



Research Article

EVALUATION OF BIOACTIVE SECONDARY METABOLITES IN *VILVATHI PODI* FOR DERMATOLOGICAL AND RESPIRATORY AILMENTS

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ABSTRACT

The Siddha system of medicine, originating in South India, is a comprehensive traditional science encompassing *Yogam* (spirituality), *Gnanam* (wisdom), *Vaadham* (alchemy), and *Vaithiyam* (therapeutics). Within the realm of *Vaithiyam*, various formulations have been utilized for centuries to maintain health and treat diverse ailments. Despite the richness of this system, many classical texts remain unexplored. *Maruthuva Asiriyam* is one such significant yet understudied piece of Siddha literature, documenting medicinal preparations traditionally practiced in the southernmost regions of India, particularly Kanyakumari. **Aim:** The present study focuses on the phytochemical evaluation of *Vilvathi Podi*, a traditional formulation described in *Maruthuva Asiriyam*. While the preparation of this medicine is relatively simple, it is credited with a wide range of therapeutic properties. **Methods:** To facilitate global acceptance and ensure the safety and efficacy of this traditional drug, a systematic phytochemical screening was conducted. **Results:** The preliminary phytochemical analysis of *Vilvathi Podi* revealed the presence of several bioactive secondary metabolites, including alkaloids, flavonoids, glucosides, steroids, terpenoids, and coumarins. Additionally, the study confirmed the presence of phenols, tannins, saponins, sugars, and beta-cyanin. **Conclusion:** The identification of these diverse phytochemical constituents provides a scientific basis for the therapeutic potential of *Vilvathi Podi*. This study serves as a foundational step toward the standardization and validation of unexplored Siddha literature, highlighting the importance of preserving and scientifically documenting regional traditional medical knowledge.


INTRODUCTION

The Siddha system of medicine, an ancient and profound traditional science originating in South India, offers a unique holistic approach to health through its four pillars: *Yogam* (spirituality), *Gnanam* (wisdom), *Vaadham* (alchemy), and *Vaithiyam* (therapeutics)^[1]. Central to its pharmacological practice is a highly structured classification of 32 types of internal medicines.^[2] Among these, the *Vilvathi Podi* is a fundamental dosage form, valued for its clinical efficacy and ease of preparation. While much of Siddha knowledge is documented in mainstream classical texts,

a wealth of therapeutic wisdom remains localized in unexplored literature such as *Maruthuva Asiriyam*. This text preserves centuries-old medicinal formulations, particularly those practiced in the southern regions of India like Kanyakumari.

One such significant formulation described in *Maruthuva Asiriyam* is *Vilvathi Podi*. Despite being a simple preparation consisting of only four botanical ingredients, it is credited with a wide range of therapeutic values, primarily indicated for the management of skin diseases and respiratory ailments. Interestingly, from a modern clinical perspective, these two categories of disease often share a common allergic etiology.

In Siddha physiology, the efficacy of *Vilvathi Podi* can be explained through its organoleptic and energetic properties. The medicine predominantly possesses a *Kaipu* (bitter) taste and is characterized by a majorly hot potency (*Ushna Veeriyam*) with a minor

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cold potency.^[4] This specific combination is logically designed to decrease *Kabapitham*, a dual-humoral derangement. In modern medical terminology, a vitiated *Kaba-Pitha* state correlates closely with chronic inflammation and allergic hypersensitivity.

By addressing the root humoral imbalance, *Vilvathi Podi* serves as a potent intervention for both dermatological and bronchopulmonary conditions.

