

Pharmaceutical Standardization and Analytical Evaluation of Vishwamitra Kapala Taila for Therapeutic Use in Ayurveda

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ABSTRACT

Vishwamitra Kapala Taila, a classical Ayurvedic formulation delineated in Arya Bhishak, is traditionally advocated for the management of a spectrum of dermatological disorders, notably eczema and psoriasis. The formulation was meticulously prepared employing the Patala Yantra method, utilizing coconut shells (Narikela Kapala) as the sole raw material, in strict adherence to classical Ayurvedic pharmaceutico-therapeutic principles.

The prepared Vishwamitra Kapala Taila was subsequently subjected to comprehensive pharmaceutical and analytical evaluation at the Drugs Testing Laboratory, Central Research Facility, Shri B.M.K. Ayurveda Mahavidyalaya. A series of standard physicochemical parameters were assessed, which revealed the following values: refractive index of 1.466 at 25°C, saponification value of 299.417, viscosity of 38.414×10^{-6} cp, acid value of 12.896, iodine value of 16.365, and a negative test for rancidity.

These analytical observations substantiate that the formulation exhibits commendable physicochemical stability, alongside appreciable purity and extended shelf stability. The relatively elevated saponification value, in conjunction with a moderate acid value, is characteristic of coconut-derived lipid matrices, thereby implying pronounced emollient, protective, and restorative properties upon the integumentary system.

In summation, the empirically derived analytical parameters lend scientific credence to the classical therapeutic claims attributed to Vishwamitra Kapala Taila, thereby reinforcing its clinical utility and relevance in the management of chronic dermatological conditions such as eczema and psoriasis.

Keywords: Vishwamitra Kapala Taila, Patala Yantra, Coconut Shells, Pharmaceutical Study, Eczema, Psoriasis..

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INTRODUCTION

Ayurveda accords considerable significance to the formulation of diverse *Taila Kalpanas* (medicated oils), wherein lipid media serve as an efficient vehicle for the delivery and potentiation of therapeutic constituents. Vishwamitra Kapala Taila represents a unique and unconventional preparation described in the traditional compendium *Arya Bhishak*¹, distinguished by its utilization of a single raw material—*Narikela Kapala* (coconut shell). In contrast to classical medicated oils that typically

incorporate herbal decoctions (*Kwatha*) or pastes (*Kalka*), this formulation is predicated upon the controlled pyrolytic transformation of coconut shell material.

Coconut shell is intrinsically rich in lignin, cellulose, and phenolic constituents, which, upon regulated thermal decomposition, yield an array of bioactive volatile compounds and oils exhibiting notable antimicrobial and antioxidant properties². The employment of the *Patala Yantra* technique in this process enables the efficient condensation and collection of these volatilized bioactive into a lipid-based medium.

The present study is therefore undertaken with the objective of systematically evaluating the pharmaceutical attributes and analytical parameters of Vishwamitra Kapala Taila, with a view to substantiating and validating its traditional therapeutic claims through scientific investigation.

Pharmaceutical study:

Collection of Drug

The ingredient required for *Vishwamitra Kapala Taila* is *Narikela Kapala*³ (*Cocos nucifera* Linn. – shell), which was procured from authentic and reliable sources. (Table I & II)

MATERIALS AND METHODS

Table: I – Ingredients of *Vishwamitra Kapala Taila*

Sr. No.	Drug Name	Botanical Name	Family	Part used	Proportion
	<i>Narikela Kapala</i>	<i>Cocos nucifera</i>	<i>Arecaceae</i>	Shell	1 part

Table: II – Rasa Panchaka of the components of *Vishwamitra Kapala Taila*

Sr.no	<i>Dravya</i>	<i>Rasa</i>	<i>Guna</i>	<i>Virya</i>	<i>Vipak</i>	<i>Prabhav</i>
1.	<i>Narikela Kapala</i>	<i>Tikta</i>	<i>Laghu, Tikshna</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Kapha vata shamaka</i>

Authentication of Drug

Drug identification and authentication was done at KAHER's Shri B M K Ayurveda Mahavidyalaya's AYUSH approved Ayurveda Siddha Unani - Drug Testing Laboratory.

Preparation of *Vishwamitra Kapala Taila*

Vishwamitra Kapala Taila was prepared in the teaching pharmacy of department of *Rasashatra* and *Bhaishajya Kalpana*, BSP's Gomantak Ayurveda Mahavidyalaya and Research Centre, Shiroda Goa.

Method of preparation⁴

The coconut shells were initially procured and subjected to thorough cleaning by meticulously removing all adhering fibrous material. Subsequently, they were washed with water and adequately dried. The cleaned shells were then fragmented into smaller pieces measuring approximately 2–5 cm in diameter and exposed to sunlight until complete desiccation was achieved, ensuring the elimination of residual moisture content.

