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Review Article

PODUTHALAIYATHY KUDINEER: A REVIEW OF ITS THERAPEUTIC POTENTIAL

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ABSTRACT

Siddha, a traditional system of medicine, leverages the therapeutic potential of herbs and natural substances to promote holistic health. In Siddha medicine, *Maantham* is categorised under *Aga Karana Noigal,* encompassing 21 types, including *Por Maantham*. The signs and symptoms of *Por Maanthan* are correlated with acute diarrhoeal disease. *Poduthalaiyathy Kudineer*, a classical Siddha polyherbal formulation, is traditionally used to treat *Por Maantham*, a condition akin to acute diarrhoeal disease. This comprehensive review aims to explore the therapeutic potential of *Poduthalaiyathy Kudineer* in managing *Por maantham* (acute diarrhoeal disease). Diarrhoea in children is a common and significant health issue worldwide, particularly in developing countries. It can lead to dehydration, electrolyte imbalance, malnutrition, and even death if left untreated or poorly managed. Children under the age of five are most vulnerable to diarrhoeal diseases due to their developing immune systems and increased exposure to pathogens. Effective management and prevention strategies are crucial to reducing the morbidity and mortality associated with diarrhoeal diseases in children. A thorough examination of traditional Siddha texts and contemporary scientific literature was conducted to elucidate the formulation's composition, mechanism of action and efficacy. The review highlights the synergistic potential of *Poduthalaiytahy kudineer's* multi-herbal components, which may contribute to its efficacy in managing acute diarrhoeal disease.

INTRODUCTION

In Siddha medicine, *Maantham* has a significant impact on children, predominantly between the ages of 1 and 3 years. In the developmental stages of child *Taala paruvam, Chappani paruvam, Mutha paruvam,* and *Varugai paruvam,* which correspond to the ages 1 to 3 years. In Siddha literature*, Maantham* is attributed to the mother's consumption of inappropriate food or an imbalanced diet regimen during the lactation period, which can affect the child through breast milk.[1] Among this type of signs and symptoms of *Por maantham* is correlated with acute diarrhoeal disease. According to the World Health Organisation (WHO), diarrhoeal disease is the third leading cause of mortality in children aged 1-59 months. Diarrhoea is a leading cause of malnutrition in children under 5 years old.[2]

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This review aims to provide an analysis of its ingredients, preparation methods, traditional uses, and pharmacological activities of *Poduthalaiyathy kudineer.*

METHOD

The studies were conducted according to the preferred reported items/checklists from the systematic reviews or research articles published in national and international journals.

Search Strategy

The information was gathered through a prospective comprehensive literature search using databases such as Google Scholar, Elsevier, PubMed, Springer. The combination of keywords used in electronic databases was as follows: *Poduthalaiyathy kudineer, Phyla nodiflora, Azadirachta indica, Mangifera indica, Tamarindus indica, Morinda tinctoria, Pergularia daemia, Trachyspermum ammi* L, *Vitex negundo, Allium sativum, Piper longum*, pharmacological activity, anti-diarrhoeal, anti-inflammatory, antimicrobial.

Review Findings

Ingredients

Research drug: *Poduthalaiyathy kudineer*[1]

Poduthalai eerku - 10g
Vembu eerku - 10g
Ma eerku - 10g
Puli eerku - 10g
Nuna eerku - 10g
Nochi eerku - 10g
Veliparuthi eerku - 10g
Omam - 5g
Vellaipoondu - 5g
Thippili - 5g

Purification

Traditional siddha drug purification methods, as described in classical texts such as *Sigicha Rathina Deepam*[2] and *Sarakku-Suthi Seyimuraikal*[23], are often used to purify ingredients. Specifically,

- *Thipilli* (Piper longum) is typically soaked in lemon juice for 3 hours and then dried.
- *Omam* (*Trachyspermum ammi*) is soaked in lime water for 3 hours, then fried.
- *Vellaipoondu* (Allium cepa) is sliced into small pieces and dried thoroughly.
- The twigs of other ingredients are washed and shade-dried before use.

This standardized purification and processing protocol is commonly used to ensure the quality and efficacy of ingredients in Siddha medicine.