MATERIALS AND METHODS

Ingredients

S.No	Name	Botanical name	Family name	Part used	Quantity
1	<i>Vilvam</i>	<i>Aegle marmelos</i>	<i>Rutaceae</i>	Leaf	300 gm
2	<i>Vendhayam</i>	<i>Trigonella foenum-graecum</i>	<i>Fabaceae</i>	Seed	100 gm
3	<i>Sitharathai</i>	<i>Alpinia officinarum</i>	<i>Zingiberaceae</i>	Rhizome	100 gm
4	<i>Omam</i>	<i>Trachyspermum ammi</i>	<i>Apiaceae</i>	Fruit	100 gm

Collection, Identification, and Authentication of the Drug

The above mentioned four raw drugs for the trial drug *Vilvathi Podi* were bought from a reputed supplier in Nagercoil, Tamil Nadu. The authenticity, identity and purity of these raw drugs were analysed and verified by the Head of the Department, Department of Gunapadam, Government Siddha Medical College, Palayamkottai.

As per the traditional way all raw drugs were subjected to strict special purification (*Suddhi*) process to remove the impurities, enhance medicinal values, and to prevent the ADR (Adverse Drug Reaction) by those particular herbs if any. Following purification, the trial drug was manufactured in the Gunapadam Laboratory at the Government Siddha Medical College, Palayamkottai.

Preparation of the trial drug

Purification process (*Suddhi*)

- *Vilvam* (*Aegle marmelos*) were cleaned to remove any impurities and shade-dried.
- *Omam* (*Trachyspermum ammi*) was soaked in lime water for 3 hours and dried thoroughly under a fan to remove all moisture.^[6]
- *Sitharathai* (*Alpinia officinarum*), the outer skin was removed and shade-dried.^[5]
- For *Chukku* (*Zingiber officinale*), the outer skin was removed.^[6]
- *Vendhayam* (*Trigonella foenum-graecum*) was soaked in fermented rice water for 12 minutes and dried thoroughly under a fan to prevent fungal growth and moisture-induced contamination.^[5]

Preparation

The individual raw drugs were powdered separately and sieved through a fine mesh. Then the required quantities were weighted and mixed thoroughly and uniformly.

However, for such traditional formulations to gain global acceptance and ensure patient safety, scientific validation through phytochemical profiling is essential. This paper focuses on the phytochemical study of *Vilvathi Podi* to identify the bioactive constituents- such as alkaloids, flavonoids, and phenols- that support its traditional use as an anti-inflammatory and anti-allergic agent.

Administration of the Drug

- Dose: 3 grams - After food.
- Duration: Twice a day

Organoleptic Character

The organoleptic features such as colour, total solids, presence and absence of mineral oil, pH were evaluated.

Qualitative Phytochemical Analysis

The phytochemical screening was performed according to the PLIM-Protocol for ASU Formulations to identify secondary metabolites.

• Test for alkaloids

Mayer's Test: To the test sample *Vilvathi Podi*, 2ml of Mayer's reagent was added, a dull white precipitate revealed the presence of alkaloids.

• Test for coumarins

To the test sample *Vilvathi Podi*, 1ml of 10% sodium hydroxide was added. The presence of coumarins is indicated by the formation of yellow color.

• Test for saponins

To the test sample *Vilvathi Podi*, 5ml of water was added and the tube was shaken vigorously. Copious lather formation indicates the presence of Saponins.

• Test for tannins

To the test sample *Vilvathi Podi*, ferric chloride was added, formation of a dark blue or greenish black color showed the presence of tannins.

• Test for glycosides- Borntrager's Test

Test drug *Vilvathi Podi* is hydrolysed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests. To the 2ml of filtered hydrolysate, 3ml of chloroform is added and shaken, chloroform layer is separated and 10% ammonia solution is added to it. Pink colour indicates presence of glycosides.

- **Test for flavonoids**

Alkaline reagent test: Two to three drops of sodium hydroxide were added to 2 mL of extract. Initially, a deep yellow colour appeared but it gradually became colourless by adding few drops of dilute HCL, indicating that flavonoids were present.

