Physiochemical Evaluation and Standerdization of *Shigru Taila* for *Nasya*

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Abstract:
Standardization of Ayurvedic formulations plays a vital role in ensuring their identity, purity, quality, safety, and therapeutic reliability. *Shigru Taila* is a classical Tila Taila-based preparation used for *Nasya* therapy and is prepared using ingredients such as *Shigru, Priyangu, Vacha, Vyosha, Draksha, Surasa, and Saindhava Lavana*. As herbal formulations may exhibit variations due to differences in raw materials and preparation methods, establishing standard quality parameters becomes essential for maintaining uniformity and reproducibility. Therefore, the present analytical study was carried out to evaluate and standardize *Shigru Taila* through organoleptic, physicochemical, chromatographic, and microbial analyses. The findings demonstrated desirable physicochemical properties, indicating the stability and quality of the formulation. Furthermore, microbial assessment confirmed the absence of bacterial and fungal contamination, supporting its safety for *Nasya* administration. Overall, the study establishes reference standards for *Shigru Taila* and supports its suitability as a safe, stable, and authentic Ayurvedic formulation for use in the management of *Vataja Pratishyaya.*

Key words: *Shigru Taila,* Standardization, *Nasya, Vataja Pratishyaya.*

INTRODUCTION

Vataja Pratishyaya is one among the *Nasagata Vikaras* caused predominantly by the vitiation of *Vata dosha* with the involvement of *Rasa* and *Rakta dhatus*. It is characterized by symptoms such as *Nasavarodha, Nasasrava, Kshavathu, Mukhashosha Swaropaghata, Nistoda of Shiras* and *Nasa kandu*. Clinically, this condition closely resembles Nasal eosinophilia and Allergic rhinitis, which are commonly associated with sneezing, itching, watery nasal discharge, and nasal blockage due to eosinophilic inflammation of the nasal mucosa. If left untreated, it may progress to rhinosinusitis and significantly affect an individual's quality of life. The prevalence of allergic rhinitis has increased considerably in India over recent decades, affecting nearly one-fifth of the population.

Conventional management mainly relies on intranasal corticosteroids and antihistamines, which may not be suitable for long-term use because of potential adverse effects. Ayurveda advocates *Nasya Karma* as an important therapeutic approach for diseases affecting the head and nasal passages, as the Nose is considered the gateway to the head. *Shigru Taila*, described in *Vangasena Samhita* under *Nasarogadhikara Adhyaya*, is one such formulation indicated for *Nasya Karma.* Owing to its *Vata-Kapha* pacifying properties, it may be beneficial in the effective management of *Vataja Pratishyaya*.

MATERIALS AND METHODS

Preparation of *Shigru taila*

The *Kalka Dravyas* were powdered (40 g each) and mixed with sufficient water to prepare a paste. In a vessel, 1.5 L of *Tila Taila* was taken and heated gently, after which the prepared *Kalka* and 6.5 L of water were added and mixed thoroughly. The mixture was boiled over mild heat until the *Kalka* settled at the bottom, the colour changed to light brown, and the consistency became thicker. The process was continued until the *Sneha Siddhi Lakshanas* were attained, indicating the completion of *Shigru Taila* preparation.



Figure: 1 – *Shigru, Pippali& Saindhava*



Figure: 2 – *Vacha, Sunti & Maricha*



Figure: 3 *Priyangu, Surasa &Draksha*



Figure: 4 – *Tila Taila*



Figure: 5 – Kalka form of drugs

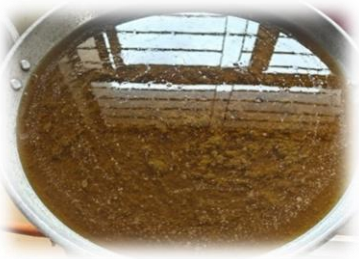


Figure: 6– Boiling of *Taila*



Figure: 7 –*Taila* processing



Figure: 8 – Filtration of *Taila*



Figure: 9 -Prepared *Shigru Taila*

Physiochemical evaluation

- **Refractive index**

The Refractive index of *Shigru Taila* was recorded as 1.47156, reflecting its characteristic physicochemical property and supporting its identity and quality. A stable refractive index in Taila indicates good quality, purity, and physicochemical stability of the formulation and serves as an important parameter for its standardization.

- **pH**

The pH of *Shigru Taila* was found to be 6.0, indicating a slightly acidic nature of the formulation. A pH value close to neutrality is considered favourable for Nasya administration, as it may help minimize irritation to the nasal mucosa and improve patient acceptability. This finding also reflects the physicochemical stability of the formulation and supports its suitability for intranasal use.

