ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 1| January2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

PHARMACEUTICAL STANDARDIZATION AND ANALYTICAL EVALUATION OF VIDANGADI GUGGULU VATI

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Article DOI: https://doi.org/10.36713/epra25885
DOI No: 10.36713/epra25885

ABSTRACT

Vidangadi Guggulu is a classical polyherbal Guggulu Vati formulation described in Chakradatta (Vrana Śoṭha Adhikāra 44/69–70) and indicated in Duṣṭa Vraṇa, Āpachi, Meha, Kuṣṭha, and Nāḍī Vraṇa. The present study aimed to standardize its pharmaceutical preparation and to establish a comprehensive analytical profile in accordance with contemporary quality control norms.

Vidangadi Guggulu was prepared following the classical Vati Kalpanā method and evaluated for organoleptic characteristics, physicochemical parameters, preliminary phytochemical profile, chromatographic pattern, and microbial load. The prepared formulation consisted of uniform, brownish-black Vatis with characteristic odour and taste, reflecting classical therapeutic attributes in a stable and patient-friendly dosage form.

The study concludes that Vidangadi Guggulu Vati is a safe and standardized Āyurvedic formulation, supporting its classical indications and providing a scientific basis for future pharmacological evaluation and potential application in Madhumeha.

KEYWORDS: *Vidangadi Guggulu, Guggulu Vati, Ayurvedic pharmaceutics, Vati Kalpana, Pharmaceutical standardization, Analytical evaluation, Meha.*

INTRODUCTION

Āyurvedic principles advocate disease management through an integrated approach involving **Ahāra**, **Vihāra**, and **Auṣadha**, with **Auṣadha** playing a central role in restoring health. In the Āyurvedic system, Auṣadhi are broadly classified into **Kāshta-Auṣadhi** (purely herbal) and **Rasa-Auṣadhi** (herbo-mineral). In **Bhaishajya Kalpanā**, Kāshta-Auṣadhi are processed to enhance therapeutic efficacy, stability, and patient acceptability while minimizing potential adverse effects, thus ensuring optimal clinical outcomes. **Acharya Charaka** described the **Pancha Kaṣāya Kalpanā** (Swarasa, Kalka, Śruta, Śīta, and Phānta), forming the fundamental basis of all **Āyurvedic formulations** and exemplifying classical drug preparation principles.

With advancements in pharmaceutical science, several secondary dosage forms emerged. Among these, **Vati Kalpanā** occupies a significant place and is considered an advanced form of **Kalka Kalpanā**. **Vati** is a solid dosage form prepared by **Pāka** of **Guda, Śarkarā**, or **Guggulu**, combined with finely powdered **Auṣadha Dravyas**. Its advantages include ease of administration, better palatability, accurate dosing, and prolonged shelf life. Although classical texts do not describe a separate chapter for **Guggulu Kalpanā**, **Śārṅgadhara Saṃhitā** includes it under **Vati Kalpanā**. When prepared using **Guggulu** as the binding medium, it is termed **Guggulu Vati Kalpanā**, reflecting the evolution of classical formulations into patient-friendly, stable dosage forms.

Vidangadi Guggulu is a classical polyherbal **Guggulu Vati** mentioned in *Chakradatta* (Vrana-Śoṭha-Adhikāra 44/69-70), indicated for **Duṣṭa Vraṇa, Āpachi, Meha, Kuṣṭha**, and **Nāḍī-Vraṇa**. The formulation comprises **Vidanga, Triphala, Vyosha powders**, and **Guggulu**, processed according to classical principles. Conversion into Vati ensures stability, accurate dosing, and patient compliance. This study aimed to standardize the pharmaceutical preparation of **Vidangadi Guggulu Vati** and establish a comprehensive analytical profile, providing a scientific foundation for future pharmacological studies and potential application in **Madhumeha** management.

AIMS AND OBJECTIVES

1. To prepare **Vidangadi Guggulu** strictly following classical *Chakradatta* references.
2. To systematically document the pharmaceutical process, including observations, yield, and precautions, ensuring reproducibility.