Preparation

After purification, all ingredients were crushed into coarse powder. The coarse powder of purified ingredients was subjected to decoction preparation by adding 8 times the amount of water, followed by boiling and subsequent reduction to one-eighth of the original volume.[1]

Dosage

According to Siddha literature, *Balavagadam*, the dosage of *Poduthalaiyathy Kudineer* for children aged 1-5 years is typically titrated based on age and body weight, with a recommended dose range of 5-15ml twice daily after meals.[1]

Clinical Features of *Por Maantham*

Vayiru porumi kaliyum (abdomen tympanitis or rumbling and diarrhoea), *Vayiru purattal* (nausea), *Vali* (pain), *Thayppal unna mudiyamal mangum* (inability to take breastfeed & fatigue), *Vanti* (vomit), *Kan kuli vizhum* (sunken eyes), *Na varatchi* (dryness of tongue), *Suram* (fever), *Maarpu tutikkum* (palpitation), *Talai purattum* (rolling of head very often), *Sornthu mayankum* (drowsiness), *Netri narampu putaippu* (frontal vessel prominent), *Vayum nenjum ularum* (dryness of mouth and throat), *Vayiru oothum* (abdomen distension), *Udal vaadum* (tiredness).[1,24]

Clinical Features of Acute Diarrhoeal Disease

The WHO (2024) defines diarrhoea as the passage of 3 or more loose or liquid stools per day, exceeding the individual's normal frequency. Diarrhoeal episodes result in significant losses of water and essential electrolytes, including sodium, chloride, potassium, and bicarbonate, through various routes such as liquid stools, vomit, sweat, urine, and breathing. Severe dehydration symptoms, lethargy/ unconsciousness, sunken eyes, unable to drink or drink poorly, skin pinch goes back very slowly (>2 seconds). Mild dehydration, restlessness, irritability, sunken eyes, drinks eagerly, and is thirsty.[3]

Clinical features of *Por maantham* are correlated with acute diarrhoeal disease

Table 1: Ingredients, Scientific Name, Pharmacological Activity and General Characteristic Indicated in Siddha Literature

S.No	Ingredients	Botanical name	Pharmacological activities	General characters mentioned in siddha literature [4]
1.	*Poduthalai*	*Phyla nodiflora*	Anti-diarrhoeal Anti-inflammatory Anti-microbial Hepatoprotective Antioxidant Antidiabetic Antihyperlipidemic Antimelanogenic Antidandruff Antihyperuricemic Antiurolithiatic Diuretic	*Sithakalichal* (dysentery) *Perung kalichal* (diarrhoea) *Erumal* (cough) *Soolai* (pain) *Vellai* (leucorrhea) *Vali noi* (*Vadha* disease)

			Hypotensive[5]	
2.	*Vembu*	*Azadirachta indica*	Antiviral Antibacterial Antifungal Antioxidant Antimalarial Anti-inflammatory Anticancer Antinephrotoxicity Hepatoprotective Neuroprotective Immunomodulatory Wound healing Anticancer Antidiabetic[6] Antipyretic Antihaemorrhagic Antisecretory[7]	*Maantham* (gastroenteritis) *Vayitru puzhu* (worm infestation) *Nanju suram* (fever) *Ammai pun* (chicken pox wound) *Sori, Sirangu* (scabies)
3.	*Ma*	*Mangifera indica*	Anti-inflammatory Antispasmodic Antibacterial Antipyretic Antifungal Antihelmintic Antiparasitic Anti tumor Antibone resorption Antidiarrhoeal Antiallergic Immunomodulation Hepatoprotective Gastroprotective[8]	*Maantham* (gastroenteritis) *Vanti* (vomit) *Vali noi* (*Vadha* disease) *Suvai inmai* (ageusia)
4.	*Puli*	*Tamarindus indica*	Antidiabetic Antimicrobial Analgesic Anti-inflammatory Hepatoprotective Antipyretic Anti-emetic Laxative[9]	*Alal noi* (pitha disease) *Sithakalicha*l (dysentery) *Kalichal* (diarrhea) *Vanti* (vomit) *Alukiya pun* (necrotic wound) for external use
5.	*Nunna*	*Morinda tinctoria*	Antidiarrhoeal[10] Antimicrobial Antimalarial Antioxidant Anticancer Hypoglycemic Nephro-protective Wound healing[11]	*Pattai karappan*(eczema) *Iya suram* (Iya disease) *Pun* (wound) *Kiranthi* *Maantham* (gastroenteritis)

