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PHYSICOCHEMICAL STANDARDIZATION OF THE TRADITIONAL SIDDHA POLYHERBAL FORMULALTION MAANTHA KULIGAI

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ABSTRACT

Introduction: Siddha Medicine, a valuable part of India's rich traditional heritage, represents an ancient system that offers a holistic and compassionate approach to health. This system primarily uses natural substances such as plants, minerals, and metals to treat a variety of diseases. Although many Siddha medicines have demonstrated therapeutic benefits, most lack proper standardization. Standardizing Siddha polyherbal formulations is essential to establish detailed monographs, ensuring the genuineness, purity, and safety of these preparations for patient use. Maantha Kuligai (MK) is a classical Siddha polyherbal formulation has been used to manage various neurological condition including Autism spectrum Disorder. (ASD). Standardizing such formulations through physicochemical evaluation is important for assuring consistent quality and efficacy. **Aim and Objective:** To establish reliable quality control measures for Maantha Kuligai, a Siddha polyherbal formulation, by conducting comprehensive physicochemical analysis to ensure its authenticity, effectiveness, and safety. **Materials and Methods:** Maantha Kuligai was prepared following traditional Siddha methods as documented in the Siddha text, Bala Vaithiya Thirattu.Its physicochemical properties, such as moisture level, ash content, extractive values, and pH, were evaluated using established standard procedures to verify its quality and uniformity. **Results:** The physicochemical evaluation of Maantha

Kuligai revealed a moisture content of $3.23 \pm 0.32\%$, total ash value of $1.73 \pm 0.20\%$, and no detectable acid-insoluble ash. The water-soluble extractive was found to be $10.03 \pm 0.55\%$, while the alcohol-soluble extractive measured $8.33 \pm 0.20\%$. The pH of the formulation was recorded as 6.44, indicating a slightly acidic nature. **Conclusion:** The physicochemical evaluation of *Maantha Kuligai* confirms its compliance with key quality standards, supporting its traditional use in Siddha medicine. These findings serve as a foundation for further standardization and future pharmacological or clinical investigations.

KEYWORDS: Maantha kuligai, Physiochemical Standardization, Bala Vaithiya Thirattu.

INTRODUCTION

In recent years, there has been a growing emphasis on integrating traditional medicine with modern healthcare systems. To facilitate this integration, classical formulations must undergo rigorous scientific evaluation to establish their efficacy, safety, and quality. Siddha medicine, one of the oldest traditional systems of medicine, offers time-tested solutions for various health concerns through its unique approach and polyherbal combinations. Maantha Kuligai, a small pill ("Kuligai") formulation, is documented in the Siddha textbook Bala Vaithiya Thirattu. Traditionally used in pediatric neurology, particularly in the management of conditions such as Autism Spectrum Disorder (ASD), Maantha Kuligai has been a part of Siddha therapeutic practices. Despite its longstanding use and therapeutic potential, the absence of standardized quality control data has limited its widespread clinical acceptance and integration into evidence-based healthcare frameworks. This research aims to bridge this gap by undertaking a comprehensive physicochemical analysis of Maantha Kuligai. Through systematic evaluation of its physical and chemical properties including moisture content, ash values, extractive values, and pH, this study seeks to establish a reproducible profile for the formulation. By elucidating the scientific basis of Maantha Kuligai, this research endeavors to promote evidence-based development, ensure quality control, and explore its therapeutic potential in the context of modern healthcare. The findings aim to support the integration of Siddha formulations like Maantha Kuligai into contemporary medical practice, offering patients safe and effective alternative treatment options.

MATERIALS AND METHODS

SELECTION OF THE TRIAL DRUG

The polyherbal formulation "Maantha Kuligai," described in "Bala Vaithiya Thirattu" (Page 85), was selected for investigation due to its traditional use in managing Maantha Sanni (Autism Spectrum Disorder).

