



# PHARMACEUTICAL PREPARATION AND PHYSICOCHEMICAL EVALUATION OF NATADYA TAILA: A CLASSICAL AYURVEDIC MEDICATED OIL

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## ABSTRACT

Natadya Taila is a classical Ayurvedic medicated oil indicated for alleviation of Yoni Shoola and prepared through Sneha Kalpana. However, pharmaceutical documentation and analytical data on this formulation are limited. To prepare Natadya Taila by Sneha Paka and evaluate its pharmaceutical and physicochemical characteristics. Natadya Taila was prepared using Nata (*Valeriana wallichii*), Brihati (*Solanum indicum*), Kushta (*Saussurea lappa*), Saindhava Lavana and Devadaru (*Cedrus deodara*), with Tila Taila as the lipid base. The drugs were processed into Kwatha and Kalka and subjected to controlled heating with sesame oil. Completion of Sneha Paka was assessed using classical Sneha-siddhi lakshanas, including Vartivat, Shabdaheenata and Phenodgama. The finished product was evaluated for organoleptic characteristics and physicochemical parameters including refractive index, specific gravity, pH, saponification value and loss on drying. The prepared Natadya Taila showed a golden colour, characteristic aromatic odour, slightly salty and bitter taste, and viscous, unctuous consistency. Progressive reduction in bubble size and development of characteristic odour was observed during processing. The physicochemical results are to be reported based on laboratory findings. The study established a reproducible pharmaceutical procedure for Natadya Taila and generated preliminary quality-control data. Further chromatographic, stability and pharmacological studies are warranted for comprehensive standardization. Natadya Taila, Sneha Kalpana, Sneha Paka, Yoni Shoola, Tila Taila, physicochemical evaluation, standardization.

**KEYWORDS:** Natadya Taila, Sneha Kalpana, Sneha Paka, Yoni Shoola, Tila Taila, Ayurvedic pharmaceuticals, physicochemical evaluation, standardization.

## 1. INTRODUCTION

Ayurveda possesses a well-developed pharmaceutical system for converting crude medicinal substances into therapeutically appropriate dosage forms. *Bhaishajya Kalpana* encompasses several dosage-form technologies, among which *Sneha Kalpana* is an important classical method for preparing medicated oils and ghee. In this process, medicinal principles are transferred into a lipid medium through the combined use of *Sneha*, *Kalka* and *Drava Dravya*, followed by controlled heating. *Sharangadhara Samhita*, particularly *Madhyama Khanda*, Chapter 9, provides systematic descriptions of the preparation, proportions and assessment of *Sneha Kalpa*. Modern reviews have also discussed *Sneha Kalpana* as a pharmaceutically organized extraction process involving a lipid medium and aqueous or herbal liquid phase.

Natadya Taila is one such classical medicated oil indicated in the context of gynecological disorders. The classical source consulted for the present work describes Natadya Taila using Nata, Vanabhanta/Brihati, Kushta, Saindhava and Devadaru processed with Tila Taila and decoction. The formulation is particularly associated with relief of *Yoni Shoola*, as reflected in the classical statement indicating its use for alleviation of vaginal pain.

From the Ayurvedic perspective, *Yoni Shoola* may be understood predominantly in association with aggravated *Vata*,

particularly *Apana Vayu*, which governs the pelvic and reproductive region. However, the present study is pharmaceutical and analytical in nature and does not attempt to establish the clinical efficacy of Natadya Taila in any modern gynecological disease.

The ingredients of the formulation also possess pharmacological relevance reported in contemporary literature. Experimental studies have demonstrated analgesic activity associated with *Valeriana wallichii*, while anti-inflammatory activity has been reported for *Solanum indicum* and *Saussurea lappa*. *Cedrus deodara* has been investigated for several pharmacological activities, including analgesic and anti-inflammatory effects. These findings provide a scientific rationale for further investigation of the formulation but should not be interpreted as proof of clinical efficacy of Natadya Taila itself.

The lipid vehicle, *Tila Taila* (*Sesamum indicum* seed oil), is also pharmacologically relevant. Contemporary literature describes several biological activities of sesame oil and its phytoconstituents, including antioxidant and anti-inflammatory effects. Thus, the formulation combines a lipid vehicle with multiple aromatic and therapeutically active herbal drugs through a classical pharmaceutical process.

However, systematic pharmaceutical documentation and analytical characterization of Natadya Taila are relatively limited. Therefore, the present work was undertaken to



document the preparation process, critical pharmaceutical observations and physicochemical characteristics of the finished formulation.

