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PHARMACEUTICAL PREPARATION AND ANALYTICAL EVALUATION OF GUDUCHYADI GHRITA

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ABSTRACT

Guduchyadi Ghrita is a classical Ayurvedic formulation indicated in the management of Kasa (respiratory disorders). The present study aimed to prepare Guduchyadi Ghrita as per the reference of Yogaratnakara following standard Sneha Paka procedures, along with its pharmaceutical documentation and analytical evaluation. Raw materials were procured, authenticated, and processed through sequential steps including Ghrita Murchhana, Kwatha preparation, Kalka preparation, and final Sneha Paka. The preparation was carried out under controlled conditions, observing classical Siddhi Lakshanas at each stage.

Comprehensive documentation of methodology, observations, yield, and precautions was maintained. The final product was subjected to organoleptic, physico-chemical, chromatographic, and microbial analyses using standard protocols. Organoleptic evaluation revealed characteristic colour, odour, taste, and semi-solid consistency. Physico-chemical parameters such as acid value, peroxide value, saponification value, and iodine value indicated good stability and quality of the formulation. Thin Layer Chromatography (TLC) showed multiple spots, suggesting the presence of diverse phytoconstituents. Microbial analysis confirmed the absence of bacterial and fungal contamination.

KEY WORDS- *Guduchyadi Ghrita, Ghrita Kalpana, Kasa, Pharmaceutico- Analytical Study, A*yurveda.

INTRODUCTION

Ayurveda, the ancient science of life, encompasses extensive pharmaceutico-therapeutic approach wherein various dosage forms are designed to enhance drug efficacy and patient compliance. Among these, Ghrita Kalpana occupies a prominent place due to its unique physico-chemical properties. Ghrita serves as a lipid-based medium capable of extracting both fat-soluble and water-soluble active principles.

Guduchyadi Ghrita is a classical formulation under Ghrita Kalpana, described in Yogaratnakara for the management of Kasa. It comprises Guduchi, Vasa, Kantakari, and Ghrita as its main ingredients. The preparation process involves initial Murchhana of Ghrita, followed by Sneha Paka using both Kalka and Kwatha of the specified drugs, adhering to proper standard operating procedures. The attainment of Samyak Siddhi Lakshana is carefully monitored throughout the process and at completion. Once these signs are observed, the prepared ghrita is collected and preserved appropriately.

Establishing quality control parameters is essential for ensuring the safety, efficacy, and consistency of the formulations through evaluation of organoleptic and physicochemical properties. These assessments help confirm proper Sneha Siddhi, detect adulteration, and ensure reproducibility.

AIMS AND OBJECTIVE

- Preparation of Guduchyadi Ghṛita in accordance with the method described in Yogaratnakara, adhering to standard Sneha Paka procedures.
- Comprehensive pharmaceutical documentation covering methodology, observations, final yield, and necessary precautions.
- Development of an analytical profile to establish preliminary quality standards for identity, purity, potency, and safety.

MATERIALS AND METHOD

Pharmaceutical source- All raw drugs were procured from local ayurvedic drug market and authenticated by experts from department of Dravyaguna and Rasashastra, ensuring genuineness and quality. Pharmaceutical work was carried out in pharmacy unit, P.G. department of RS&BK, Gopabandhu Ayurveda Mahavidyalaya, Puri.

Analytical source: Analytical testing was Performed at Quality Control Laboratories, ALN Rao Memorial Ayurvedic Medical College and PG Centre, Koppa, Chikmagaluru, Karnataka, utilizing calibrated instruments and analytical-grade reagents.

The pharmaceutical study consists of following steps.

Step1- Go-ghrita murchhana

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Step2- Preparation of Kwatha (Guduchi, Kantakari &Vasa)
Step3- Preparation of Kalka (Guduchi, Kantakari &Vasa)
Step4- Preparation of Guduchyadi Ghrita

1. **Goghrita murchana** [Ref- Bhaisajya Ratnavali (5/1285)]

Ingredients for Ghrita Murchhana -

Sl. No.	Name	Botanical name	Parts used	Quantity
1	Haritaki	Terminalia chebula Linn.	Pericarp	100 gm
2	Vibhitaki	Terminalia bellerica Linn.	Pericarp	100 gm
3	Amalaki	Emblica officinalis Gaertn.	Pericarp	100 gm
4	Haridra	Curcuma longa Linn.	Rhizome	100 gm
5	Musta	Cyperus rotundus Linn.	Rhizome	100 gm
6	Matulunga	Citrus medica Linn.	Fruit Juice	100 gm
7	Go ghrita	-	-	2ltr.
8	Jala	-	-	8ltr.