6.	*Nochi*	*Vitex negundo*	Antinociceptive Anti-inflammatory Anti-oxidant Antimicrobial Hepatoprotective Antihyperglycemic Anti-tumor Anti-androgenic Anti-osteoporotic Anti-cataract Antidiarrhoeal Antispasmodic[12]	*Vali noi* (vadha disease) *Maantham* (gastroenteritis) *Vayitru pulu* (worm infestation) *Suram* (fever) *Manneeral veekam* (spleen enlargement)
7.	*Veliparuthi*	*Pergularia daemia*	Anti-inflammatory Analgesic Antipyretic Hepatoprotective Antioxidant Anticancer Antidiabetic Antibacterial Anti-fungal[13] Anti-arthritic Antifertility Anthelmentic Antiulcer Diuretic[14]	*Vali noi* (vadha disease) *Veekam* (oedema) *Icivu* (epilepsy) *Erumal* (cough) *Kozhaikattu* (cold) *Maantham* (gastroenteritis) *Seriya kalichal* (indigestive diarrhea)
8.	*Omam*	*Trachyspermum ammi* L.	Analgesic Antibacterial Antifilarial Anthelmintic Insecticidal Antiplelate Antioxidant Antihistamine Gastroprotective Antitussive Abortifacient Galactogogue Anti-hyperlipidemic Antihypertensive Broncho-dilating Anti-inflammatory[15] Antispasmodic[15,16]	*Iya suram* (Iya fever) *Erumal* (cough) *Seriya maantham* (gastroenteritis) *Porumal* (bloating abdomen) *Kalichal* (diarrhea) *Iraippu* (asthma) *Pal noi* (dental disorder) *Kuyya rogam*
9.	*Vellaipoondu*	*Allium sativum*	Antibacterial Antifungal Antiviral Antiprotozoal Antioxidant	*Ciriya katti* (small cyst) *Nalpatta erumal* (chronic cough), *Iraippu* (asthma) *Vayitru pulu* (worm infestation), *Vali noi*(vadha disease) *Iya talaivali* (Iya head ache)

			Anti-inflammatory Anti-cancer Immunomodulatory Anti-obesity Antidiabetic Hypolipidemic Anti-atherosclerotic Antihypertensive[17] Antidiarrhoeal[18]	*Vay noi* (mouth ulcer) *Neer etram* (oedema) *Sitha kalichal* (dysentery) *Moolam* (piles)
10.	*Thippili*	*Piper longum*	Antidiarrhoeal Antispasmodic[19] Antimicrobial Antiparasitic Anthelmintic Mosquito-larvicidal Anti-inflammatory Analgesic Antioxidant Anticancer Antihyperglycaemic Neuro-pharmacological Hepatoprotective Antihyperlipidaemic Antiangiogenic Immunomodulatory Antiarthritic Antiulcer Antiasthmatic Cardioprotective Antisnake-venom[20]	*Erumal* (cough) *Gunmam* (peptic ulcer) *Iraippu* (asthma) *Iya noi* (Iya disease) *Paandu* (anaemia) *Suvai inmai* (ageusia) *Porumal* (bloating abdomen) *Thalaivali* (head ache) *Moorchai (*dizziness) *Neer etram* (oedema) *Thontai noi* (throat disorder) *Mookku-kathu-kan noi* (nose, ear, eye disorders) *Pulu noi* (worm infestation)

DISCUSSION

Poduthalaiyathy kudineer is composed of 7 herbal twigs and 3 raw drugs, which are mentioned in the siddha classical text*, Balavagadam*.[1] *Balavagadam* is included in the scheduled book list under the Drug and Cosmetic Act, 1940.[21] So *Poduthalaiyathy kudineer* is considered a safe herbal formulation for the pediatric age group. From the above table, it is evident that the general characters of *Poduthalaiyathy kudineer* constituents in the siddha literature review correlate with the pharmacological activities in published research articles. The pharmacological activities, such as anti-diarrhoeal, anti-inflammatory, antipyretic, antimicrobial, antispasmodic, anti-emetic and gastroprotective properties, will effectively alleviate the symptoms of *Por maantham* characteristic.