- **Specific gravity**

The specific gravity of *Shigru Taila* was found to be 0.8889, indicating that the formulation is lighter than water, which is a characteristic property of oil-based preparations. Specific gravity is an important physicochemical parameter used to assess the identity, purity, and consistency of the formulation.

- **Acid value**

The acid value of *Shigru Taila* was found to be 3.25, indicating a low level of free fatty acids in the formulation. Acid value is an important quality control parameter used to assess the extent of hydrolytic degradation and freshness of oil-based preparations. The obtained value suggests good stability and proper processing of the *Taila*, supporting its suitability for *Nasya* administration.

- **Saponification value**

The saponification value of *Shigru Taila* was recorded as 220.46, indicating the characteristic fatty acid composition of the formulation. Saponification value is an important physicochemical parameter that reflects the composition and quality of oil-based preparations. The obtained value suggests good integrity and consistency of the *Taila.*

- **Iodine value**

The iodine value of *Shigru Taila* was recorded as 9.23, indicating a relatively low degree of unsaturation in the fatty acid content of the formulation. The obtained value suggests good oxidative stability, which may contribute to maintaining the quality and shelf stability of the *Taila.*

- **Peroxide value**

The peroxide value of *Shigru Taila* was measured as 0.79, indicating a low level of oxidative degradation in the formulation. The low value suggests that the *Taila* is fresh, stable, and less prone to rancidity, thereby supporting its quality and suitability for *Nasya* administration.

- **Unsaponifiable matter**

The Unsaponifiable matter of *Shigru Taila* was recorded as 0.3%, indicating the presence of a small proportion of non-saponifiable constituents naturally present in the formulation. This parameter reflects the characteristic composition and purity of the *Taila* and may contribute to its overall stability.

- **Rancidity**

The rancidity test was negative, indicating that the fats in *Shigru Taila* had not undergone oxidation and supporting the stability and quality of the formulation.

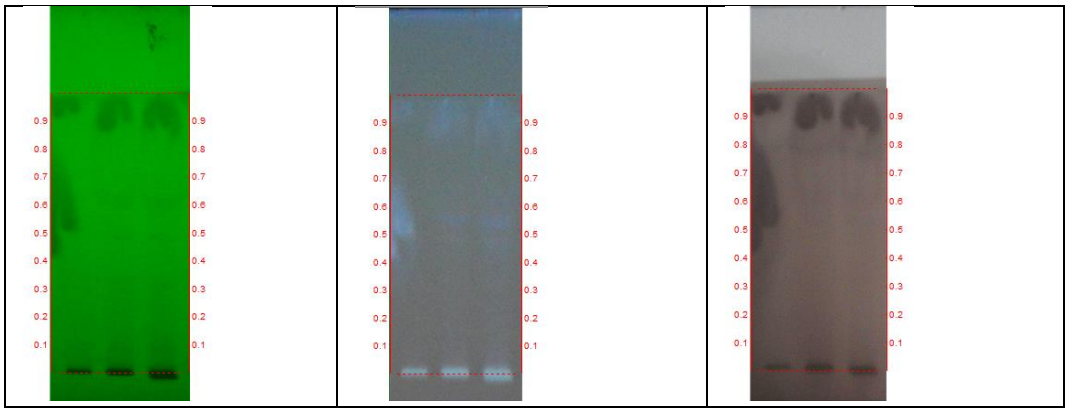
- **Chromatographic Analysis (HPTLC)**

HPTLC profiling of *Shigru Taila* for *Nasya* revealed distinct chromatographic peaks at different wavelengths, indicating the presence of multiple phytoconstituents derived from the ingredients of the formulation. The characteristic Rf values obtained can serve as a fingerprint profile for the identification and authentication of *Shigru Taila.* The distinct banding pattern obtained reflects the complex herbal composition of the formulation and provides a reference profile for its analytical characterization.

Table 1: R_f values of samples

At 254nm	At 366nm	White light
0.32 (Green)	-	-
0.48 (Green)	-	-
-	0.56 (F. blue)	0.55 (Purple)
0.61 (Green)	-	-
-	-	0.81 (Purple)

The HPTLC profile of *Shigru Taila* for *Nasya* exhibited several distinct bands at different wavelengths, reflecting the presence of diverse phytoconstituents in the formulation. Green bands were observed at Rf values of 0.32, 0.48, and 0.61 at 254 nm, while a fluorescent blue band appeared at an Rf value of 0.56 at 366 nm. Under white light after derivatization, purple bands were noted at Rf values of 0.55 and 0.81. These findings indicate the presence of multiple chemical constituents derived from the herbal ingredients and contribute to establishing a characteristic chromatographic profile of the formulation.



