

A COMPARATIVE PHARMACEUTICO-ANALYTICAL STUDY OF GUDUCHI GHRITA PREPARED BY USING FRESH AND DRY GUDUCHI (*Tinospora cordifolia*)

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Abstract

Sneha kalpana is the method wherein the active principles of the drugs are incorporated in to sneha. Ghrita, Tailam or such other fatty substances are used as base. Guduchi ghrita is an herbal preparation mentioned in Sharangadhara samhitha, which is indicated in Vatarakta (gout) and Kushta (skin disorders). The ingredients of this medicine are guduchi, ksheera and ghrita. The main aims are to compile, analyse various textual references with contemporary literatures on sneha kalpana, kashaya kalpana, ghrita kalpana and guduchi ghrita. To prepare guduchi ghrita by using fresh and dry guduchi adhering to standard operating procedure. To comparatively analyse the physico-chemical properties of guduchi ghrita samples prepared using fresh and dry guduchi. Guduchi ghrita is prepared by using Fresh and Dry Guduchi. Fresh Guduchi ghrita and Dry Guduchi ghrita is prepared with standard house hold parameters. Analytical study was carried out on both Guduchi ghrita samples will be comparatively analysed with suitable physicochemical parameters and advanced instrumental methods of analysis. The quantity of loss found in the final product was negligible in the Ghrita prepared by using dry guduchi and was considerably more than wet guduchi was used. In fresh guduchi sample the alkaloids were strongly positive to that of dry sample. The parameters LOD for all these samples indicated that as time advances moisture content increasing in all the samples which indicates an increased risk of rancidity. In the context of viscosity the ghrita prepared by using fresh drugs showed a higher value than in the Ghrita by using dry guduchi. All the samples of guduchi Ghrita were subjected to HPTLC and GC-MS determination which yielded characteristic finger prints and fatty acid composition. The quantity of loss found in the final product was negligible in the Ghrita prepared by using dry guduchi compared to that of wet guduchi. Analytical results suggest that fresh guduchi Ghrita is more potent than dry guduchi Ghrita.

Key words: Sneha kalpana; Guduchi ghrita.

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INTRODUCTION

Sneha kalpana^[1] is the method wherein the active principles of the drugs are incorporated in to sneha. Ghrita, Taila or such other fatty substances are used as base. Sneha kalpana are used both internally and externally in various forms like pana, nasya, vasti, abhyanga, dhara etc.^[2] Guduchi is one of the drug extensively used in Ayurvedic medicine due to its medicinal properties. It is even been mentioned by brihat trayees many times along with important formulations. In the context of collection of drugs for formulations, Sharangadhara samhita^[3] mentions particularly 9 drugs which are to be used especially in their wet states which includes guduchi, kutaja, vasa, kushmanda, shatavari, ashwagandha, sahachari, shatapushpa and prasarini. Eventhough a few studies have been carried out with regard to guduchi ghrita and its activity, a comparative pharmaceutico - analytical study of Guduchi ghrita prepared by using wet and dry guduchi has not been carried out yet and hence an attempt is made to standardize the same.

Guduchi Ghrita^[4] is an herbal preparation mentioned in Sharangadhara samhitha, which is indicated in Vataraktha and Kushta. The ingredients of this medicine are Guduchi, ksheera and ghrita.

MATERIALS AND METHODS

Starting from the collection of best sample of raw materials, till the preparation of guduchi ghrita is dealt step by step in this study. And the study was planned in the following steps.

Procurement and purity test of ingredients

All the required ingredients namely milk; ghee and guduchi were procured, identified and authenticated to be of good quality, with the help of classical and modern physico-chemical parameters, prior to their use.

Drying of guduchi

Guduchi required for preparing dry guduchi ghrita was dried in hot air oven at 50⁰C due to climatic conditions for 12 days.

Preparation of guduchi Ghrita

Two batches of Guduchi ghrita were prepared. One batch contains three samples with fresh guduchi and another batch of three samples with dry guduchi. Thus total pharmaceutical study completed in six samples of Guduchi ghrita preparation.

Step 1: Preparation of Guduchi Kashaya

Procedure

Fresh Guduchi was washed properly. 5 L of water was taken in a stainless steel vessel. Guduchi was boiled and reduced to 1/4th then the kwatha was filtered and used as Drava dravya.

In case of Dry guduchi they were pounded properly and boiled with water (water is taken 8 times of the drug since the drug is hard), later reduced to 1/4th to obtain Guduchi kashaya and filtered.