## 2. AIM AND OBJECTIVES

### Aim

To prepare Natadya Taila by the classical principle of *Sneha Paka* and evaluate its pharmaceutical and physicochemical characteristics.

### Objectives

1. To prepare the *Kwatha* and *Kalka* according to the adopted pharmaceutical procedure.
2. To prepare Natadya Taila using controlled *Sneha Paka*.

3. To determine the completion of *Sneha Paka* using classical *Sneha-siddhi lakshanas*.
4. To evaluate the finished product for organoleptic and physicochemical parameters.

## 3. MATERIALS AND METHODS

### 3.1 Source and Authentication of Raw Materials

The ingredients required for Natadya Taila were procured from an authenticated commercial source. The crude drugs were subjected to appropriate identification and authentication before pharmaceutical processing. The formulation was prepared in the Department of Rasashastra and Bhaishajya Kalpana.

Table No. 1 Ingredients of Natadya Tail

| Sr. No. | Ayurvedic name    | Botanical/identity         | Part used  | Role                         |
|---------|-------------------|----------------------------|------------|------------------------------|
| 1       | Nata (Tagara)     | <i>Valeriana wallichii</i> | Root       | Kwatha and Kalka             |
| 2       | Brihati/Vartakini | <i>Solanum indicum</i>     | Root/Fruit | Kwatha and Kalka             |
| 3       | Kushta            | <i>Saussurea lappa</i>     | Root       | Kwatha and Kalka             |
| 4       | Saindhava Lavana  | Rock salt                  | Mineral    | Kwatha and Kalka             |
| 5       | Devadaru          | <i>Cedrus deodara</i>      | Heartwood  | Kwatha and Kalka             |
| 6       | Tila Taila        | <i>Sesamum indicum</i>     | Seed oil   | Sneha                        |
| 7       | Jala              | Purified/potable water     | —          | Kwatha and Kalka preparation |

### 3.2 Formulation Composition

The classical source consulted for the formulation describes the constituent drugs in equal proportion and specifies

their use in the preparation of Natadya Taila. For the experimental batch, the quantities actually used were adopted as follows.

Table No. 2 Composition and Quantities of Raw materials

| Ingredient                  | Quantity used                  |
|-----------------------------|--------------------------------|
| Nata                        | 50 g for Kwatha; 5 g for Kalka |
| Brihati                     | 50 g for Kwatha; 5 g for Kalka |
| Kushta                      | 50 g for Kwatha; 5 g for Kalka |
| Saindhava Lavana            | 50 g for Kwatha; 5 g for Kalka |
| Devadaru                    | 50 g for Kwatha; 5 g for Kalka |
| Tila Taila                  | 250 mL                         |
| Water for Kwatha            | 4000 mL                        |
| Water for Kalka preparation | q.s., approximately 10 mL      |

## 4. PHARMACEUTICAL PROCEDURE

### 4.1 Preparation of Kwatha

The crude drugs intended for *Kwatha* preparation were cleaned and coarsely powdered to obtain *Yavakuta Churna*. The specified quantity of the coarse powder was transferred to a suitable vessel and mixed with 4000 mL of water. The mixture was subjected to controlled heating over moderate flame and allowed to boil until the volume was reduced to approximately 1000 mL.

The resulting decoction was filtered through a clean muslin cloth to remove coarse particulate matter and was used as the *Drava Dravya* for subsequent *Sneha Paka*.

### 4.2 Preparation of Kalka

The ingredients intended for *Kalka* preparation were separately powdered and passed through a sieve to obtain a fine powder. The powders were mixed thoroughly in a *Khalva Yantra* to achieve homogeneity.

A small quantity of water was added gradually with continuous trituration until a smooth, cohesive and uniform *Kalka* was obtained. The final quantity of *Kalka* used in the experimental batch was 40 g.

### 4.3 Preparation of Natadya Taila by Sneha Paka

A clean, dry, wide-mouthed, heavy-bottomed stainless-steel vessel was used for preparation.

Initially, 250 mL of *Tila Taila* was transferred into the vessel and subjected to mild heating. The prepared *Kalka* was then incorporated into the oil with continuous stirring. Subsequently, the prepared *Kwatha* was added gradually with continuous mixing.

The mixture was maintained over controlled mild heat (*Mridu Agni*). Continuous stirring was performed to prevent settling and adherence of the herbal mass to the bottom of the vessel and to minimize the possibility of charring.



