WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 21, 1221-1232. Research Article ISSN 2277–105

PHARMACEUTICAL AND ANALYTICAL STUDY OF *JATI GHRITA*

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Article Received on 02 Oct. 2026,
Article Revised on 22 Oct. 2026,
Article Published on 01 Nov. 2026,

https://doi.org/10.5281/zenodo.23792943

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How to cite this Article: [*1]Dr. Payal Bhimrao Rathod, [2]Dr. Sheetal Pravin Koparde (2026). Pharmaceutical And Analytical Study Of Jati Ghrita. World Journal of Pharmaceutical Research, 15(21), 1221–1232.
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ABSTRACT

Background: *Ghrita* is thought to be the best of the different *Snehakalpanas.*[1] It has a special ability to absorb extra pharmacological qualities from integrated medications while maintaining its own intrinsic qualities. Additionally, the body accepts *Ghrita* well, increasing its therapeutic efficiency without sacrificing its original properties. *Ashtang sangraha* mentions *Jati ghrita* as one of the remedies for Visha, Kushta, and other conditions. *Jati patra kwath*, *Jati patra kalka*, and cow's ghee are the ingredients of *Jati ghrita*. **Aim:** To carry out the pharmaceutical preparation of *Jati Ghrita* and to analyze the prepared *Jati Ghrita*. **Materials and Methods:** *Jati Ghrita* is a unique formulation which comes under *snehakalpana* prepared by the general method of *sneha* preparation. It is indicated in *visha, mukhpak, kushta.* **Results:** The pharmaceutical study showed that there were no pharmaceutical errors in the preparation of *Jati Ghrita*. The analytical parameters helped establish preliminary standards for *Jati Ghrita* according to the testing protocols. The GC-MS technique aided in identifying and documenting the active components present in the sample.

KEYWORDS: *Snehakalpna*, *Jati Ghrita*, Analytical study, Pharmaceutical study.

INTRODUCTION

Vati (tablets), *Churna* (powders), *Asava* and *Arishta* (self-made alcoholic formulations), *Snehakalpa* (medicated oils), and *Ghrita* (medicated *ghee*) are examples of Ayurvedic herbal-

based dosage forms used to treat a variety of illnesses. Classical Ayurvedic books, such as the Ayurvedic Pharmacopoeia and Ayurvedic Formulary, provide detailed descriptions of these dose regimens.[2] *Vata*, *Pitta*, and *Kapha*—collectively referred to as the *Tridosha*—are the three fundamental forces that control the body's emotional and physical processes. For both physical and mental well-being, these doshas must be kept in balance. About 40 ailments are caused by an imbalance of *Pitta*, while roughly 80 disorders are caused by a disturbance of *Vata Dosha*.[3] One such *Kalpana* is *ghrita*, which is considered a significant pharmacological preparation in Ayurveda and is used to create a semi-solid oleaginous dose form for topical and systemic treatment in a variety of ailments. In accordance with the recommended formulation, it is made by heating *Ghrita*, *Kalka* (herbal paste), and *Drava* (liquid media like juice, decoction, hot or cold infusion, milk, etc.).[4]

Ashtang sangraha uttarsthan vishapratishedha adhyaya[5] mentions *Jati Ghrita*, which has been utilised for centuries to heal *Visha* (poisoning) due to its simple availability.

Jati Ghrita is appropriate for patient usage due to its flavour, aroma, shelf life, and general acceptability. The pharmaceutical preparation and analytical assessment of *Jati Ghrita* were both completed in the current investigation.

MATERIALS AND METHODS

Pharmaceutical Study

The pharmaceutical study covers every step of the medication preparation process, from gathering raw materials to making the finished product. The following sections were used to conduct the study.

A. Collection of raw drugs

B. Standardisation and Authentication of raw drugs

C. *Go-Ghrita*

D. Preparation of *Jati Ghrita*

A. Collection of Raw Drugs

The raw drugs required for the preparation of the medicine were procured from the *Bhavprakash* Udyan of Government Ayurvedic College, Dharashiv.

B. Standardisation and Authentification of raw drugs

The Authentication of all the raw drugs was done at the Department of *Dravyaguna*, Government Ayurvedic college of Ayurveda and Hospital, Dharashiv.

C. Preparation of *Jati Ghrita*

Jati ghrita was prepared as per *Asthang Sangraha utharsthan.*

Method of Preparation

PS1, PS2, PS3 were prepared in the same manner, the ingradient and their proportion are given in the table below.

Table 1: Ingradient and quantity of drugs taken.