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3. To establish a preliminary analytical profile for the formulation, covering **identity, purity, strength, and safety**, in line with pharmacopeial quality standards.

MATERIALS AND METHODS

Pharmaceutical Source: All raw drugs were procured from the local Ayurvedic drug market, Puri, and authenticated by experts from the Departments of Dravyaguna and Rasashastra & Bhaishajya Kalpana, ensuring genuineness and quality. Pharmaceutical processing was carried out in the Mini Pharmacy Unit, PG Department of RS & BK, Gopabandhu Ayurveda Mahavidyalaya, Puri.

Analytical source: The analytical testing was performed at the Quality Control Laboratories, ALN Rao Memorial Ayurvedic Medical College and PG Centre, Koppa, Chikkamagaluru, Karnataka, using calibrated instruments and analytical-grade reagents following standard procedures.

PHARMACEUTICAL PROCEDURE

1. Preparation of Triphala Kwatha

Table 1: list of ingredients of Kwatha Dravya

Sr.no.	Ingredients	Latin Name	Family	Part used	Parts Ratio	Quantity
1	Amalaki	Emblica officinalis	Euphorbiacea	Dried Fruit	1	200gm
2	Haritaki	Terminalia chebula	Combretaceae	Dried Fruit	1	200gm
3	Vibhitaka	Terminalia bellirica	Combretaceae	Dried Fruit	1	200gm
4	Water	-	-	-	-	9.6liters

Triphala Kwatha was prepared using water in 16-fold quantity (w/v) relative to the total weight of Triphala (Amalaki, Haritaki, and Vibhitaki combined).

Yavakūta (coarse powder) of Amalaki, Haritaki, and Vibhitaka (200 g each; total 600 g) was prepared by removing seeds and then pounding and sieving to achieve a uniform particle size suitable for decoction. The coarsely powdered drugs were soaked overnight in 9.6 litres of potable water to enhance initial extraction. The next morning, the soaked mixture was boiled over a mild flame with intermittent stirring until the volume reduced to one-fourth (approximately 2.4 litres). The hot decoction was immediately filtered through a clean cotton cloth, yielding a dark blackish brown Kwatha with Kashaya taste and strong herbal characteristic odour.

Fig. 1. Triphala Kwatha Nirman

Observations

- The Yavakūta Triphala Churna softened during overnight soaking.
- Little froth was observed during boiling
- Colour: Dark blackish brown colour with herbal hue.
- Taste: Kashaya
- Smell: Strong herbal characteristic odour.
- Consistency: Clear liquid with fine sediment at bottom
- Yield: 2.4liters from initial 9.6liters.

Precautions

- Only Yavakūta Churna (coarse powder) is used to ensure optimal extraction fine powder causes excessive turbidity.
- Chemically inert vessels (iron or stainless steel) are employed to avoid interaction with herbal constituents.
- A mild to moderate flame is maintained during boiling to preserve phytoconstituents and prevent charring.
- The container is kept uncovered during boiling to allow proper evaporation and maintain the desired consistency of the Kwatha.

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2. Guggulu shodhan by triphala Kwatha

Principle: Swedana

Materials

- Raw Guggulu – 500 g
- Triphala Kwatha – 2.4 L

Procedure

Raw Guggulu was cleaned by removing visible impurities such as sand, stones, and leaves, and then cut into small pieces. The pieces of Guggulu were placed in a clean cotton cloth and tied to form a pottali. The Pottali was immersed in a Dola yantra containing freshly prepared Triphala Kwath for swedana.

The kwath was boiled on Mandāgni until all the Guggulu dissolved completely and passed into kwath through the cloth. Continuous stirring was carried out to ensure uniform dissolution of Guggulu and to prevent sticking at bottom of the vessel. After complete dissolution, the pottali was removed. The Kwatha containing dissolved Guggulu was further heated on Mandāgni with continuous stirring until evaporation of water occurred and a soft, cohesive mass was obtained. When a soft mass consistency was achieved, it was transferred into a small vessel and allowed to dry under shade.