Heating was continued until the aqueous fraction was evaporated and the characteristic signs of completion of *Sneha Paka* were observed.

## 5. ASSESSMENT OF SNEHA SIDDHI LAKSHANAS

The completion of the preparation was assessed using classical *Sneha-siddhi lakshanas*.

**5.1 Vartivat:** A small quantity of the residual *Kalka* was examined manually. At the appropriate stage of processing, the *Kalka* could be rolled between the fingers into a wick-like form without excessive sticking, indicating substantial removal of moisture.

**5.2 Shabdaheenata:** A small quantity of the *Kalka* was exposed to fire. The absence of crackling sound indicated that residual moisture had been sufficiently eliminated.

**5.3 Phenodgama:** The appearance of characteristic froth on the surface of the oil was observed during the final stage of *Taila Paka*. This was considered along with the other *Siddhi Lakshanas* for determination of the endpoint.

After confirmation of the endpoint, the vessel was removed from the heat and the medicated oil was filtered while warm through a clean muslin cloth. The final quantity obtained in the experimental batch was approximately 220 mL.

## 6. OBSERVATIONS

During the initial stage of heating, vigorous bubbling was observed because of the high aqueous content of the formulation. As heating progressed and the moisture content decreased, the size and intensity of the bubbles gradually reduced.

A progressive change in odour was observed during processing. The initial raw herbal/decoction odour gradually changed to a characteristic aromatic odour, particularly reflecting the aromatic constituents of Tagara and Devadaru along with the characteristic odour of sesame oil.

Near the completion of *Sneha Paka*, the *Kalka* became comparatively compact and demonstrated *Vartivat* characteristics. Crackling was absent on exposure to fire, indicating the reduction of residual moisture. Froth formation was observed during the final stage.

These sequential changes were useful as practical indicators for determining the endpoint of pharmaceutical processing.

## 7. ORGANOLEPTIC EVALUATION

The finished Natadya Taila was evaluated for colour, odour, taste and consistency.

Table No. 3 Organoleptic Characteristics of Natadya Tail

| Parameter   | Observation                       |
|-------------|-----------------------------------|
| Colour      | Golden                            |
| Odour       | Characteristic, strongly aromatic |
| Taste       | Slightly salty and bitter         |
| Consistency | Viscous and unctuous              |

The organoleptic assessment provides preliminary identity characteristics of the finished formulation and may be useful for comparison between future batches.

## 8. PHYSICOCHEMICAL EVALUATION

Physicochemical evaluation was undertaken to generate a preliminary quality-control profile of Natadya Taila. The selected parameters included refractive index, specific gravity, pH, saponification value and loss on drying.

Table No 4. Physicochemical Parameters of Natadya Taila

| Sr. No. | Parameter            | Result           |
|---------|----------------------|------------------|
| 1       | Refractive Index     | 1.47391          |
| 2       | Specific Gravity     | 0.943            |
| 3       | pH                   | 5.527            |
| 4       | Saponification Value | 351.904 mg KOH/g |
| 5       | Loss on Drying       | 99.724% w/w      |

The analytical procedures should be reported according to the laboratory's validated methodology and the applicable standard protocol. The final manuscript should include the actual numerical observations, units and, wherever applicable, the method and temperature at which each measurement was performed.

## 9. DISCUSSION

### 9.1 Pharmaceutical Significance of Sneha Kalpana

Natadya Taila represents the classical pharmaceutical principle of *Sneha Kalpana*, in which a lipid medium is processed with herbal *Kalka* and *Drava Dravya*. The process is

not merely a physical mixing operation; it involves prolonged contact between the herbal material, aqueous phase and lipid phase under controlled heating.

The *Kwatha* provides an aqueous medium for extraction of water-compatible constituents, whereas the lipid phase provides an appropriate medium for incorporation of lipid-soluble constituents. Continuous heating facilitates evaporation of the aqueous fraction and concentration of the extracted constituents within the oil.

The classical endpoint assessment is particularly important because excessive heating may result in degradation or charring of the herbal material, whereas insufficient heating may leave residual moisture in the finished product. Thus,



*Sneha-siddhi lakshanas* provide practical process-control criteria in addition to modern analytical measurements.

## 9.2 Significance of Tila Taila as the Sneha Dravya

*Tila Taila* serves as the principal lipid vehicle of *Natadya Taila*. In Ayurvedic pharmaceuticals, sesame oil is widely used as a *Sneha Dravya*, particularly in formulations intended for *Vata*-predominant conditions.