Sr.No	Ingradients	Quantity
1	*Jati patra kwath*	1000ml
2	*Go-Ghrita*	250gm
3	*Jati patra kalka*	50gm

At 11:00 AM, the preparations began. Throughout the process, a stainless steel vessel was set on an LPG stove and kept at a moderate temperature. The vessel was filled with 250 ml of *Go-Ghrita*. 50 g of *Kalka* and 1000 ml of *Jati Patra Kwatha* were added to the *Ghrita* once it had completely liquefied. The ratio of the ingredients was 1:4:1/8 (*Ghrita: Kwatha: Kalka*). To create a homogenous mixture and guarantee that every ingredient was distributed evenly, the entire mixture was constantly mixed. *Mandagni* oversaw the entire preparation procedure. After two hours and twenty minutes, the heating was turned off. After that, a fresh cloth was placed over the vessel.

The *Paka* procedure started at 11:30 AM on the second day. Until a uniform consistency was reached, the mixture was constantly churned. *Mandagni* was kept constant during the process. Throughout the entire operation, temperature changes were noted every fifteen minutes. *Sneha Siddhi Lakshanas* were witnessed when the heating procedure was finished at 4:37 PM. The preparation of *Ghrita* took ten hours and fifteen minutes in total. A clean towel was used to filter the prepared *Jati Ghrita*, yielding 250 millilitres. After then, the prepared *Ghrita* was used in experiments and analyses.

In this manner 3 samples of *Jati Ghrita* were prepared with same ingradient, following same manufacturing method and were coded as PS1,PS2,PS3.

There were total 3 samples of *Jati Ghrita* for analytical study.

1. *Jati Ghrita* PS1
2. *Jati Ghrita* PS2

3. *Jati Ghrita* PS3

RESULTS

Pharmaceutical Study Results

Table 2: Result obtained during *Jati Ghrita* preparation.

Observations	PS1	PS2	PS3
Initial quantity of *Ghrita*	250ml	250ml	250ml
Final quantity of *Jati Ghrita*	240ml	240ml	245ml

ANALYTICAL STUDY of *Jati Ghrita* involved

1. Analysis of Raw drugs.
2. Organoleptic characterstics of prepared *Jati Ghrita.*
3. Physicochemical analysis of prepared *Jati ghrita.*

1. Analysis of Raw drugs

Table 3: Result of Organoleptic character of *Jati patra churna.*

Test	*Jati patra churna*
Shabda – Surface structure	Fine, smooth powder (free flowing)
Sparsh – Consistancy	Fine powder
Roop – Appearance	Homogenous powder free from foreign matter
Rasa – Taste	Bitter and slightly astringent
Gandha – Odour	Characterstic aromatic odour

Table 4: Result of Organoleptic character of *Jati patra kwath.*

Test	*Jati patra kwath*
Shabda – Surface structure	Fine,smooth powder (free flowing)
Sparsh – Consistancy	Thin to slightly viscous
Roop – Appearance	Light yellowish to green coloured liquid, clear or slightly turbid
Rasa – Taste	*Kashay* (astringent) with slight *Tikta* (bitter)
Gandha – Odour	Characterstic aromatic odour, slightly spicy and pleasant

Go-Ghrita (clarified butter or ghee) is a fatty substance derived from cow's milk, commonly used in Ayurvedic medicine, cooking, and rituals. It is obtained by heating curd-derived butter until the water evaporates and the pure fat is left behind.

Table 5: Result of Organoleptic character of *Go-Ghrita.*

Test	*Go-Ghrita*
Shabda – Surface structure	Soft,unctuous,greasy
Sparsh – Consistancy	Semisolid at room temprecture, melts uniformly on

	touch
Roop – Appearance	Clear,golden yellow colour
Rasa – Taste	Mildly sweet,pleasant;no rancid or sour taste
Gandha – Odour	Ckaracterstic nutty or rich aroma of pure gheee
Appearance	Smooth, homogenous

The organoleptic characteristics, including colour, taste, and odour, were carefully observed and recorded.

Table 6: Result of Organoleptic character of *Jati Ghrita.*

Tests	***Jati Ghrita***
Shabda- Surface texture	Smooth and uniform
Sparsha- Consistency	Semi-solid at room temperature; soft and unctuous
Roopa- Appearance	Green coloured, clear and glossy
Rasa- Taste	Mildly sweet with characteristic *ghee* taste
Gandha– Odour	Pleasant, characteristic *ghee* odour with mild aromatic note of *Jati Ghrita.*

Pharmaceutical Evaluation

The physico-chemical parameters of *Jati Ghrita*, including refractive index, specific gravity, rancidity, acid value, saponification value, fat content, and viscocity value, were evaluated. The details are presented in Table 7.