Fig. 2. Guggulu shodhan by triphala Kwatha

Precautions

- Utensils and cotton cloth should be clean.
- Raw Guggulu should be cut into small pieces to facilitate uniform purification.
- Heating should be carried out on Mandāgni.
- Continuous stirring should be maintained to prevent sticking of the Guggulu at the base of vessel.
- The pottali should not touch the bottom of the heating vessel.

Table 2: Observation and Result of Guggulu shodhan

Observation	Raw Guggulu	Shuddha Guggulu
Appearance	Brownish-black with mild luster	Blackish-brown, soft, waxy
Odor	Strong, resinous, slightly pungent, earthy	Mild, aromatic, with faint herbal aroma; pungency reduced
Consistency	Hard, brittle pieces	Soft, cohesive, sticky
During Process	–	Dissolved in Triphala Kwatha, heated on Mandāgni, water evaporated
Weight	500 g	410 g
Total Loss	–	90 g (due to impurities & adhesion of Guggulu to the vessel).

"Guggulu Śodhana was carried out as per the procedure described in Rasajalanidhi, Trutiya Khanda, Chapter 8 (p. 359)."

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1. Preparation of Vidangadi Guggulu Vati

Principle: Vati Kalpanā using Guggulu as the binding medium.

MATERIALS AND METHODS

Table 3: Ingredients of Vidangadi Guggulu vati

Sr. No.	Ingredients	Latin Name	Family	Part used	Ratio	Quantity
1	Vidanga	Embelia ribes	Myrsinaceae	Dried Fruit	1part	50gm
2	Amalaki	Emblica officinalis	Euphorbiacea	Dried Fruit	1part	50gm
3	Haritaki	Terminalia chebula	Combretaceae	Dried Fruit	1part	50gm
4	Vibhitaka	Terminalia bellirica	Combretaceae	Dried Fruit	1part	50gm
5	Sunthi	Zingiber officinale	Zingiberaceae	Dried Rhizome	1part	50gm
6	Maricha	Piper nigrum	Piperaceae	Dried Fruit	1part	50gm
7	Pippali	Piper longum	Piperaceae	Dried Fruit	1part	50gm
8	Shuddha Guggulu	Commiphora mukul	Burseraceae	Exudate	7part	350gm
9	Go-ghrit	-	-	Clarified butter (processing medium)	-	Q.S.

Fig. 3. A.Vidanga, B. Amalaki, C. Haritaki, D. Vibhitaka, E. Sunthi, F. Maricha, G. Pippali, H. Guggulu, I. Go-ghrit

Method of Preparation of Vidangadi Guggulu Vati

Step 1: Preparation of Fine Powder

All ingredients, except Guggulu, were taken in prescribed quantities and carefully examined to remove visible impurities. The cleaned raw drugs were dried under sunlight until completely free from moisture to facilitate easy powdering and enhance shelf life. Each ingredient was powdered separately to obtain a fine powder and passed through a sieve to ensure uniform particle size. The fine powders were thoroughly mixed in a clean, dry vessel to obtain a homogeneous mixture.

Step 2: Softening of Śodhita Guggulu

Purified Guggulu was taken in a wide-mouthed vessel, and a small quantity of water was added. The vessel was placed over mild heat (mandāgni) and stirred continuously until the Guggulu melted and attained a soft, semi-liquid consistency.

Step 3: Mixing of Powdered Drugs

The softened Guggulu was removed from heat and kept aside. The fine powder of all ingredients was gradually added to the softened Guggulu with continuous mixing to obtain a uniform mass. The mixture was transferred to a Khalva Yantra, and required quantity of Go-Ghṛita was gradually added. Pounding was continued until a homogeneous, soft mass suitable for Vati preparation was obtained.

Step 4: Formation of Vati

The homogeneous mass was allowed to cool slightly until suitable for handling. Small portions were manually rolled into tablets using the thumb and index finger. Uniform-sized Vatis of equal weight were prepared.

- **Standard size:** 500 mg
- **Shape:** Round and uniform

Step 5: Drying and Storage

- The prepared Vatis were dried in shade until completely free from moisture. The dried Vatis were stored in clean, airtight, moisture-free containers. Proper labeling was done indicating the formulation name, date of preparation, and other relevant details. The containers were kept in a cool, dry place to maintain stability and prevent contamination.