Equipment required- Gas stove, Wide mouth vessel, Cloth, Spatula, Stainless steel vessel, Weighing machine

Procedure

- The prescribed drugs were prepared in Yavakuta churna (coarse powder) form and then converted into Kalka by triturating with Matulunga swarasa.
- Goghrita was placed in a wide mouth vessel and gently heated over a moderate flame until all moisture evaporated and the froth completely disappeared.
- Then prepared Kalka was gradually added into the Ghrita with continuous stirring to ensure uniform blending.
- To this 4 times of water was added and boiled.
- The heating process (Paka) was continued until all Sneha Siddhi Lakshanas were clearly observed.
- The prepared Ghrita was filtered warm through a clean cloth after completion.

Observations

- Continuous and attentive stirring was essential throughout the process to prevent from getting charred.
- The fragrance of Kalka dravyas became evident during the heating process.
- At the final stage, both frothing and sound completely subsided.

Tests for Completion of Ghrita Murchana

- Ghrita, when placed on fire, burned steadily without producing any cracking sound.
- Kalka, when exposed to fire, did not emit any sound.
- The kalka was soft in consistency.
- Color-golden brown

Precautions-

- It should be heated in mrudu agni (mild fire).
- Continuous and careful stirring is needed during the process to avoid charring of Kalka.
- Flame of the gas should be maintained at medium for constant temperature

Result-

Weight of crude Go-ghrita- 2ltr
Weights of Murchita Go-ghrita- 1.8ltr
Weight loss- 200 ml

Cause of weight loss-

- The water content of the ghee evaporated during the heating process.
- Some amount of Ghrita was also absorbed by the Kalka drugs.

2. **Guduchi Kantakari Vasa-Kwatha preparation** (ref- Sarangdhara Samhita, Madhyama Khanda)

Ingredient taken-

Sl. No.	Name	Botanical Name	Parts Used	Quantity
1	Water	-	-	18ltr (approx)
2	Guduchi	Tinospora cordifolia	Stem	1.460kg
3	Vasa	Adhatoda vasica	Leaf	1.460kg
4	Kantakari	Solanum Surattense	Whole plant	1.460kg

Equipment required- Wide mouth copper vessel, Gas stove, large spatula, Cotton cloth, Stainless steel container

Procedure

- The ingredients were taken (Guduchi, Kantakari, and Vasa) in required quantity.
- Separately each ingredient was Made to coarsely powdered form (Yavakuta Churṇa).
- Required quantity of potable water was added to the Yavakuta churna and kept overnight for soaking.
- The next day the soaked Yavakuta churna was subjected to mild to moderate heat and boiled with intermittent stirring. The boiling process was continued until the volume of the liquid was reduced to one-fourth of the initial quantity, indicating proper extraction of active principle.

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- Then the decoction was removed from fire and filtered through a clean cotton cloth.
- Then the filtered kwatha was collected and stored for further processing of Guduchyadi Ghrita.

Observations

- Upon soaking the coarse powder in water, partial softening of the drugs was observed, particularly in Guduchi and Vasa, indicating absorption of water prior to boiling.
- A characteristic odour became evident after the commencement of boiling.
- As the boiling progressed and the volume reduced to one-fourth of the initial quantity, the decoction became darker in colour and slightly viscous in consistency.
- No signs of charring or burning were observed at the bottom of the vessel, indicating proper maintenance of mild to moderate heat throughout the process.

Precautions-

- The drugs should be in the form of Yavakuṭa Churna (coarse powder) for kwatha preparation and a prescribed drug-to-water ratio should be maintained.
- The decoction should be prepared over mild to moderate heat, avoiding excessive heating and stirring should be done intermittently during boiling
- The boiling process should be continued until the liquid reduced to one-fourth of the initial volume, as per classical guidelines, and over- or under-reduction should be avoided.