Table 7: Result of physicochemical parameters of *Jati patra churna.*

Sr No	**Test particulars**	**Observations (*Jati patra churna)***
1.	pH value	5.56
2.	Ash value	8.1
3.	LOD	9.2%
4.	Acid insoluble content	1.11%
5.	Water soluble ash	3.2%
6.	Water soluble extractive value	13.6%
7.	Alcohole soluble extractive value	9.8%
8.	Foreign Organic Matter	0.60%

Table 8: Result of physicochemical parameters of *Jati patra kwath.*

Sr No	**Test particulars**	**Observations (*Jati patra kwath)***
1.	pH Value	5.52
2.	Moisture contents/LOD	97.91%
3.	Water Soluble Extractive Value	8%
4.	Alcohol Soluble Extractive Value	12%
5.	Specific gravity	1.06g/mL
6.	Viscocity	2.1 centipose

Table 9: Result of physicochemical parameters of *Go- Ghrita.*

Sr No	Test particulars	Test particulars (*Go- Ghrita)*
1.	Acid value	1.12mg KOH/g
2.	Peroxide value	19meq o_2/kg
3.	Iodine value	10.15g of Iodine per kg of fat
4.	Saponification	213.18 mg KOH/g
5.	Miosture content	0.48%
6.	Baudouin test	Negative
7.	Soloubility	Insoluble in water, soluble in hot alcohol and organic solvents

Table 10: Result of physicochemical parameters of prepared samples of *Jati Ghrita.*

Sr No	Test particulars	Observations (*Jati Ghrita*) PS1	PS2	PS3
1.	pH Value	4.64	4.60	4.63
2.	Volatile Content	0.76%	0.75%	0.76%
3.	Saponification Value	28.05mg KOH/g	27.65mg KOH/g	28.00mg KOH/g
4.	Fat Content	Present	Present	Present
5.	Moisture contents/LOD at 110°C	1.1%	1.25%	1.18%
6.	Viscocity	72centipoise	70 centipoise	71 centipoise
7.	Rancidity	Negative	Negative	Negative
8.	Specific gravity	1.0468	1.0500	1.0476

Preparation of *Jati Ghrita*









DISCUSSION

Discussion on *Ghrita*

The undesirable contaminants found in raw *Ghrita*, such as moisture, adulterants, dissolved gases, intermediary chemical elements, and plant poisons, are referred to as *amadosha*. It is

crucial to make sure that only pure and strong *Ghrita* is utilised for the creation of *Siddha Ghrita* because lengthy storage of *Ghrita* may result in the development of *Dourgandha* (a foul odour). When combined with *Kalka* and *Drava Dravyas* during *Sneha Kalpana*, *Ghrita* is a great lipid medium for the pharmaceutical extraction of both fat-soluble and water-soluble active ingredients. The heating technique improves the formulation's stability, shelf life, palatability, and medicinal efficacy.

By removing unwanted odours, excess moisture, and other contaminants, the *Murchana* process improves the quality of *Ghrita* and increases its stability and capacity to absorb medicinal active ingredients. *Ghrita* that has been properly processed demonstrates appropriate organoleptic and physicochemical criteria that demonstrate its quality, purity, and medicinal usefulness.

Discussion on preparation of *Jati Ghrita*

The reference of *Jati Ghrita* was taken from *Ashtang Sangraha uttarsthan Vishapratishedha adhyaya*. This reference was selected because the method of preparation was comparatively simple and required fewer ingredients than other references. In this study, the formulation was prepared using *Kalka Dravya*, *Sneha Dravya*, and *Drava Dravya*. The preparation process was completed over a duration of two days. A wide-mouthed vessel was used during the preparation of *Ghrita* to facilitate easy stirring and ensure proper evaporation.

After *Ghrita* (250gm), *Jati patra kalka* 50gm, *Jati patra kwath* 1lit was added. It was done to avoid the burning of *Kalka* and proper mixing with the *Sneha* and *drava Dravya*. Cintinuous stirring was done during so as to avoid charring of Kalka Dravyas. The temperature was maintained at *Mandagni* throughout the procedure to prevent degradation of the phytoconstituents present in the drugs. The reduction in quantity and increase in consistency were mainly due to the evaporation of water content from the mixture. *Phena Shanti* was observed as a result of the formation of lower fatty acids. Immediately after attaining the desired Paka, the vessel was removed from the stove to prevent further progression to the next stage of Paka. Filtration was carried out while the preparation was still hot to obtain maximum yield of *Ghrita* through proper squeezing. The final yield of *Ghrita* obtained was 200 ml, with a loss of about 50 ml due to prolonged heating for two days and absorption of *Ghrita* by the *Kalka*. The prepared *Jati Ghrita* exhibited a greenish-yellow colour.