Step 2: Preparation of Guduchi Ghrita

Procedure

Guduchi is pounded properly to form kalka. Goghrita is taken and heated to melt. Then the prepared kashaya is added to it along with milk and guduchi kalka in certain intervals. These were subjected to mandagni for a minimum period and left as such overnight. Next day again it was heated till the onset of chikkana paka and left as such overnight. On the 3rd day the heating process was continued till the sneha siddhi lakshanas appeared.

RESULTS AND OBSERVATION

Analytical values of the raw materials are tabulated in Table 1 to Table 5. Finished product standardization are tabulated in Table 6 and Table 7. Physico-chemical analyses of finished products are mentioned in Table 8 to 18. Phytochemical evaluation of fresh and dry guduchi ghritam samples in hexane extract are

tabulated in Table 19. Phytochemical evaluation of fresh and dry guduchi ghritam samples in chloroform extract Table 20 and able 21. GCMS profile of Guduchi Ghrita samples are tabulated in Table 22. Images of raw drugs and pharmaceutical procedures are mentioned as Figure 1 to Figure 4.

Table 1: Showing purity study of Milk^[5]

Test	Observation	Result
Water	Lactometer reading was 38.1	Negative
Formalin	Absence of violet or blue colour ring	Negative
Sugar	Absence of red colour	Negative
Starch	Absence of blue colour	Negative
Pulverized soap	Absence of pink colour	Negative
Vanaspati	Absence of red colour	Negative

Table 2: Showing purity study of Ghee

Test	Observation	Result
Furfural test ^[6]	Absence of crimson colour	Negative
Coal tar dye test	Absence of red colour	Negative
Test for vanaspati ^[7]	Absence of crimson colour	Negative
Polenske value ^[8]		1.25

Table 3: Showing analytical study result of Ghee

Test	Result
Refractive index ^[9]	1.45
Specific gravity ^[10]	0.923
LOD ^[11]	0.36
Saponification value ^[12]	213.42
Acid value ^[13]	0.332
Iodine value ^[14]	35.3

Table 4: Showing Raw Drug Analysis of Guduchi

TESTS	Fresh guduchi (April)	Fresh guduchi (May)	Dry guduchi (July)
Water soluble extractive	19.44	20.47	14.85
Alcohol soluble extractive	17.04	16.54	9.82
Total ash	2.89	3.42	7.73
Acid insoluble ash	1.5	1.8	3.5
LOD	73.68	73.74	12.06

Table 5: Showing phytochemical evaluation of Guduchi

Test	Fresh Guduchi (April)		Fresh Guduchi (May)		Dry Guduchi(July)	
	Water	Alcohol	Water	Alcohol	water	Alcohol
Alkaloids (Mayer’s test)	+	++	++	++	+	+
Glycosides (Keller-Kiliyani test)	+	++	+	++	+	++
Sugars (Fehling’s solution)	+	++	+	+	+	+
Phenolic Compounds	-	-	-	-	-	-
Flavanoids (Shinoda test)	-	-	-	-	-	-
Amino acids (Ninhydrin test)	-	-	-	-	-	-
Proteins (Biuret test)	-	-	-	-	-	-
Saponins (Foam test)	-	-	-	-	-	-
Lipids (Salkowaski reaction)	+	+	+	+	+	+
Tannins (Ferric chloride test)	-	-	-	-	-	-

Table 6: Phytochemical analysis of kashaya

TESTS	FGG kashaya	DGG kashaya
Bricks value	3	2.5
Ph	4.83	4.84
Refractive index	1.337	1.336
Specific gravity	1.049	1.028
Total solids	3.92	3.068

Table 7: Organoleptic characters of Fresh and Dry Guduchi Ghritam

Characters	FGG	DGG
Colour	Greenish yellowish	Greenish yellow
Smell	Ghrita smell	Ghrita smell
Consistency	Liquid, oily	Liquid, oily
Appearance	Oily	Oily
Taste	Tikta++	Tikta++

Table 8: LOD of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	0.95	1.632	1.716
DGG	0.615	1.088	1.46

Table 9: Showing specific gravity of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	0.932	0.912	0.891
DGG	0.916	0.901	0.894

Table 10: Showing rancidity test result of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	Negative	Slightly +ve	+ve
DGG	Negative	Slightly +ve	+ve

Table 11: Showing iodine value of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	16.480	19.210	22.149
DGG	18.758	21.311	26.212

Table 12: Showing acid value of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	0.143	0.210	0.281
DGG	0.194	0.210	0.225

Table 13: Showing free fatty acids of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	0.072	0.105	0.141
DGG	0.097	0.105	0.113