Anti-diarrhoeal activity

Antidiarrhoeal activities have been attributed to the presence of bioactive agents or phytochemicals such as tannins, alkaloids, saponins, flavonoids, steroids and terpenoids. Most plant species that have antidiarrhoeal potential confirm tannins as one of the major constituents. Tannins can denature proteins in the intestinal mucosa, enhancing their resistance to chemical alterations and subsequently reducing secretions. While the flavonoids are known to inhibit intestinal motility and hydroelectrolytic secretion. Therefore, the antidiarrhoeal activity of Phyla nodiflora may be attributed to the presence of the above-mentioned bioactive agents.[22]

Phyla nodiflora, Mangifera indica, Morinda tinctoria, and *Allium sativum* exhibit antidiarrheal activity, potentially due to their content of tannins and flavonoids.

Piper longum has alkaloid piperin, which has calcium channel blockage activity, which is responsible for anti-diarrhoeal and anti-spasmotic activity. By blocking calcium channel, which reduce intestinal muscle contraction and decrease fluid secretion, which contributes to their anti-diarrhoea activity.[19]

Antispasmodic activity

Trachyspermum ammi and *Piper longum* exhibit antispasmodic activity.[16,19] In *Piper longum*, alkaloid piperine, which has calcium channel blocking action, is responsible for antispasmodic activity.[19]

Essence of *Trachyspermum ammi* has several compounds, including thymol (49.0%), γ-terpinene (30.8%), p-cymene (15.7%), β-pinene (2.1%), myrcene (0.8%), and limonene (0.7%). Thymol's relaxant effect on smooth muscle is thought to occur by counteracting the calcium- and ATP-dependent contraction process, potentially by modulating calcium influx or interfering with ATP utilisation, leading to muscle relaxation. It also blocks the ca+2 influxes across the cell membrane and reduces the calcium content in the sarcoplasmic reticulum. Another pharmacologically active compound, Carvacrol, found in the essence, exhibits a notable relaxant effect on smooth muscles by its blocking actions, which stimulate muscarinic receptors and/or β-adrenergic receptors. Research has shown that pinene compounds, found in essence, have a relaxant effect on smooth muscle contractions induced by KCl (potassium chloride) or acetylcholine. The greater spasmolytic efficacy of the essence compared to the extract could be linked to its higher concentration of inhibitory compounds, which may underlie the mechanisms driving its therapeutic effects.[16]

Anti-emetic activity

Tamarindus indica has methanolic and butanolic extracts that exhibit anti-emetic activity comparable to the medication chlorpromazine. [8]

Antimicrobial activity

Antimicrobial activity is present in plants such as *Phyla nodiflora, Azadirachta indica, Mangifera indica, Tamarindus indica, Morinda tinctoria, Pergularia daemia, Trachyspermum ammi L, Vitex negundo, Allium sativum, Piper longum.* [Table:1]

Anti-inflammatory activity

Antimicrobial activity present in the following plants such as *Phyla nodiflora, Azadirachta indica, Mangifera indica, Tamarindus indica, Morinda tinctoria, Pergularia daemia, Tachyspermum ammi* L, *Vitex negundo, Allium sativum, Piper longum.* [Table:1]

Antipyretic activity

Pergularia daemia, Tamarindus indica, and *Azadirachta indica* have antipyretic activity. [Table:1]

Analgesic activity

Piper longum, Trachyspermum ammi L., *Pergularia daemia*, and *Tamarindus indica* demonstrate analgesic properties, as shown in Table 1.

This study sheds light on the therapeutic benefits of *Poduthalaiyathy kudineer*, exploring its potential outcomes and interpretive implications, and culminates in suggestions for future research.

CONCLUSION

Poduthalaiyathy kudineer, a traditional siddha formulation, demonstrates potential as a safe, accessible, and simple intervention for managing *Por maantham* (acute diarrhoeal disease), warranting future research through clinical trials and evaluations to validate its therapeutic efficacy.

Declaration of Competing Interests

The authors confirm that the research was conducted without any financial or personal biases that could have influenced the findings presented in this study.

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