- **Test for phenols**

Lead acetate test: To the test sample *Vilvathi Podi*, 3ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

- **Test for steroids**

To the test sample *Vilvathi Podi*, 2ml of chloroform was added with few drops of conc. Sulphuric acid (3ml), and shaken well. The upper layer in the test tube was turned into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

- **Triterpenoids**

Liebermann–Burchard test: To the chloroform solution, few drops of acetic anhydride was added then mixed well. 1ml concentrated sulphuric acid was added from the sides of the test tube,

appearance of red ring indicates the presence of triterpenoids.

- **Test for Cyanins**

Aanthocyanin

To the test sample *Vilvathi Podi*, 1ml of 2N sodium hydroxide was added and heated for 5 min at 100°C. Formation of bluish green colour indicates the presence of anthocyanin.

- **Test for Carbohydrates - Benedict's test**

To the test sample *Vilvathi Podi* about 0.5ml of Benedic's reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic-coloured precipitate indicates the presence of sugar.

- **Proteins (Biuret Test)**

To extracts 1% solution of copper sulphate was added followed by 5% solution of sodium hydroxide, formation of violet purple colour indicates the presence of proteins.

Biochemical Analysis (Acid and Basic Radicals)

Analytical investigation for acid and basic radicals was conducted using standard biochemical procedures:

Analytical Investigation on Test for Acid Radicals

S.No	Test for Specific Acid Radical	Indication/ Observation	Inference	Results
1.	Test for Carbonates To 1ml of the test solution about 1ml of concentration (conc.) HCL was added.	Formation of brisk effervescence indicates the presence of carbonates	Presence of brisk effervescence. Absence of brisk effervescence.	Positive Negative
2.	Test for chlorides To 2ml of test solution, about 1ml of silver nitrate solution was added.	Appearance of white precipitate indicates the presence of chlorides.	Presence of white precipitate. Absence of white precipitate.	Positive Negative
3.	Test for sulfates To 1ml of the test sample add diluted H ₂ SO ₄ till effervescence ceases followed by this about 1ml of barium chloride solution was added.	Appearance of white precipitate indicates the presence of sulfates.	Presence of white precipitate Presence of white precipitate	Positive Negative
4.	Test for sulfides To 1ml of the test sample about 2ml of HCL was added with slight warming the mixture.	Formation of colorless gas with the smell of rotten egg indicates the presence of sulfides.	Presence of rotten egg smell. Absence of rotten egg smell.	Positive Negative
5.	Test for phosphates To 2ml of test solution treated with 2ml of ammonium molybdate solution followed by addition of 2ml of concentrated nitric acid.	Formation of yellow precipitate Indicates the presence of phosphates.	Presence of yellow precipitate. Absence of yellow precipitate.	Positive Negative
6.	Test for Fluoride and Oxalate To 2ml of the test solution about 2ml of dil acetic acid and 2ml of calcium chloride solution was added	Formation of white precipitate indicates the presence of fluoride/ oxalate.	Presence of white precipitate. Absence of white precipitate	Positive Negative

7.	Test for Borates 2ml of the test solution was added with sulphuric acid and 95% alcohol followed by exposure to flame.	Appearance of green flame indicates the presence of borates.	Presence of green flame Absence of green flame	Positive Negative
8.	Test for Nitrates 0.5ml of test solution heated with copper turning followed by addition of sulphuric acid.	Appearance of reddish-brown gas indicates the presence of nitrates.	Presence of reddish-brown color Absence of reddish-brown color	Positive Negative

