



Research Article

ANALYTICAL EVALUATION AND HPTLC FINGERPRINTING OF *PIPPALYADI TAILA* PREPARED

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ABSTRACT

Pippalyadi Taila is a classical Ayurvedic medicated oil formulation described in *Charaka Samhita Arsha Chikitsa Adhyaya* and used also in disorders associated with vitiated *Vata Dosha*, *Udavarta*, *Moodhavaata* and *Shoola*. Standardization of Ayurvedic formulations is essential to ensure quality, safety, efficacy, reproducibility and batch-to-batch consistency. The present study was undertaken to evaluate the organoleptic and physicochemical characteristics of *Pippalyadi Taila* and to establish its High-Performance Thin Layer Chromatography (HPTLC) fingerprint profile. HPTLC fingerprint profiling serves as a reliable analytical tool for identifying characteristic phytochemical constituents present in the *Taila*. The generated chromatographic fingerprint helps detect adulteration and ensures reproducibility of the formulation. The formulation was subjected to organoleptic evaluation, physicochemical analysis and HPTLC fingerprinting in an AYUSH-approved laboratory. HPTLC fingerprinting was performed on silica gel 60 F254 plates using n-Hexane:Diethyl ether (7:3 v/v) as the mobile phase, with detection at 254nm, 366nm and 540nm. **Results:** The sample was a yellowish-green oil with characteristic odour and taste. Specific gravity was 0.92, viscosity 36.11 cP, refractive index 1.468, acid value 0.0, peroxide value 8.24, saponification value 203.89, and iodine value 115.7. HPTLC analysis resolved nine bands at 254nm and 366nm and eight bands at 540nm, indicating the presence of diverse phytoconstituents derived from the formulation ingredients. **Conclusion:** The physicochemical parameters and HPTLC fingerprint profile generated in this study establish preliminary analytical reference standards for *Pippalyadi Taila*, supporting its identity, purity, and quality control for future clinical and research applications.

INTRODUCTION

Pippalyadi Taila^[1] is traditionally indicated in conditions involving *Vata* imbalance and gastrointestinal dysfunction. *Pippalyadi Taila* is a classical Ayurvedic medicated oil formulation described in *Charaka Samhita Arsha Chikitsa Adhyaya*. Standardization and analytical evaluation of Ayurvedic formulations are essential to ensure quality, safety,

efficacy and reproducibility. Modern chromatographic techniques such as HPTLC^[2] provide characteristic fingerprint profiles useful for authentication, quality control and batch-to-batch consistency. Owing to variations in raw materials, processing methods and storage conditions, standardization is essential to ensure the quality, safety, efficacy and reproducibility of Ayurvedic *Taila* preparations. Physicochemical evaluation helps assess identity, purity and stability, while HPTLC fingerprinting generates characteristic chromatographic profiles useful for authentication and batch-to-batch consistency. The present work focuses on the analytical assessment of *Pippalyadi Taila* prepared for clinical research.

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Table 1. Ingredients of Pippalyadi Taila

Drug	Botanical Name	Family	Part Used	Proportion
<i>Pippali</i>	<i>Piper longum</i>	Piperaceae	Fruit	1 part
<i>Madhuka</i>	<i>Glycyrrhiza glabra</i>	Fabaceae	Root	1 part
<i>Bilva</i>	<i>Aegle marmelos</i>	Rutaceae	Root bark	1 part
<i>Shatahva</i>	<i>Anethum sowa</i>	Apiaceae	Seeds	1 part
<i>Madanaphala</i>	<i>Randia spinosa</i>	Rubiaceae	Fruit	1 part
<i>Vacha</i>	<i>Acorus calamus</i>	Acoraceae	Root	1 part
<i>Shati</i>	<i>Hedychium spicatum</i>	Zingiberaceae	Root	1 part
<i>Pushkarahva</i>	<i>Inula racemosa</i>	Asteraceae	Root	1 part
<i>Chitraka</i>	<i>Plumbago zeylanica</i>	Plumbaginaceae	Root	1 part
<i>Devadaru</i>	<i>Cedrus deodara</i>	Pinaceae	Root	1 part
<i>Tila Taila</i>	<i>Sesamum indicum</i>	Pedaliaceae	Seed extract	1 part
<i>Ksheera</i>	Cow's milk	-	-	2 parts