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Table 4: Observation and Results of preparation

Parameter	Observation / Result
Initial weight	750gm
Final weight	690gm
Total weight loss	60gm
Cause of loss	Adhesion of mixture to vessel and loss of powder during handling/powdering
Colour	Dark brown
Odour	Mild aromatic, Characteristic of Guggulu
Consistency	Sticky, Cohesive

"Vidangadi guggulu vati was carried out as per the procedure described in Chakradatta, 44/69-70.

Precautions

- Utensils should be clean and dry.
- Heating should be done on mandāgni.
- Powders should be added gradually for uniform mixing.
- Continuous stirring prevents sticking at the base of the vessel.

Packaging and Labeling: To ensure protection, convenience, identification, and safe storage of the prepared formulation, the final Vidangadi Guggulu Vatis were stored in clean, dry, airtight containers to protect them from moisture and microbial contamination. The finished product was filled into containers, sealed, and properly labeled with the drug name, date of preparation (21-10-2024), batch number (02-VG-24), and date of expiry, which is 5 years from the date of manufacture (20-10-2029).

Fig. 4. Vati Preparation

ANALYTICAL STUDY

The analysis was carried out at ALN Rao Memorial Ayurvedic Medical College & PG Centre, Koppa, Karnataka. All tests were conducted using modern scientific parameters, in accordance with the guidelines prescribed by the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of India.

EVALUATION

It can be done on following parameters:

1. Organoleptic evaluation
2. Physico-chemical parameters
3. Tablet testing parameters
4. Biological evaluation

GENERAL /ORGANOLEPTIC EXAMINATION

1. Rūpa (Colour) – Visual appearance of the drug
2. Rasa (Taste) – Perceived taste upon oral intake
3. Gandha (Odour) – Smell or aroma of the drug
4. Sparśa (Consistency & Texture) – Feel of the drug to the touch

PHYSICO-CHEMICAL PARAMETERS

It includes the following parameters

1. pH Value
2. Loss on drying at 105°C / Moisture content
3. Total Ash
4. Water soluble Ash
5. Acid insoluble Ash
6. Water soluble extractive
7. Alcohol soluble extractive
8. Chromatographic methods- viz T.L.C.

TABLET TESTING PARAMETERS

1. Uniformity of weight
2. Friability test

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3. Hardness test
4. Disintegration Time

BIOLOGICAL EVALUATION

1. Microbial limit test
2. Test for specific pathogen

ANALYTICAL RESULTS

A. ORGANOLEPTIC PARAMETERS

Table 5

Sl.no.	Characters	Results
1	Colour	Brown-black
2	Odour	Characteristic
3	Taste	Astringent, sour, slightly bitter
4	Texture	Vati

B. PHYSICO-CHEMICAL PARAMETERS

Table 6

Parameters	Results
Loss on Drying at 105°C	5.07 %
Total ash	5.30 %
Acid insoluble ash	0.19 %
Water soluble ash	2.37 %
Alcohol soluble extractives	16.03 %
Water soluble extractives	32.54 %
pH (5% aqueous solution)	3.68± 0.10

C. PRELIMINARY PHYTOCHEMICAL TESTS (QUALITATIVE TESTS)

Table 7

Test Parameters	Results
Carbohydrate	Present
Protein	Present
Alkaloid	Present
Cardiac glycoside	Present
Flavonoids	Present
Tannins	Present
Anthraquinone glycoside	Present
Triterpenoides	Present

D. FLUORESCENT TESTS

Table 8

Sl.no.	Parameters	Under visible light	Under long UV
1.	Sample + water	Brownish-yellow	Fluorescent yellow
2.	Sample + MeOH	Greenish-yellow	Fluorescent yellow
3.	Sample + 10% NaOH	Orange-brown	Fluorescent green
4.	Sample + 10% HCl	Greenish-yellow	Fluorescent yellow
5.	Sample + 10% HNO3	Light brown	Brown
6.	Sample + 10% H2SO4	Light brown	Fluorescent green
7.	Sample + 10% NH3	Dark brown	Brown