Discussion on Analytical Study

The analytical study was carried out to evaluate the standard parameters of the formulation according to the guidelines prescribed by Central Council for Research in Ayurvedic Sciences (CCRAS).

A. Organoleptic characters

1. Colour – The *Ghrita* colour was Green colour, clear and glossy.
2. Odour – Prepartion was having pleasant, characterstic *ghee* odour with mild aromatic note of *Jati*.
3. Taste – The preparation of having mildly sweet with characterstic *ghee* taste.

B. Physicochemical parameters

1. Specific Gravity[6]

Sneha's specific gravity is thought to be a crucial factor in the examination of medicated *Sneha* preparations since the presence of dissolved components is anticipated to change it. This parameter's evaluation aids in the non-invasive assessment of the formulation's molecular properties.

The data showed that the specific gravity of *Jati Ghrita* 1.0468, which indicate active constituents present in it.

2. Rancidity[7]

Rancidity determines the level of oxidation and Helps to determine the shelf life of *Ghrita*. The data showed that the No colour development was observed thus the sample is fresh.

3. Determination of Saponofication Value[8]

Higher saponification values in medicated *ghrita* are said to have superior absorption ability. This measure aids in identifying the average chain length and molecular makeup of the fatty acids found in the fat. The molecular weight of the fat has an inverse relationship with the saponification value. While a low saponification value shows the existence of more complicated and higher molecular weight fatty acid chains, a high saponification value indicates the presence of low molecular weight fatty acids, suggesting that the molecules are present in a simpler form. Short-chain fatty acid-containing fats typically have higher saponification values.

The number of carboxyl (-COOH) groups in the fat determines how much alkali is needed for saponification. Because short-chain fats have more -COOH groups per gram than long-chain fats, they need more alkali to saponify, which results in a higher saponification number.

The saponification value of *Jati Ghrita* was found to be 28.05 mg KOH/g, which indicates good stability of the formulation.

4. Fat Content

The data showed that the after drying, there was a translucent oily spot observed indicating the presence of fats.

5. Loss of drying (LOD) at 110°C[9]

The conventional laboratory method for figuring out high-level moisture in solid or semi-solid materials is loss on drying.

The data showed that the Loss on drying determines the amount of moisture and volatile matter present in the sample.

6. Viscosity[10,11]

A friction force forms between two fluid layers as they move in relation to one another, and the slower layer slows down the quicker layer. The fluid attribute known as viscosity, which represents the fluid's inherent sluggishness, describes this internal resistance to flow. Viscosity is caused by cohesive molecular forces in liquids and molecular collisions in gases.

The data showed that the Viscosity of *Jati Ghrita* 72 centipose.

RESULT

Jati Ghrita was evaluated for its sensory qualities, showing a smooth, semi-solid texture, pale yellow color, and characteristic ghee taste with a pleasant odor. Physicochemical analysis revealed a pH of 4.64, low volatile content (0.76%), a typical saponification value of 28.05 mg KOH/g, viscosity of 72 centipoise and 1.1% moisture content, indicating stability and a good shelf life. The rancidity test was negative, confirming freshness, and the specific gravity was 1.0468, within normal range.

CONCLUSION

The genuine raw materials required for the study formulation were easily and abundantly available. No pharmaceutical difficulties were encountered during the preparation of *Jati Ghrita*. The analytical values obtained were found to be within the standard permissible

limits, indicating the quality and standardization of the formulation. This suggests that the preparation was carried out in a proper and authenticated manner.

Jati Ghrita is a high-quality ghee with ideal sensory characteristics and standard test results, such as low moisture, absence of rancidity, and a typical saponification value. It is suitable for culinary and medicinal use, offering good shelf life and freshness.

Jati Patra Churna contains a high mineral content, indicated by its substantial ash values. Its moderate water and alcohol-soluble extractive values suggest it has bioactive compounds, making it suitable for medicinal or therapeutic purposes. Both products meet the necessary quality standards, with *Jati Ghrita* excelling as a premium ghee and *Jati Patra Churna* as a potent plant-based powder.

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