Result-

Quantity taken- 22ltr (approx.)
Quantity obtained- 4.5ltr
Loss in Quantity- 18ltr
Reason of loss-

- Due to evaporation of water.
- Due to removal of solid residue (Vasa, Guduchi, Kantakari)

3. Guduchi, Kantakari, Vasa-Kalka preparation (ref-Sarangdhara Samhita, Madhyama Khanda)

Ingredients Taken-

Sl. No.	Ingredient	Latin name	Parts used	Amount
1	Guduchi	Tinospora cordifolia	Stem	130 gm
2	Kantakari	Solanum surattense	Whole plant	130 gm
3	Vasa	Adhatoda vasica	Leaf	130 gm

Equipment required- Mixer grinder, Ulukhala yantra, Stainless steel vessel, Gas stove

Procedure

- The selected raw drugs i.e., Guduchi, Kantakari, and Vasa were first properly identified and purified by removal of foreign matter.
- Required quantity of drugs were taken and washed properly and dried to remove excess water.
- All the drugs were taken in a khalva yantra and pounded to make small pieces.
- Then this mass was grinded in a mixer grinder to make a smooth paste form.
- The paste was then collected in a stainless-steel vessel and kept for further processing of Guduchyadi Ghrita preparation.

Observations

- The prepared Kalka exhibited soft consistency, neither excessively thick nor too fluid and the colour of the Kalka appeared dark greenish.

Precautions

- It should be crushed well into soft paste form, devoid of any fibrous part.
- Drugs should be dried well, to remove excess water.

Result

Quantity taken- 390 gm
Quantity obtained- 410 gm
Gain in Quantity- 20gm
Reason of Gain-
Due to absorption of water by drugs.

4. Preparation of Guduchyadi Ghrita

5. (Yogaratnakara-Kasarogadhikar-126)

Ingredients Taken-

Sl. No.	Ingredient	Amount
1	Murchhita ghrita	1.8ltr
2	Prepared kwatha	4.5 ltr
3	Prepared kalka	410 gm

Equipment required- Wide mouth copper vessel, Gas stove, Spatula, Stainless steel tray, Steel container, Cotton cloth, Airtight container

Procedure

- A wide mouthed copper vessel was placed over fire and heated and Required quantity of Murchita Ghrita was taken and subjected to mild heating.
- When the ghrita became warm and the formation of bubbles ceased, the intensity of the flame was reduced.
- Thereafter, the prepared Kwatha was added little by little into the ghrita with continuous stirring to ensure proper mixing and to manage the froth formed during the process.
- Subsequently, the prepared Kalka was added gradually into the vessel with the help of a spatula. Continuous stirring was performed to ensure uniform mixing of the Kalka with the ghṛita.
- The mixture was then allowed to boil with frequent stirring to prevent the Kalka from sticking to the bottom of the vessel.

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- After one hour of heating, the flame was extinguished and the ghṛita was allowed to cool naturally.
- On the following day, the ghṛita was again heated for one hour and subsequently allowed to cool. This process of intermittent heating and cooling was repeated daily for a total duration of twelve consecutive days. On the twelfth day, upon attainment of the classical Paka Lakshanas, the ghṛita was removed from the fire and allowed to cool.
- In a little warm state for better yield, the prepared ghrita was filtered through a clean cotton cloth into a stainless-steel container, to remove residual Kalka particles.
- The filtered ghrita was then allowed to cool completely and was transferred into an airtight container and properly labelled for storage and further use.

Paschat lakshana/ test of perfectness

- When subjected to fire, the prepared Ghrita burned steadily without producing any crackling sound indicating proper paka siddhi.
- The Kalka, when placed over fire, did not emit any sound, suggesting complete evaporation of moisture content.
- For the assessment of Sneha Siddhi, the Kalka was rolled into a Varti (wick-shaped form) and examined accordingly.
- The Ghrita exhibited a soft and smooth consistency.
- The colour of the Ghrita was uniform dark green, characteristic of well-prepared Ghrita

Precautions

- Murchita Ghrita should be used for Sneha Kalpana to eliminate undesirable odour and impurities.
- Kwatha should be added slowly to warm ghrita and not to excessively hot ghrita to avoid sudden frothing or spillage.
- Continuous stirring must be ensured during addition of Kwatha and Kalka to maintain uniform mixing and prevent overflow.

Result

Weight of murchhita ghrita- 1.8ltr
Weight of Guduchyadi Ghrita- 1.5ltr
Weight loss-300 ml
Reason of wt. loss-

- The aqueous content of the Ghrita was gradually evaporated during the heating process.
- A portion of the Ghrita was absorbed by the Kalka material during Sneha Paka.