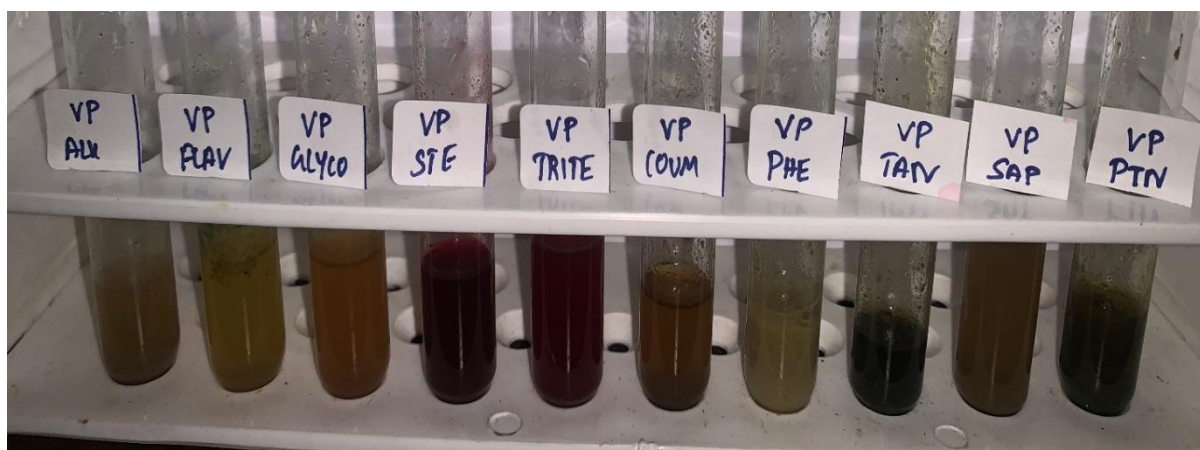
Analytical Investigation on Test for Basic Radicals

S.No	Test for Specific Basic Radical	Indication/ Observation	Inference	Results
1.	Test for Lead 1ml of the test solution added with 2ml of potassium chromate solution.	Formation of yellow precipitate indicates the presence of lead.	Presence of yellow precipitate Absence of yellow precipitate	Positive Negative
2.	Test for Arsenic 1ml of the test solution added with 2ml of 10% (2N) sodium hydroxide (NaOH) solution.	Formation of brownish red precipitate indicates the presence of arsenic	Presence of brownish red precipitate Absence of brownish red precipitate	Positive Negative
3.	Test for Mercury 1ml of the test solution added with 2ml of 10% (2N) sodium hydroxide (NaOH) solution.	Formation of yellow precipitate indicates the presence of mercury.	Presence of yellow precipitate Absence of yellow precipitate	Positive Negative
4.	Test for Copper 1ml of the test solution added with 1ml of ammonium hydroxide (NH ₄ OH) solution.	Formation of blue precipitate indicates the presence of copper.	Presence of blue precipitate Absence of blue precipitate	Positive Negative
5.	Test for Ferric To 1ml of test solution, about 2ml of potassium ferrocyanide was added.	Formation of blue precipitate indicates the presence of ferric.	Presence of blue precipitate Absence of blue precipitate	Positive Negative
6.	Test for Ferrous To 1ml of test solution, about 1 ml of potassium ferric cyanide solution was added.	Formation of blue precipitate indicates the presence of ferrous.	Presence of blue precipitate Absence of blue precipitate	Positive Negative
7.	Test for Zinc 1ml of the test solution added with 2ml of sodium hydroxide (NaOH) drop wise until indication appears.	Formation of white precipitate indicates the presence of zinc.	Presence of white precipitate Absence of white precipitate	Positive Negative
8.	Test for Silver 1ml of the test solution was added with 1ml of conc. HCL followed by appearance of curdy white precipitate. Boil the precipitate with water. It does not dissolve. Add NH ₄ OH solution in it and add 1 ml dilute HNO ₃ .	Formation of curdy white precipitate indicates the presence of silver.	Presence of curdy white precipitate Absence of curdy white precipitate	Positive Negative
9.	Test for Magnesium 1ml of the test solution added with 2ml of sodium hydroxide (NaOH) drop wise until indication appears.	Formation of white precipitate indicates the presence of magnesium.	Presence of white precipitate Absence of white precipitate	Positive Negative

RESULT

Qualitative Phytochemical Analysis of Vilvathi Podi

S.No	Test	Observation
1	Alkaloids	+
2	Flavonoids	+
3	Glycosides	+
4	Steroids	+
5	Triterpenoids	+
6	Coumarin	+
7	Phenol	+
8	Tannin	+
9	Saponins	+
10	Protein	-
11	Sugar	+
12	Anthocyanin	-
13	Betacyanin	+