Method of Preparation of Pippalyadi Taila^[3]

Take *Yavakut* of *Pippalyadi Dravya Choorna* each in 1-part *Pramana* and water 4 *Drona*, make its decoction with $\frac{1}{4}$ reduction of water. Now add *Pippalyadi Dravya Kalka* in 10 *Pala Pramana*, *Tila Taila* in 2 *Aadhak Pramana*, *Go Ksheera* in 4 *Aadhaka Pramana*. Water 4 times more to *Taila* in prepared decoction. *Taila* was prepared on slow fire. This *Pippalyadi Taila* is good in all types of *Shoola*, *Arshas*, *Moodh Vaat*, *Udavarta*, *Pravahika*, *Mootra Krurcha*. *Pippalyadi Taila* was prepared in the pharmacy department of Indian Institute of Ayurved Research and Hospital Rajkot.

Contents	Proportion
<i>Kwath – Pippalyadi Dravya Yavakut</i>	1 part each
Water	10 parts
Reduction	$\frac{1}{4}^{\text{th}}$
In prepared <i>Kwath</i> addition of <i>Pippalyadi Dravya Kalka</i>	1 part each
<i>Go Ksheera</i>	Total of 2 times
<i>Tila Taila</i>	Total of 4 times
Water	16 times

The mixture was heated on slow fire and stirred continuously till *Samyaka Snehapaka Lakshana* were obtained.

MATERIALS AND METHODS

The prepared sample of *Pippalyadi Taila* was subjected to analytical evaluation at an AYUSH-approved laboratory. Organoleptic analysis, physico-chemical parameters, and HPTLC fingerprinting were performed using standard analytical procedures.

Physico-Chemical Evaluation

S. No.	Parameter	Result
1	Description	Yellowish green coloured oil
2	Odour	Characteristic
3	Taste	Characteristic
4	Specific gravity	0.92
5	Viscosity by Ostwald	36.11 cP
6	Refractive index	1.468
7	Acid value	0.0

8	Peroxide value	8.24
9	Saponification value	203.89
10	Iodine value	115.7

HPTLC Fingerprinting

HPTLC fingerprinting was carried out using silica gel 60 F254 precoated aluminium plates. The mobile phase employed was n-Hexane: Diethyl ether (7:3 v/v). Visualization was performed at 254nm, 366nm, and 540nm after derivatization. Distinct bands observed at different R_f values indicate the presence of multiple phytochemical constituents in the formulation.

R_f Values Observed

HPTLC Chromatogram at 254 nm

Spot No.	R _f Value
1	0.15
2	0.20
3	0.25
4	0.30
5	0.39
6	0.62
7	0.81
8	0.85
9	0.94

HPTLC Chromatogram at 366 nm

Spot No.	R _f Value
1	0.11
2	0.20
3	0.25
4	0.30
5	0.39
6	0.56
7	0.61
8	0.85
9	0.94