Table No. 1: Ingredients with Botanical name of Maantha kuligai.[1]

S.No	Ingredients	English name	Botanical name	Part used	Quantity
1	NARSEERAGAM	Cumin seeds	Cuminum cymimum	Fruit	5.1GRAMS
2	KOTHTHAMALLI	Coriander seeds	Coriandrum sativum	Fruit	5.1GRAMS
3	PERUNJEERAGAM	Anise seeds	Foeniculum vulgare	Fruit	5.1GRAMS
4	KUROSANI OMAM	Henbane seeds	Hyoscymus niger	Seed	5.1GRAMS
5	CHUKKU	Dried ginger	Zingiber officinale	Rhizome	5.1GRAMS
6	SARANAI KIZHANGU	Horse purslane	Trianthema decandra	Tuber	5.1GRAMS
7	OMAM	Bishops weed	Trachyspermum ammi	Fruit	5.1GRAMS
8	THIPPLI	Long pepper	Piper longum	Fruit	5.1GRAMS
9	VASAMBU	Sweet-flag	Acorus calamus	Rhizome	5.1GRAMS

COLLECTION OF DRUG MATERIALS

The raw herbal components, including Cuminum cyminum, Coriandrum sativum, Foeniculum vulgare, Hyoscyamus niger, Zingiber officinale, Trianthema decandra, Trachyspermum ammi, Piper longum, and Acorus calamus, were sourced from a certified herbal drug vendor in Chennai to ensure authenticity and quality.

IDENTIFICATION AND AUTHENTICATION OF THE DRUGS

The raw materials utilized in this study were examined and authenticated by botanical and pharmacological experts at the Government Siddha Medical College, Chennai. Each sample—including Cuminum cyminum, Coriandrum sativum, Foeniculum vulgare, Hyoscyamus niger, Zingiber officinale, Trianthema decandra, Trachyspermum ammi, Piper longum, and Acorus calamus—was carefully labeled as GSMC/GD/374 to 382 and stored in the PG Gunapadam department of the Government Siddha Medical College, Chennai 106-for documentation and future use.

PURIFICATION PROCESS

The purification of the medicinal substances was carried out according to the traditional methods described in the Siddha text Sikicha Rathna Deepam and Sarakku Suthimuraigal. The procedures for each material included.

- Cuminum cyminum: Cleaned to remove dirt and impurities, then dry roasted.

- Coriandrum sativum: Tied in a bundle, dipped in hot water or fruit juice, burned, and then powdered.
- Foeniculum vulgare: Fried gently over low heat.
- Hyoscyamus niger: Thoroughly washed to eliminate impurities and fried over a low flame.
- Zingiber officinale: Outer skin was peeled off.
- Trianthema decandra: Washed carefully and cleaned.
- Trachyspermum ammi: Soaked in lime water and dried afterward.
- Piper longum: Lightly fried on low heat.
- Acorus calamus: Charred well.

PREPARATION OF THE MEDICINE

Each of the components—Cuminum cyminum, Coriandrum sativum, Foeniculum vulgare, Hyoscyamus niger, Zingiber officinale, Trianthema decandra, Trachyspermum ammi, Piper longum, and Acorus calamus—was dried individually and powdered finely. The powders were then mixed with hot water and molded into tablets.

STANDARDIZATION OF THE DRUG

ORGANOLEPTIC ASSESSMENT OF MK

The formulation was evaluated based on its physical properties, including appearance, texture, odor, touch, and flow behavior.

These assessments were performed at Noble Research Solutions, Perambur, Chennai.

PHYSICOCHEMICAL EVALUATION OF MAANTHA KULIGAI (MK)

Percentage Loss on Drying: Test drug was accurately weighed in evaporating dish. The sample was dried at 105^{o}C for 5 hours and then weighed.

Determination of Total Ash

Test drug was accurately weighed in silica dish and incinerated at the furnace a temperature 400 ºC until it turns white in color which indicates absence of carbon. Percentage of total ash will be calculated with reference to the weight of air-dried drug.

Determination of Acid Insoluble Ash

The ash obtained by total ash test will be boiled with 25 ml of dilute hydrochloric acid for 6mins. Then the insoluble matter is collected in crucible and will be washed with hot water

and ignited to constant weight. Percentage of acid insoluble ash will be calculated with reference to the weight of air-dried ash.