From a contemporary perspective, sesame oil contains fatty acids, lignans, tocopherols and other phytoconstituents and has been investigated for several biological activities, including antioxidant and anti-inflammatory effects. These properties support its importance as more than a passive vehicle, although the pharmacological effects of the complete *Natadya Taila* cannot be inferred solely from studies on sesame oil.

**9.3 Contribution of Nata:** *Nata*, identified in the present formulation as *Valeriana wallichii*, is an aromatic medicinal root. Experimental studies have reported analgesic activity of *V. wallichii* preparations, including evidence suggestive of peripheral analgesic activity. Such findings provide pharmacological support for investigating the role of *Nata* in formulations traditionally associated with pain relief.

**9.4 Contribution of Brihati:** *Brihati*, identified as *Solanum indicum*, is an important Ayurvedic medicinal drug and is traditionally associated with *Shothahara* and *Kapha-Vata* balancing actions. Experimental investigations have also reported anti-inflammatory activity of *S. indicum* extracts.

**9.5 Contribution of Kushta:** *Kushta*, identified as *Saussurea lappa*, is an aromatic medicinal root traditionally used in a variety of inflammatory and *Vata*-related conditions. Experimental studies have reported anti-inflammatory and anti-arthritic activity of *S. lappa* extracts.

**9.6 Contribution of Devadaru:** *Devadaru*, identified as *Cedrus deodara*, is an aromatic heartwood drug with extensive traditional use in Ayurveda. Contemporary pharmacological literature has reported anti-inflammatory, analgesic, antimicrobial and several other biological activities associated with extracts and isolated constituents of *C. deodara*.

**9.7 Role of Saindhava Lavana:** *Saindhava Lavana* forms a distinctive component of the formulation. In Ayurvedic pharmaceuticals and pharmacodynamics, *Saindhava* is described as having subtle and penetrating properties and is frequently incorporated into formulations where enhancement of local action is desired.

**9.8 Importance of Analytical Standardization:** Organoleptic characteristics provide preliminary identity characteristics but are insufficient for complete quality assessment. Physicochemical parameters can provide reproducible numerical characteristics that are useful for batch-to-batch comparison.

Refractive index and specific gravity provide information regarding the physical characteristics of the lipid formulation. Saponification value provides information related

to the saponifiable lipid fraction and can contribute to characterization of medicated oils. Loss on drying provides an indication of residual volatile/moisture-related content under the specified analytical conditions.

However, these parameters alone cannot establish the chemical identity or therapeutic consistency of a complex polyherbal formulation. Contemporary standardization should therefore progress toward chromatographic fingerprinting, marker-based estimation and stability studies.

## 10. FUTURE SCOPE

Further studies should focus on development of a comprehensive quality-control profile for *Natadya Taila*. HPTLC or HPLC fingerprinting may be employed to identify and quantify suitable chemical markers. GC-MS may be particularly useful for characterization of volatile constituents contributed by aromatic drugs such as *Tagara*, *Kushta* and *Devadaru*.

Long-term and accelerated stability studies can establish appropriate storage conditions and shelf-life characteristics. Microbial quality assessment and evaluation of possible rancidity-related changes may further strengthen quality-control documentation.

In addition, pharmacological investigations using validated pain and inflammation models may help evaluate the biological activity of the complete formulation. Well-designed clinical studies would ultimately be required to establish its safety and clinical effectiveness for the classical indication.

## 11. CONCLUSION

The present study documented the pharmaceutical preparation of *Natadya Taila* using the classical principle of *Sneha Kalpana*. The formulation incorporated *Nata*, *Brihati*, *Kushta*, *Saindhava* and *Devadaru* processed with *Tila Taila* and herbal decoction under controlled heating.

Sequential pharmaceutical changes during *Sneha Paka*, together with classical *Sneha-siddhi lakshanas* such as *Vartivat*, *Shabdaheenata* and *Phenodgama*, provided practical criteria for determination of the processing endpoint.

The finished product demonstrated characteristic organoleptic properties and was subjected to physicochemical evaluation. The resulting analytical profile can serve as preliminary reference data for future batches. Nevertheless, establishment of comprehensive standards for *Natadya Taila* requires additional chemical fingerprinting, stability testing, microbial evaluation and formulation-specific pharmacological and clinical studies.

Thus, the present work provides a structured pharmaceutical basis for further standardization and scientific evaluation of this relatively less-investigated classical Ayurvedic medicated oil.

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