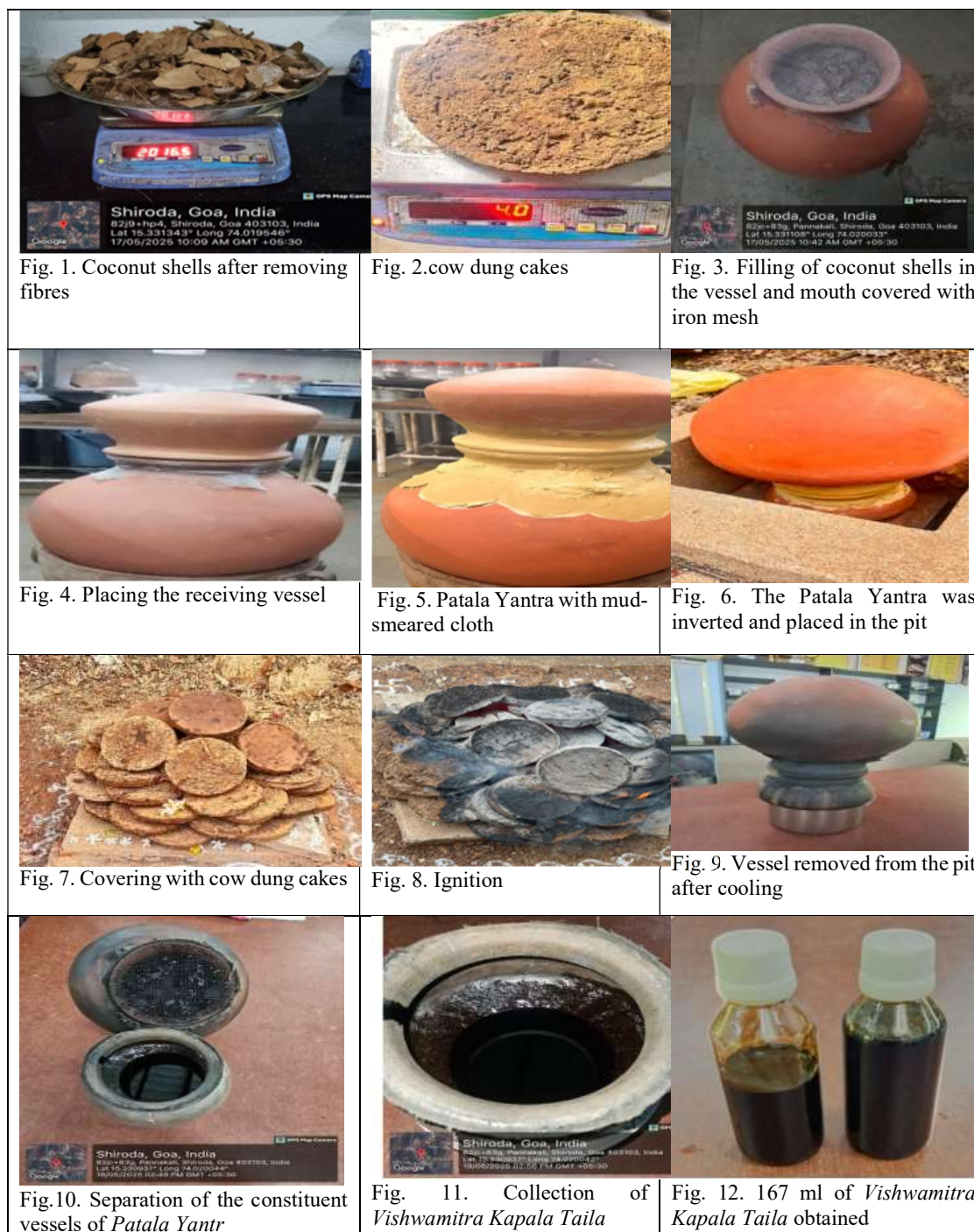
The preparation of *Vishwamitra Kapala Taila* was carried out employing the *Patala Yantra* method. Approximately 5 kg of the dried coconut shell pieces were placed into a large earthen vessel, the mouth of which was covered with an iron mesh. A second earthen pot of comparable neck diameter,

designated as the receiving vessel, was positioned beneath the primary container. The junction between the two vessels was meticulously sealed using a cloth smeared with mud, thereby preventing leakage of the oil and entry of external contaminants.

A pit of appropriate dimensions was excavated in the ground and moistened with water to facilitate uniform heating. The assembled apparatus was carefully positioned within the pit such that the larger vessel remained above the receiving pot. The entire setup was then covered with approximately 60 cow dung cakes, which were ignited and allowed to burn completely, thereby generating sustained heat necessary for the pyrolytic extraction process.