Table 14: Showing saponification value of Guduchi Ghrita samples

Sample	After 1st Month	After 3rd Month	After 5th Month
FGG	241.159	242.981	245.693
DGG	224.385	273.259	322.961

Table 15: Showing peroxide value of Guduchi Ghrita samples

Sample	FGG	DGG
Peroxide value	10.5962	9.292

Table 16: Showing viscosity of Guduchi Ghrita samples

Sample	FGG	DGG
Viscosity (cps)	7980	4820

Table 17: Showing refractive index of Guduchi Ghrita samples

Sample	FGG	DGG
Refractive index	1.481	1.481

Table 18: Phytochemical evaluation of fresh and dry guduchi ghritam samples in methanol extract

Sample	Saponins	Tanins	Flavonoids	Glycosides	Alkaloids
1st Month Analysis					
FGG	Negative	Negative	Negative	Present (++)	Present (++)
DGG	Negative	Negative	Negative	Present	Negative
3rd Month Analysis					
FGG	Negative	Negative	Negative	Present (++)	Present (+)
DGG	Negative	Negative	Negative	Present	Negative
5th Month Analysis					
FGG	Negative	Negative	Negative	Present (+)	Negative
DGG	Negative	Negative	Negative	Present	Negative

Table 19: Phytochemical evaluation of Fresh and Dry Guduchi Ghritam samples in Hexane extract

Sample	Saponins	Tanins	Flavonoids	Glycosides
1st Month Analysis				
FGG	Present	Negative	Negative	Present (+)
DGG	Present	Negative	Negative	Present (+++)
3rd Month Analysis				
FGG	Present	Negative	Negative	Present (+)
DGG	Present	Negative	Negative	Present (++)
5th Month Analysis				
FGG	Present	Negative	Negative	Present (+)
DGG	Present	Negative	Negative	Present (++)

Table 20: Phytochemical evaluation of Fresh and Dry Guduchi Ghritam samples in Chloroform extract

Sample	Saponins	Tanins	Flavonoids	Glycosides	Alkaloids
1st Month Analysis					
FGG	Present	Negative	Negative	Present (+)	Negative
DGG	Present	Negative	Negative	Present (++)	Negative
3rd Month Analysis					
FGG	Present	Negative	Negative	Present (+)	Negative
DGG	Present	Negative	Negative	Present (++)	Negative
5th Month Analysis					
FGG	Present	Negative	Negative	Present (+)	Negative
DGG	Present	Negative	Negative	Present (+)	Negative

SAMPLES	Month	METHANOL	HEXANE	CHLOROFORM
FGG	1 st month	22.24	61.13	59.28
	3 rd month	28.63	69.86	58.43
	5 th month	39.24	77.92	73.92
DGG	1 st month	15.8	79.45	37.58
	3 rd month	24.49	84.75	41.21
	5 th month	30.54	95.47	49.74

Table 21: Extractive value of Fresh and Dry Guduchi Ghritam in Methanol, Hexane and Chloroform

Table 22: GCMS profile of Guduchi Ghrita samples

Sl No.	Parameters	FGG	DGG
1	Butanoic acid	0.42	0.46
2	Caproic acid	0.59	0.61
3	Caprylic acid	0.62	0.65
4	Capric acid	1.85	1.84
5	4-Decanoic acid	0.18	0.18
6	Undecanoic acid	0.03	0.03
7	Lauric acid	2.76	2.68
8	Tridecanoic acid	0.11	0.1
9	Myristic acid	11.05	11.34
10	Methyl Myristoleate	1.06	0.97
11	Pentadecanoic acid	1.28	1.18
12	Palmitic acid	35.32	36.91
13	Palmitoleic acid	2.02	1.83
14	Margaric acid	0.8	0.72
15	Cis 10 heptadecanoic acid	0.42	0.36
16	Stearic acid	13.12	12.9
17	Elaidic acid/ Oleic acid	20.94	20.4
18	11-Octadecanoic acid	3.01	2.91
19	Linoleic acid	2.81	2.45
20	12,15 Octadecadieoic acid	0.15	0.1
21	Nonadecanoic acid	0.13	0.14
22	Cis 10 Nonadecanoic acid	0.17	0.16
23	Linolenic acid	0.24	0.22
24	Arachidic acid	0.24	0.23
25	Elicosenoic acid	0.22	0.22
26	8,11,14 Elicosa trienoate acid	0.06	0.05
27	Arachidonic acid	0.13	0.1
28	Behenic acid	0.13	0.18
29	Lignoceric acid	0.15	0.1



Figure 1: Wet guduchi



Figure 2: Dry guduchi



Figure 3: Sneha paka



Figure 4: Varti formation

DISCUSSION

The utility of sneha is seen in various contexts, starting from the vedic period. Ghrita, taila, vasa, majja are the four sneha dravyas told by the Acharyas. The sthavara and jangama are the two sources of origin i.e., yonis of sneha. Goghrita and tila taila are considered as the best sneha in all sthavara and jangama sneha respectively. Out of the four sneha dravyas, Ghrita is considered to be the best due to its power to assimilate the property of other substances when added to it.^[15] It has the capacity to imbibe all the qualities of a substances added to it as well as retaining its own quality.