Determination of Alcohol Soluble Extractive

Test sample was macerated with 100 ml of Alcohol in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105ºC, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Determination of Water Soluble Extractive

Test sample was macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand and for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105ºC, to constant weight and weigh. Calculate the percentage of water-soluble extractive with reference to the air-dried drug.

pH determination

Required quantity of test sample was admixed with distilled water and the subjected to screening using pH meter.

Solubility Test

A small amount of the Maantha Kuligai sample was placed in a clean, dry test tube. To this, 2 ml of each solvent was added individually, and the mixture was shaken vigorously for about one minute. The solubility or dispersibility of the sample in each solvent was then observed. The test was performed using various solvents, including Chloroform, Ethanol, Water, Ethyl acetate and Dimethyl sulfoxide (DMSO), and the results were recorded separately for each.

RESULTS

Organoleptic characters

Figure 1.

Table No. 2: Organoleptic characters.

State	Solid
Nature	Moderately fine
Odor	Characteristic
Touch / Consistency	Soft
Flow Property	Non Free flowing
Appearance	Brownish

Physicochemical parameters

Table No. 3: Results of Physiochemical Evaluation of Maantha kuligai.

S.No	Parameter	Mean (n=3) SD
1.	Loss on Drying at 105 °C (%)	3.23 ± 0.32
2.	Total Ash (%)	1.73 ± 0.20
3.	Acid insoluble Ash (%)	0 ± 0
4.	Water soluble Extractive (%)	10.03 ± 0.55
5.	Alcohol Soluble Extractive (%)	8.33 ± 0.20
6.	pH	6.44

Table No 4: Solubility Profile.

S.No	Solvent Used	Solubility / Dispensability
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble
4	Ethyl acetate	Insoluble
5	DMSO	Soluble

DISCUSSION

The evaluation of Maantha kuligai through organoleptic and physicochemical parameters provides a preliminary understanding of its quality, consistency, and formulation standards. These characteristics are essential for validating traditional medicines and ensuring their acceptability in modern therapeutic contexts Organoleptically, the formulation appears as a brownish solid with a moderately fine texture and soft consistency. It possesses a characteristic odor and exhibits non-free-flowing properties. Such features are typical of herbal powders, where particle size and moisture retention influence texture and flow behavior. The soft nature and lack of free flow may suggest the need for enhanced drying or the inclusion of flow-improving agents if scaled for larger production. The physicochemical findings offer supportive evidence for its quality and stability. The loss on drying at 105°C was observed to be 3.23 ± 0.32%, indicating a relatively low moisture content. This is beneficial for maintaining the shelf life of the product and reducing the likelihood of microbial growth. The total ash content, measured at 1.73 ± 0.20%, suggests minimal inorganic residues, while the acid-insoluble ash was found to be 0%, indicating the absence of siliceous contaminants like sand or soil. These values support the conclusion that the raw materials used were clean and properly processed. The extractive values further demonstrate the formulation's potential for bioactive constituents. The water-soluble extractive value of 10.03 ± 0.55% and alcohol-soluble extractive of 8.33 ± 0.20% reflect the presence of a broad range of phytoconstituents, including both polar and moderately polar compounds. These substances could include glycosides, alkaloids, flavonoids, and tannins, which are commonly found in traditional herbal preparations. The pH value of 6.44 is nearly neutral, which is considered suitable for oral formulations, reducing the risk of gastrointestinal irritation. Regarding the solubility profile, the formulation is soluble in water, ethanol, and DMSO, while it is insoluble in chloroform and ethyl acetate. This pattern indicates that the majority of active constituents are polar, aligning with the traditional preparation methods that typically involve aqueous or hydroalcoholic media. Altogether, the results suggest that Maantha kuligai meets acceptable standards for herbal formulations. These evaluations form a basis for quality control and further standardization. However, additional studies including microbial analysis, heavy metal testing, and stability assessments are recommended to fully validate its safety and efficacy for therapeutic use.

CONCLUSION

This study establishes that Maantha Kuligai possesses favorable physicochemical properties, confirming its traditional formulation quality. The consistency in results such as moisture content, ash values, and solubility indicates that the preparation is well-suited for further standardization. These findings not only support its traditional use in managing pediatric neurological conditions but also pave the way for future studies focused on its clinical applications and safety profiling.

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