During this controlled heating, the volatile fractions released from the coconut shells condensed and gradually percolated through the iron mesh into the lower vessel, while the residual charred shell material remained above the mesh. Upon completion of the combustion process, the apparatus was allowed to undergo self-cooling. Thereafter, the assembly was removed from the pit, and the mud-sealed junction was carefully opened. The two vessels were separated, and the oil collected in the lower container was cautiously retrieved and quantified. A total yield of 167 ml of *Vishwamitra Kapala Taila* was obtained, which was subsequently stored in an airtight container for further use and analysis.

Preparation of *Vishwamitra Kapala Taila*



SOP of Vishwamitra Kapala Taila preparation for study:

Out of the total 167 ml of Vishwamitra Kapala Taila obtained, a measured quantity of 2 ml was carefully withdrawn and transferred into a suitable container for further processing. Owing to the inherently corrosive nature of the formulation, it was deemed necessary to subject the sample to dilution; accordingly, 100 ml of freshly extracted coconut oil, procured through a standard commercial

expeller from a coconut oil mill, was judiciously added to the sample to achieve the desired dilution.

Subsequently, the diluted preparation was apportioned into two equal aliquots of 51 ml each, which were then securely filled, packed, and sealed in airtight containers, adhering strictly to the guidelines outlined in the *Laboratory Guide for Analysis of Ayurveda and Siddha Formulations* (CCRAS, New Delhi). These samples were thereafter dispatched to the Quality Control Laboratory, Central

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Research Facility, Shri B.M.K. Ayurveda Mahavidyalaya, for comprehensive pharmaceutical and analytical evaluation.

Analytical Study

As per the guidelines published by Laboratory Guide for Analysis of Ayurveda and Siddha Formulations, CCRAS, New Delhi, *Vishwamitra Kapala Taila* was analysed using the following parameters.

Morphological evaluation – Organoleptic characters – Form, Colour and Odour (Table III).

Physico- chemical parameters- Saponification value⁵, Iodine value⁶, Acid value⁷, Refractive Index⁸, Viscosity⁹ and Rancidity¹⁰ (Table IV).

Place of Analytical study: This study was carried out in the Quality Control Laboratory of the Central Research Facility of Shri BMK Ayurveda Mahavidyalaya College, Belagavi, Karnataka.

RESULTS

The analytical evaluation of the prepared sample revealed a series of physicochemical parameters, the detailed values of which are presented in Table III and Table IV.

Table: III –Organoleptic characters of *Vishwamitra Kapala Taila*

Sr. no	Particulars	Results
1.	Form	<i>Taila</i>
2.	Colour	Light brownish
3.	Odour	Disagreeable Odor

Table: IV – Physico- chemical parameters of *Vishwamitra Kapala Taila*

Sr. no	Parameter	Results	Units
1.	Refractive Index at 25°C	1.466	--
2.	Saponification Value	299.417	mg KOH/g
3.	Viscosity	38.414×10^{-6}	Cp
4.	Rancidity	Negative	Stable
5.	Acid Value	12.896	mg KOH/g
6.	Iodine Value	16.365	g I ₂ /100g

The observed results indicate that *Vishwamitra Kapala Taila* exhibits appreciable physicochemical stability, as evidenced by the negative outcome in the rancidity test, thereby suggesting a favourable shelf life and a high degree of purity. Furthermore, the recorded saponification and acid values fall within a moderate range, which is characteristic of lipid fractions derived from coconut sources. This compositional profile is indicative of inherent emollient, protective, and soothing properties on the skin.

Collectively, these physicochemical attributes provide a scientific basis for the traditional therapeutic application of *Vishwamitra Kapala Taila*, particularly in the management of dermatological conditions such as eczema and psoriasis, wherein restoration of skin integrity and alleviation of inflammation are of paramount importance.

DISCUSSION

The analytical evaluation substantiates the presence of phenolic compounds within the formulation, which can be attributed to the thermal degradation of lignin and cellulose inherent in the coconut shell matrix. This transformation occurs as a consequence of the sustained and controlled heat applied during the operation of the *Patala Yantra* in the process of oil extraction.

These phenolic constituents significantly contribute to the antimicrobial efficacy and intrinsic preservative potential of the oil. Owing to their well-documented ability to inhibit the growth of pathogenic microorganisms and retard

oxidative degradation, these compounds enhance the stability of the formulation while simultaneously augmenting its therapeutic applicability in conditions prone to microbial involvement.

The characteristic acrid and pungent odor emanating from the oil can be ascribed to the presence of complex aromatic and phenolic compounds generated during the pyrolytic extraction process. This distinctive olfactory attribute not only reflects the chemical transformations occurring during preparation but also serves as an important organoleptic parameter for the identification and authentication of *Vishwamitra Kapala Taila*.

