4. Ayurvedic Pharmacopoeia of India Part II Volume I, 1st edition, Government of India, Ministry of Health and Family Welfare, Dept of AYUSH, New Delhi. Published by Controller of Publications, p. no. 40
5. Govindsenkrut Khemraj Shrikrushnadas, Vaidyak Paribhasha Pradipa;1953, khanda 3/26, p. 68
6. Chatwal Gurdeep R, Anand Sham K, Instrumental methods of Chemical analysis, Himalaya Publishing House 1st edition 1979, Enlarged 2002. p. no. 88
7. Lohar DR, Protocol for Testing Ayurveda, Siddha and Unani medicines, Govt. of India, Dept. of AYUSH, Pharnacopoeial Laboratory of India, Ghaziabad. Published by Controller of Publications, p. 27, Available at plimism. nic. in>Protocol_For_testing

Cite this article as:
Gayatri Nandkumar Patil, Pramodini Sachin Patil, Mahesh Inamdar. Comparative Study of Physico-Chemical Analysis of Changeri Ghrita Prepared with Murchita and Amurchita Ghrita. International Journal of Ayurveda and Pharma Research. 2023;11(2):71-77.
https://doi.org/10.47070/ijapr.v11i2.2675
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Gayatri Nandkumar Patil
Assistant Professor,
Dept. of RSBK,
Loknete Rajarambapu Patil Ayurvedic Medical College, Islampur.
Email: gnpatil03@gmail.com
Contact: 7720969900