E. THIN LAYER CHROMATOGRAPHY

Table 9

Rf values	Under long UV
0.11	Orange-Red
0.24	Fluorescent Blue
0.38	Orange-Red
0.50	Fluorescent Green
0.57	Light Fluorescent Green
0.62	Light Fluorescent Green
0.67	Light Fluorescent Orange-Red
0.71	Fluorescent Blue

Solvent System: Toluene: Ethyl acetate: Acetone: Formic acid:: 34:2:4:4

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F. **TABLET TESTING PARAMETERS**

Table 10

Sl.no.	Parameters	Results
1	Uniformity test (in mg)	475 ± 2.25 mg
2	Friability test (loss percentage)	0.77%
3	Hardness test (kg/cm²)	4.50
4	Disintegration time (minutes)	42

G. MICROBIAL CONTAMINATION

Table 11

Sl.no.	Parameters	Results
1	Total Aerobic Count	1.0*10²cfu
2	Total Fungal Count	1.1*10² cfu

All microbial counts were within permissible limits as per API/WHO guidelines.

DISCUSSION

The pharmaceutico-analytical evaluation of Vidangadi Guggulu Vati confirms the successful preparation of a standardized and stable classical formulation. The pharmaceutical process yielded uniform, brownish-black vatis with acceptable weight variation and good handling characteristics, indicating proper binding by Śodhita Guggulu and effective incorporation of powdered drugs.

The moisture content of the formulation, as reflected by loss on drying (5.07%), remained within acceptable limits, suggesting good stability and reduced susceptibility to microbial growth. The total ash value (5.30%) indicates minimal inorganic matter, while the low acid-insoluble ash content (0.19%) confirms negligible contamination with siliceous or earthy impurities, thereby supporting the purity of raw materials and adequacy of processing methods.

Extractive values showed a clear predominance of water-soluble constituents (32.54%) compared to alcohol-soluble extractives (16.03%). This highlights the abundance of hydrophilic phytoconstituents, which is therapeutically relevant for Vidangadi Guggulu, especially in conditions like Meha, where water-soluble bioactive compounds contribute to metabolic regulation and elimination of Kleda. The mildly acidic pH of the formulation (3.68 ± 0.10) may further aid stability and enhance gastrointestinal compatibility.

Preliminary phytochemical screening revealed the presence of carbohydrates, proteins, alkaloids, flavonoids, tannins, glycosides, and triterpenoids. These constituents collectively justify the classical indications of Vidangadi Guggulu. Alkaloids and triterpenoids are known for their anti-inflammatory and metabolic modulatory actions, while flavonoids and tannins contribute antioxidant, astringent, and wound-healing properties.
The TLC analysis demonstrated multiple distinct spots with reproducible Rf values under UV light, indicating the presence of diverse phytochemical groups and establishing a characteristic chromatographic fingerprint. This fingerprint can serve as a reference standard for identity, quality control, and detection of adulteration in future studies.

Tablet evaluation parameters such as uniformity of weight (475 ± 2.25 mg), friability (0.77%), hardness (4.50 kg/cm²), and disintegration time (42 minutes) were found to be within acceptable limits, confirming adequate mechanical strength and satisfactory disintegration behavior for oral administration.

Microbiological analysis showed low total aerobic count (1.0 × 10² cfu/g) and fungal count (1.1 × 10² cfu/g), both well below the permissible limits. This confirms proper hygienic conditions during preparation, effective drying and storage, and overall safety of the finished formulation.

CONCLUSION

The present study successfully standardized the pharmaceutical preparation and analytical profile of Vidangadi Guggulu Vati as per classical Chakradatta references. The formulation exhibited acceptable organoleptic features, satisfactory physico-chemical parameters, a consistent phytochemical profile, a reproducible TLC fingerprint, and safe microbial limits. These findings provide a scientific basis for the classical claims of Vidangadi Guggulu and support its quality, safety, and therapeutic relevance. The generated analytical data may serve as a reference for future quality control, pharmacological evaluation, and clinical studies, particularly in relation to its application in Madhumeha.

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