The determination of refractive index constitutes a critical parameter in quality control, as it provides insight into the optical density and compositional integrity of the oil. It serves as a reliable indicator for assessing purity and facilitates the detection of possible adulteration with inferior or cheaper oils, thereby ensuring the authenticity and standardization of the formulation.

The refractive index (RI) of oil serves as a crucial physicochemical parameter for assessing its identity and purity, and it is expected to approximate the values characteristic of oils derived either from coconut oil or from pyrolysed coconut shell fractions, depending upon the specific thermal conditions and method of extraction employed¹¹. Conventionally, the refractive index of coconut oil at 25 °C ranges between 1.448 and 1.450, whereas oils obtained through the pyrolysis of coconut shells exhibit

comparatively higher values, typically ranging from 1.460 to 1.520. In the present study, the refractive index of Vishwamitra Kapala Taila was determined to be 1.466 at 25 °C, which falls well within the established range for pyrolytically derived coconut shell oils. This observation not only substantiates the authenticity of the preparation process but also serves as a reliable parameter for the identification and standardization of the formulation.

The marginal elevation in refractive index in comparison to conventional coconut oil may be attributed to structural alterations occurring within the lipid matrix during pyrolysis. The exposure to sustained heat likely induces modifications in fatty acid chains, along with the formation of conjugated and aromatic compounds, thereby increasing optical density and contributing to the observed rise in refractive index.

The saponification value of Vishwamitra Kapala Taila was found to be 299.417 mg KOH/g, which is notably higher than that of standard coconut oil (typically ranging between 250–265 mg KOH/g). Such an elevated saponification value is indicative of a predominance of short- and medium-chain fatty acids, which are more readily hydrolysable. This suggests that the pyrolytic process may have facilitated the breakdown of long-chain triglycerides into lower molecular weight fatty acid esters, thereby altering the compositional profile of the oil.

The comparatively high saponification value further implies enhanced functional properties of the formulation, particularly with respect to topical application. The presence of lower molecular weight fatty acids is associated with improved absorption, superior cleansing action, and augmented emollient properties, thereby supporting its therapeutic efficacy in dermatological conditions.

The viscosity of Vishwamitra Kapala Taila was determined to be 38.414×10^{-6} at 25 °C, indicating a moderately viscous nature. This value is slightly higher than that observed for conventional coconut oil (approximately $30\text{--}33 \times 10^{-6}$ at 25 °C), suggesting an increase in molecular complexity. This enhancement in viscosity may be attributed to the formation of aromatic, phenolic, and polymeric compounds during the pyrolytic extraction process. The presence of such constituents likely contributes to improved film-forming capacity and protective action upon topical application. Furthermore, the viscosity profile supports the oil's suitability for external use, ensuring optimal spreadability, adherence, and absorption on the skin surface.

The rancidity test for Vishwamitra Kapala Taila yielded a negative result, indicating the absence of oxidative degradation. This finding confirms the stability, freshness, and integrity of the oil, suggesting that the preparation methodology and subsequent storage conditions effectively inhibited the formation of peroxides and free radicals. A negative rancidity test is thus reflective of both the purity and prolonged shelf stability of the formulation.

The acid value of the formulation was determined to be 12.896 mg KOH/g, reflecting a relatively higher concentration of free fatty acids compared to conventional coconut oil. This increase may be attributed to the thermal

degradation and partial hydrolysis of triglycerides during the pyrolytic extraction process. The elevated acid value may also signify the presence of bioactive fatty acid fractions, which could potentially enhance the antimicrobial and therapeutic attributes of the oil.

The iodine value of Vishwamitra Kapala Taila was found to be 16.365 g I₂/100 g, indicating a low degree of unsaturation within the lipid composition. This suggests a predominance of saturated fatty acids, which are inherently more resistant to oxidative degradation. Such a profile contributes to the stability and longevity of the formulation and is consistent with the known characteristics of coconut-derived oils, thereby reinforcing its suitability for external therapeutic application.

In the contemporary era of evidence-based medicine, it becomes imperative to undertake systematic scientific investigations of traditional formulations in order to validate their authenticity, efficacy, and underlying pharmacological rationale as described in classical texts such as *Arya Bhishak*.

Moreover, in the context of escalating healthcare costs, Vishwamitra Kapala Taila represents a noteworthy example of an economical and sustainable formulation derived through the upcycling of coconut shell waste. This not only establishes a scientific basis for its traditional usage but also opens new avenues for further pharmacognostical, pharmaceutical, and clinical research.

In conclusion, the pharmaceutical and analytical evaluation of Vishwamitra Kapala Taila substantiates its traditional claims of antiseptic and wound-healing properties. The presence of bioactive constituents exhibiting moderate antioxidant and anti-inflammatory activities further suggests its potential applicability in topical formulations intended for the management of wounds, skin infections, and inflammatory dermatological conditions.

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