Short UV **Long UV** **White light**

Figure 10. HPTLC photo documentation of chloroform extract of *Shigru taila* for *Nasya*

Track wise application

Track 1 - chloroform extract of *Shigru taila* for *Nasya* – 3µl

Track 2 - chloroform extract *Shigru taila* for *Nasya* – 6µl

Track 3 - chloroform extract *Shigru taila* for *Nasya* – 9µl

Track 1 (3 µL): The chromatogram of the 3 µL application exhibited distinct bands at different Rf values, indicating the presence of phytoconstituents in *Shigru Taila*. The bands were clearly visible and provided the preliminary chromatographic fingerprint of the formulation.

Track 2 (6 µL): The 6 µL application showed better-resolved bands with increased intensity compared to Track 1. The chromatographic pattern further confirmed the presence of multiple phytoconstituents contributing to the characteristic profile of *Shigru Taila*.

Track 3 (9 µL): The 9 µL application demonstrated more prominent bands owing to the higher sample concentration. The enhanced visibility of the bands aided in establishing the characteristic chromatographic fingerprint of the formulation and confirmed the reproducibility of the HPTLC profile.

Densitometric scan *Shigru taila* for *Nasya*

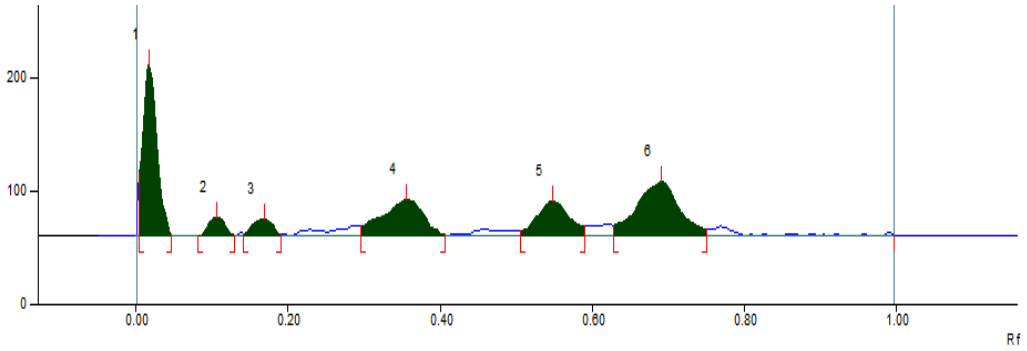
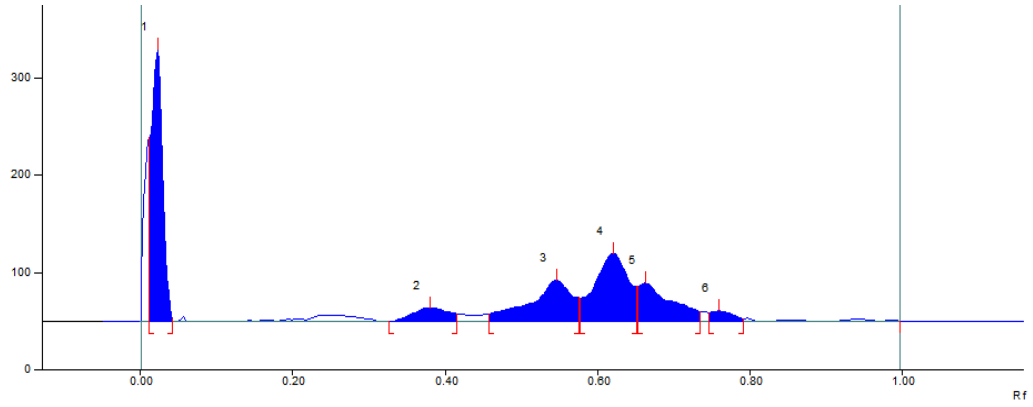