HPTLC Chromatogram at 540nm

Spot No.	R _f Value
1	0.11
2	0.20
3	0.25
4	0.39
5	0.56
6	0.62
7	0.85
8	0.97

HPTLC Chromatographic Plates

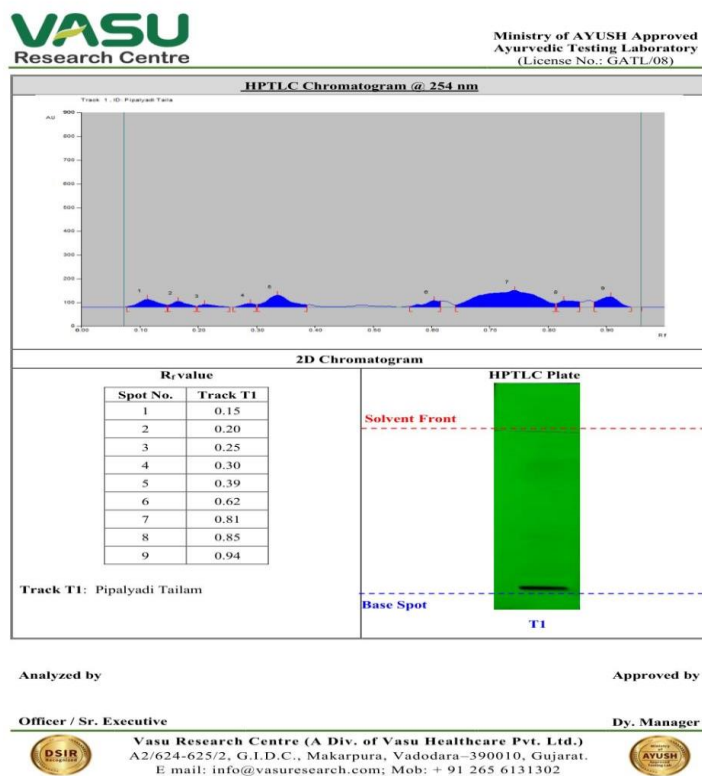


Figure 1: HPTLC chromatogram

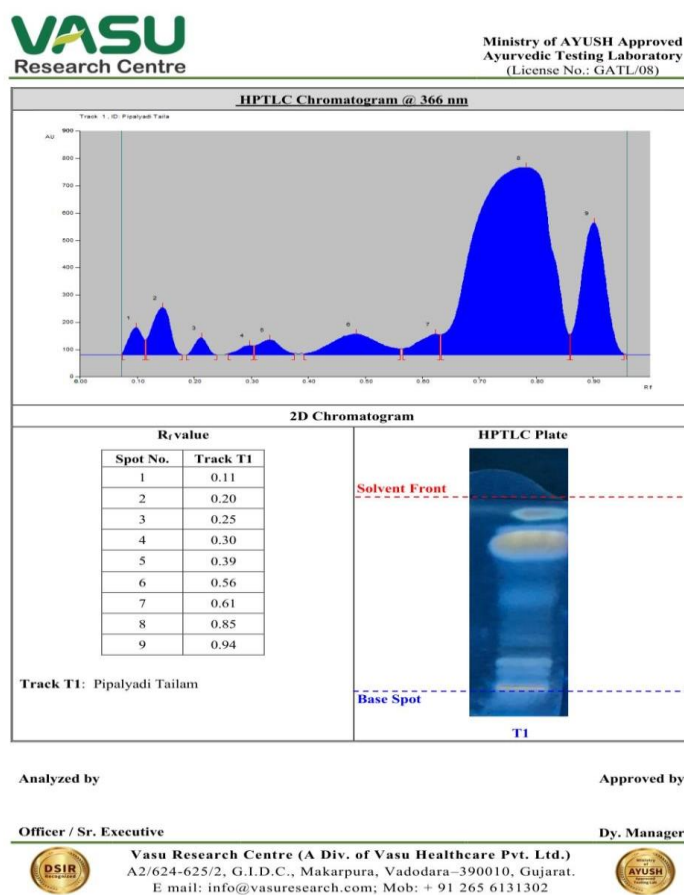


Figure 2: HPTLC chromatogram

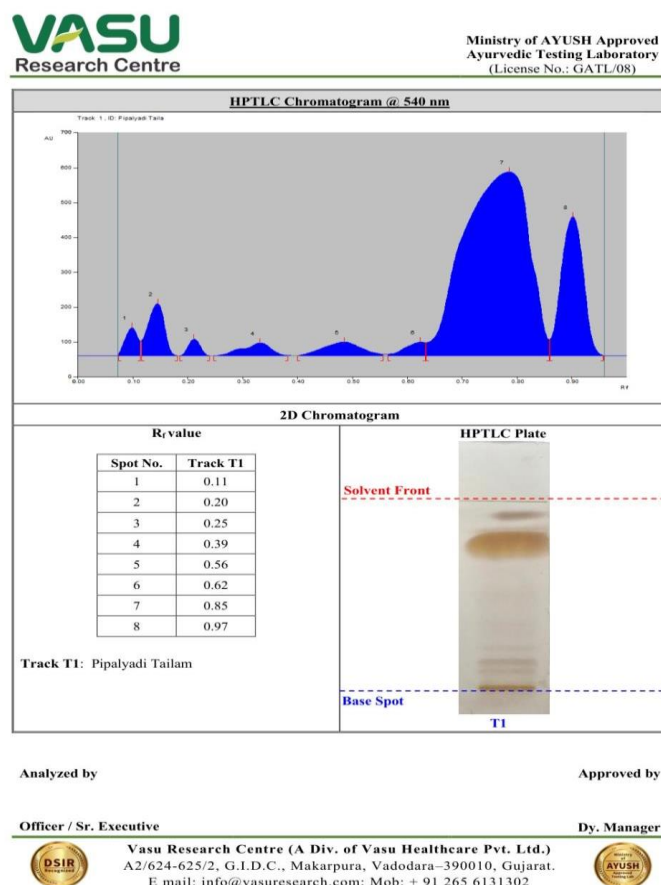


Figure 3: HPTLC chromatogram

DISCUSSION

The quality control evaluation of *Pipalyadi Taila* revealed characteristic organoleptic and physicochemical properties, which can be considered as preliminary standards for the formulation. The sample was observed as a yellowish-green colored oil with a characteristic odour and taste, indicating the presence of lipid-soluble phytoconstituents extracted during the Taila preparation process.

The specific gravity (0.92) was found to be comparable to that of sesame oil, the commonly used base oil in Ayurvedic *Sneha Kalpana*. This suggests proper incorporation of herbal constituents without significant alteration of the oil matrix.

The viscosity (36.11 cP) indicates optimum fluidity of the formulation, which is desirable for administration and absorption. Adequate viscosity ensures prolonged contact of the medicated oil with mucosal surfaces, facilitating therapeutic action.

The refractive index (1.468) reflects the purity and homogeneity of the formulation. Refractive index is a useful parameter for detecting adulteration and assessing consistency between batches. The obtained value indicates uniform dispersion of phytoconstituents in the oil medium.

The acid value was found to be 0.0, indicating the absence of free fatty acids formed due to hydrolytic rancidity. This suggests good quality raw materials, proper processing, and stability of the formulation. A low acid value is considered a desirable quality attribute for medicated oils.

The peroxide value (8.24) was within an acceptable range, indicating minimal oxidative deterioration of fatty acids. Peroxide value serves as an indicator of primary oxidation products and reflects the oxidative stability of the oil.

The saponification value (203.89) indicates the presence of fatty acids with relatively shorter chain lengths and confirms the characteristic composition of the oil base. This value reflects the amount of alkali required to saponify the fats and is useful in assessing the identity and quality of the formulation.

The iodine value (115.7) demonstrates a moderate degree of unsaturation in the oil. Unsaturated fatty acids enhance the penetrability and bioavailability of active constituents. The value also suggests that the formulation possesses suitable physicochemical characteristics for therapeutic application.

CONCLUSION

The present study establishes preliminary standardization parameters for *Pippalyadi Taila*. The formulation demonstrated satisfactory organoleptic, physicochemical and chromatographic characteristics. The analytical profile generated through HPTLC fingerprinting may serve as a reference standard for future quality assessment, authentication and research involving *Pippalyadi Taila*.

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