INGREDIENTS FOR GUDUCHYADI GHRITA PREPARATION



GO-GHRITA


VIBHITAKI


AMALAKI


HARIDRA


MUSTA


HARITAKI

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GUDUCHI



VASA



KANTAKARI

PHARMACEUTICAL PROCEDURE



Ghrita Murchana



Vasa, Kantakari, Guduchi Kwatha



Vasa, Kantakari, Guduchi kalka



Ghrita paka

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Final Guduchyadi Ghrita



Labeled trial drug

ANALYTICAL STUDY

The analytical evaluation was performed at ALN Rao Memorial Ayurvedic Medical college & PG Centre, Koppa, Karnataka. All examinations were carried out using contemporary scientific methods, in accordance with the quality control standards laid down by the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of India.

EVALUATION

It was done on following parameters

- Organoleptic Evaluation
- Physico-chemical
- Biological
- Quantitative estimation

Organoleptic parameters are

- Colour - Visual appearance of the drug
- Odour – Smell or aroma of the drug
- Taste -Perceived taste upon oral intake
- Appearance- Texture and consistency of drug

Physico-chemical Parameters

- Loss on drying
- Refractive index
- Viscosity
- Specific Gravity
- Saponification value
- Iodine value
- Acid value
- Ester value
- Peroxide value
- Rancidity test
- Chromatographic methods; - ex.-TLC

Biological evaluation includes

1. Microbial limit test
2. Test for specific pathogen

Organoleptic Characters

Sl. No.	Parameters	Observation
1	Colour	Mild-red, green
2.	Odour	Aromatic(ghrita)
3.	Taste	Bitter, pungent
4.	Appearance	Semi-solid

Physico-Chemical Parameters

Sl. No.	Parameters	Observation
1	Loss on drying at 105°C	0.71%
2	Refractive index at 35°C	1.461
3	Viscosity at 35°C	38.81
4	Specific Gravity	0.9268
5	Saponification value	198.91
6	Iodine value	83.32
7	Acid value	0.41
8	Ester value	198.50
9	Peroxide value	2.14
10	Rancidity test (Kreis test)	Negative

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Thin Layer Chromatography Result

Sl. No.	Rf value	Under long UV
1	0.08	Red orange colour
2	0.16	Red
3	0.29	Orange red
4	0.40	Red orange
5	0.46	Red orange
6	0.54	Red
7	0.66	Red
8	0.71	Red
9	0.75	Light blue red



MICROBIAL CONTAMINATION
Total aerobic count- Nil
Total fungal count- Nil

DISCUSSION

The present study focused on the pharmaceutical preparation and analytical standardization of Guduchyadi Ghrita. The preparation followed classical Sneha Paka procedures, ensuring adherence to traditional guidelines along with scientific validation.

The Ghrita Murchhana process played a crucial role in enhancing the quality of Goghrita by removing impurities, undesirable odour, and moisture content. The observed weight loss during murchhana can be attributed to evaporation of water and absorption of ghrita by kalka dravyas, which is consistent with classical expectations.

During Kwatha preparation, maintaining the proper drug-to-water ratio and controlled heating ensured effective extraction of active principles. colour change was observed and absence of charring reflected proper temperature control.

The Kalka preparation showed a slight increase in weight due to absorption of water, resulting in a soft, homogeneous paste suitable for Sneha Paka.

In the final preparation of Guduchyadi Ghrita, intermittent heating over twelve days facilitated gradual and efficient incorporation of active principles into the lipid medium. The attainment of classical Sneha Siddhi Lakshanas confirmed completion of the process. The reduction in final yield was mainly due to evaporation of aqueous content and absorption by kalka.

The analytical evaluation supports the quality and stability of the prepared formulation. Organoleptic parameters such as colour, odour, taste, and semi-solid consistency were found to be characteristic of a properly prepared ghrita. Physico-chemical parameters like low acid value and peroxide value indicate minimal rancidity and good stability. The saponification and iodine values reflect the fatty acid composition and degree of unsaturation, suggesting suitability of the formulation for therapeutic use.

The TLC profile showed multiple Rf values under UV light, indicating the presence of diverse phytoconstituents extracted from the ingredients. The absence of microbial contamination (nil bacterial and fungal count) confirms that the formulation is safe and prepared under hygienic conditions. Overall, both pharmaceutical observations and analytical results validate that the preparation was carried out successfully as per classical standards while maintaining modern quality control parameters.

CONCLUSION

Guduchyadi Ghrita was successfully prepared following classical Sneha Paka methodology. The pharmaceutical process yielded a formulation exhibiting proper Siddhi Lakshanas and acceptable organoleptic characteristics.

Analytical evaluation established preliminary quality standards for the formulation, confirming its identity, purity, stability, and safety. The absence of microbial contamination and favourable physico-chemical parameters indicate that the prepared ghrita is of good quality and suitable for therapeutic application.

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