Fig 11. At 366nm

Track 6, ID: Shigru taila for Nasya

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	55.0 AU	0.02 Rf	150.9 AU	51.58 %	0.05 Rf	0.8 AU	2012.9 AU	30.39 %
2	0.08 Rf	0.4 AU	0.11 Rf	16.3 AU	5.59 %	0.13 Rf	0.4 AU	251.9 AU	3.80 %
3	0.14 Rf	2.0 AU	0.17 Rf	15.0 AU	5.13 %	0.19 Rf	1.7 AU	282.0 AU	4.26 %
4	0.30 Rf	8.4 AU	0.36 Rf	32.5 AU	11.11 %	0.41 Rf	0.8 AU	1232.5 AU	18.61 %
5	0.51 Rf	4.4 AU	0.55 Rf	30.5 AU	10.43 %	0.59 Rf	8.4 AU	925.7 AU	13.98 %
6	0.63 Rf	9.3 AU	0.69 Rf	47.3 AU	16.18 %	0.75 Rf	5.3 AU	1918.4 AU	28.96 %

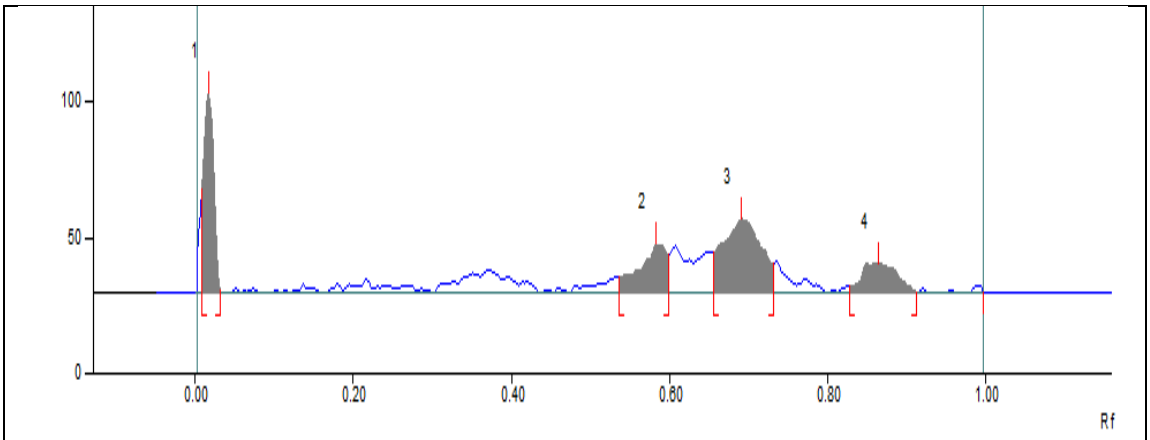
Fig 11 a. At 254nm



Track 6, ID: Shigru taila for Nasya

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	188.7 AU	0.02 Rf	278.5 AU	61.35 %	0.04 Rf	2.1 AU	3064.7 AU	34.60 %
2	0.33 Rf	0.0 AU	0.38 Rf	14.0 AU	3.09 %	0.42 Rf	7.8 AU	474.2 AU	5.35 %
3	0.46 Rf	7.7 AU	0.55 Rf	42.1 AU	9.28 %	0.58 Rf	24.2 AU	1657.2 AU	18.71 %
4	0.58 Rf	24.1 AU	0.62 Rf	69.5 AU	15.31 %	0.65 Rf	35.9 AU	2188.4 AU	24.71 %
5	0.65 Rf	36.1 AU	0.66 Rf	39.1 AU	8.62 %	0.74 Rf	10.3 AU	1240.4 AU	14.00 %
6	0.75 Rf	9.0 AU	0.76 Rf	10.7 AU	2.36 %	0.79 Rf	2.7 AU	232.3 AU	2.62 %

Fig 11b. At 366nm



Track 6, ID: Shigru taila for Nasya

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	38.0 AU	0.02 Rf	73.8 AU	56.89 %	0.03 Rf	0.7 AU	688.0 AU	28.29 %
2	0.54 Rf	5.7 AU	0.58 Rf	17.9 AU	13.83 %	0.60 Rf	13.7 AU	442.1 AU	18.17 %
3	0.66 Rf	14.9 AU	0.69 Rf	27.1 AU	20.91 %	0.73 Rf	10.5 AU	954.5 AU	39.24 %
4	0.83 Rf	2.3 AU	0.87 Rf	10.9 AU	8.37 %	0.91 Rf	0.0 AU	347.8 AU	14.30 %