Biochemical Analysis (Acid and Basic Radicals) of Vilvathi Podi

Test for Acid Radicals

Specific Radical	Test Report
Test for carbonates	Negative
Test for chlorides	Positive
Test for sulfates	Negative
Test for sulphides	Negative
Test for phosphates	Positive
Test for fluoride and oxalate	Negative
Test for borates	Negative
Test for nitrates	Negative

Test for Basic Radicals

Specific Radical	Test Report
Test for lead	Negative
Test for arsenic	Negative
Test for mercury	Negative
Test for copper	Negative

Test for ferric	Negative
Test for ferrous	Negative
Test for zinc	Negative
Test for silver	Negative

DISCUSSION

The results of the preliminary phytochemical screening of *Vilvathi Podi* provide a significant scientific rationale for its traditional use as documented in the *Maruthuva Aasiriyam*. In the Siddha system, the therapeutic success of a formulation is determined by its ability to modulate the *Mukkutram* (three humors). This study focused on a formulation indicated for skin and respiratory ailments- two systems that, while physiologically distinct, often share a common allergic and inflammatory etiology.

The clinical logic of *Vilvathi Podi* rests on its *Kaipu* (bitter) taste and majorly hot potency. In Siddha pharmacology, the Bitter taste is comprised of the *Vin* (Ether) and *Vali* (Air) elements, which are inherently antagonistic to the heat and inflammatory nature of vitiated *Pitham*. The identification of alkaloids and glucosides in this study aligns with the presence of the Bitter taste, as these secondary metabolites are frequently responsible for the bitter profile and subsequent alterative properties of medicinal plants.^[7]

Furthermore, the study revealed a high presence of flavonoids, phenols, and tannins. These compounds are well-documented in modern pharmacology for their potent antioxidant and anti-inflammatory activities. Their presence explains the medicine's ability to pacify *Kabapitham*- a state of humoral derangement that manifests as heat, redness (*Pitham*), and congestion/hypersensitivity (*Kabam*).^[8,9] The flavonoids, in particular, may act as natural mast-cell stabilizers, thereby reducing the allergic triggers common to both dermatological conditions and respiratory distress.^[10]

The presence of steroids and terpenoids further suggests a potential role in modulating immune responses, which is critical for long-term recovery from chronic allergic ailments.^[11] Interestingly, the detection of beta-cyanin and coumarins adds another layer of therapeutic depth, potentially contributing to the vascular and skin-protective properties of the powder.^[12] By treating the systemic "*Kaba-Pitha*" imbalance rather than just the localized symptoms, *Vilvathi Podi* follows the holistic Siddha principle of *Noi Naadi Noi Mudhal Naadi* (diagnosing the disease and its root cause).

CONCLUSION

The present study successfully identified the phytochemical profile of *Vilvathi Podi*, a four-ingredient *Churnam* derived from the unexplored Siddha literature, *Maruthuva Aasiriyam*. The screening

confirmed a rich diversity of bioactive secondary metabolites, including alkaloids, flavonoids, phenols, and saponins.

The integration of traditional Siddha logic with these scientific findings suggests that the medicine's efficacy in treating skin and respiratory diseases is rooted in its ability to decrease *Kabapitham*. The cold potency and bitter taste of the formulation act as a physiological counterbalance to the inflammatory and allergic pathways (*Kabapitham*) that drive these ailments.

As traditional medicine moves toward global integration, the standardization of regional formulations like *Vilvathi Podi* becomes an imperative task. This study provides the foundational evidence needed to validate the clinical wisdom of Kanyakumari's traditional practitioners. Future research involving HPTLC fingerprinting and *in-vivo* anti-allergic assays is recommended to further quantify these bioactive markers and establish a rigorous safety profile, ensuring that this simple yet potent formulation can be utilized for the benefit of global public health.

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