Sneha kalpanas is used to extract the fat soluble active principles from the raw material. It also increases the bioavailability of the drug. When it is used tropically over the fat media it enhances and hastens the absorption of drugs. It can be used both internally and externally.

An important factor to be noticed should be madhyamagni during snehapaka vidhi.^[16] It is important to stir the contents carefully and constantly at the time of snehapaka by the help of darvi to ensure the kalka does not stick to the bottom resulting in carbonization. The common siddha lakshanas^[17] of sneha paka is stoppage of bubbling sound, disappearance of foam in the Ghrita, appearance of foam in taila, ability of the kalka to get rolled into wick and

doesn't create a crackling sound when introduced in fire, appearance of desired colour, smell and taste.

Duration of snehapaka depends upon which media is used.^[18] If milk is added to sneha then sneha is prepared in the duration of two nights. When swarasa is used it should be extended for three nights. If buttermilk, kanji etc, are used the process should extend for five nights. If the process incorporates moola and lata (i.e. roots and creepers) the process has to be extended for twelve days. On the contrary if cereals and meat soups are used then the process is completed within a day.

Acharya Sharangadhara has mentioned that shelf life of sneha is four to sixteen months and he has further stated the dose as one pala.^[19] Bhaishajya Ratnavali has considered one pala as uttama matra, three tola as madhyama matra and two tola as heena matra.^[20]

It is to be told that the detailed drug review of the drugs used in Ghrita murchana are not discussed in this context as murchana was not a part of the pharmaceutical study for the reason: As Berberin, the phyto-constituent in guduchi is minimum or sometimes not found in stem of guduchi. Murchana procedure might allow the phyto-constituent which are present in the ingredient of sneha murchana to get transferred in the final project. Hence the step of ghrita murchana is not done.

Eventhough a few studies have been carried out with regard to guduchi ghrita and its activity, a comparative pharmaceutico - analytical study of Guduchi ghrita prepared by using wet and dry guduchi has not been carried out yet and hence an attempt is made to standardize the same.

Samples are prepared as per the standard operating procedure giving importance to the process validation and equipment validation. Changes occurring in each and every step, temperature pattern, siddha lakshana, final

yield, product characteristics etc are keenly observed, recorded and analysed. Guduchi ghrita samples prepared using dry guduchi and wet guduchi are analysed separately. Initially purity of ghee is confirmed by testing the Polanski number.

CONCLUSION

In the context of conceptual study a detailed description of sneha kalpana along with the classification with respect to nature of media, stage of paka and type of utility are explained.

In context of drug review the dry guduchi was widely explained and the noticeable factor is that sneha murchana which is done as a prerequisite before all sneha paka is not performed, as this procedure might allow the phyto-constituent present in the ingredient of sneha murchana to be transferred to final product.

Dry guduchi and fresh guduchi were used for the preparation of guduchi kwatha for guduchi Ghrita preparation was found similar observation and temperature pattern. The time taken for the preparation of Ghrita was approximately uniform. The quantity of loss found in the final product was negligible in the Ghrita prepared by using dry guduchi and was considerably more than wet guduchi was used.

The purity tests conducted for the ingredient proved to be within normal limits and all the other analytical parameters were comparatively similar to that found in AFI. In fresh guduchi sample the alkaloids were strongly positive to that of dry sample.

The parameters LOD for all these samples indicated that as time advances moisture content increasing in all the samples which indicates an increased risk of rancidity. In the context of specific gravity as time passed on the density of ghee got slightly reduced. The viscosity of the ghrita prepared by using fresh drugs showed a higher value than in the Ghrita

by using dry guduchi. Refractive indices and iodine value of both the samples did not have much significant changes but a gradual, mild progressive increase in values were shown in acid value.

In the context of rancidity the present study shows that both types of guduchi Ghrita have comparatively shorter shelf life due to oxidation and hydrolysis.

All the samples of guduchi Ghrita were subjected to HPTLC and GC-MS determination which yielded characteristic finger prints and fatty acid composition

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