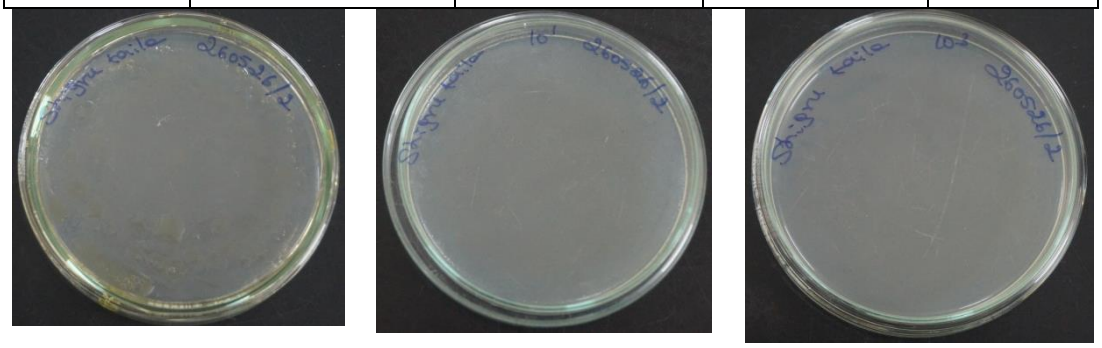
Fig 11c. At 620nm

MICROBIAL EVALUATION

The microbial quality of *Shigru Taila* for *Nasya* was evaluated using the pour plate method. Casein Soya Bean Digest Agar Medium (CSDAM) and Buffered Sodium Chloride Peptone Solution (BSCPS, pH 7.0) were prepared according to standard procedures and sterilized by autoclaving at 121°C for 20 minutes. After cooling the sterile CSDA medium to 45–55°C, 20 ml of the medium was poured into sterile Petri plates. One millilitre of the test sample, including the direct sample and its 10^{-1} and 10^{-3} dilutions prepared using BSCPS, was added to separate Petri plates and mixed thoroughly to ensure uniform distribution. The plates were incubated at 37°C for 24 hours and examined for bacterial growth.

Table 2: Microbial load count with dilution of *Shigru Taila.*

Sl. No.	Dilutions	Number of Colonies (NOC)		CFU/ml
1	Direct	0	0	0
2	1/10 (10^1)	0	0	0
3	1/1000 (10^3)	0	0	0



Direct	**10^1**	**10^3**

Figure 12: Microbial load count with dilution of Shigru Taila.

DISCUSSION

The analytical evaluation of *Shigru Taila* was carried out to establish its quality and standardization parameters for *Nasya* administration. Organoleptic examination showed the characteristic appearance, color, odor, and consistency of a properly prepared *Tila Taila*-based formulation.

The physicochemical findings indicated that the formulation possesses suitable stability and quality characteristics. The refractive index reflected the optical uniformity of the *Taila*, while the specific gravity confirmed the typical nature of an oil-based preparation. The pH value of 6.0 indicated a slightly acidic and near-neutral nature, which is considered compatible for intranasal use and may help minimize irritation to the nasal mucosa.

The acid value suggested a low level of free fatty acids, indicating minimal hydrolytic degradation and proper processing of the oil. The saponification value reflected the characteristic fatty acid composition of the formulation, whereas the iodine value indicated a relatively low degree of unsaturation, supporting the oxidative stability of the *Taila*. The peroxide value was low, showing minimal oxidative deterioration, and the rancidity test confirmed the absence of fat oxidation, suggesting that the formulation remained fresh and stable. The low percentage of unsaponifiable matter further supported the purity and characteristic composition of the preparation.

HPTLC analysis revealed distinct chromatographic bands at different wavelengths, demonstrating the presence of multiple phytoconstituents derived from the ingredients of *Shigru Taila*. The characteristic Rf values obtained under 254 nm, 366 nm, and after derivatization under white light provided a unique chromatographic fingerprint profile that may be useful for the identification and analytical characterization of the formulation.

Microbial evaluation showed no bacterial or fungal contamination in the direct sample as well as in the diluted samples. This finding indicates that the preparation was manufactured under hygienic conditions and is microbiologically safe for *Nasya* administration

Overall, the analytical results demonstrate that *Shigru Taila* possesses acceptable physicochemical properties, characteristic chromatographic features, and satisfactory microbial quality, supporting its suitability as a standardized Ayurvedic formulation for *Nasya* therapy in the management of *Vataja Pratishyaya.*

CONCLUSION

Standardization plays an important role in ensuring the quality and consistency of Ayurvedic formulations. In the present study, *Shigru Taila* for *Nasya* was successfully evaluated using organoleptic, physicochemical, HPTLC, and microbial parameters. The formulation demonstrated satisfactory analytical characteristics, a characteristic chromatographic fingerprint, and microbiological safety. The analytical data generated through this study establish a baseline profile for *Shigru Taila* and may be used as a reference for its quality assurance, authentication, and future standardization. These findings support the preparation of a reliable and reproducible formulation for *Nasya* therapy.

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