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Original Article

Formulation and Evaluation of *Truptighna Mahakashaya* Syrup: An Ayurvedic Intervention for Pediatric Appetizer

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ABSTRACT

Background: Charak Samhita mentions Truptighna Mahakashaya as a group of herbs effective in treating Kaphaja disorders, commonly seen in children with loss of appetite and Kapha dominance. However, traditional formulations are often unpalatable, reducing pediatric compliance. To address this, the present study develops a palatable and standardized syrup formulation of Truptighna Mahakashaya using sita (sugar) for improved taste and stability, while ensuring compliance with Ayurvedic Pharmacopoeia of India standards for safety and efficacy. **Materials and Methods:** The classical ingredients of *Truptighna Mahakashaya* were processed following Ayurvedic principles. Sita (sugar) was added as a natural sweetener and preservative to enhance taste and prolong shelf life. The formulation was prepared using Standard Operating Procedures (SOP) for syrup making, maintaining classical integrity. Physicochemical parameters, including specific gravity and sugar content, were measured. Thin Layer Chromatography (TLC) was performed under UV and fluorescent light to confirm the presence of bioactive compounds. Quality parameters were verified against the standards set by the Ayurvedic Pharmacopoeia of India (API). **Results:** The syrup showed a reducing sugar content of 0.573 mg/g, non-reducing sugar at 3.289 mg/g, and total sugar content of 3.862 mg/g. Specific gravity was recorded as 1.207. TLC analysis revealed multiple spots under UV and fluorescent light, indicating the presence of various bioactive constituents. The formulation complied with the quality criteria outlined in the API. **Conclusion:** A scientifically validated and organoleptically acceptable syrup formulation of *Truptighna Mahakashaya* was successfully developed. This dosage form offers improved palatability, better therapeutic compliance, and adherence to pharmacopoeial standards, making it suitable for pediatric use in managing Kaphaja disorders.

Keywords: *Truptighna Mahakashaya*, Agnimandya, Ayurveda, Charak Samhita, physicochemical analysis, TLC, Ayurvedic Pharmacopeia.

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INTRODUCTION

From a therapeutic perspective, the Charak Samhita is highly regarded among all ancient Samhitas. Acharya Charak has meticulously categorized medicinal plants based on their pharmacotherapeutic properties. He organized these plants into specific groups according to their key actions, such as *sandhanniya* (healing) and *kushthaghna* (skin diseases), among others. In the *Shadavirechana shatashiritiya* chapter, Charak classified plants into 50 pharmacological categories known as *Dashamani* or *Mahakashaya* (Acharya, 1984, Sutrasthana 4/9, 32). Acharya Charaka emphasized that these classifications serve as guidelines for practitioners, who have the Discretion to modify these groups by adding new drugs or omitting unavailable ones, thus tailoring treatments to contemporary needs.

In his commentary on *Truptighna Mahakashaya*, Acharya Chakrapani describes its use in treating *kaphaja* disorders characterized by loss of appetite (Acharya, 1984, Sutrasthana 4/9, 32). Acharya *Vagbhata* notes that *kapha* dosha predominates in the pediatric population (Harishastri Paradkar Vaidya, 2011), making them particularly susceptible to *kaphaja* disorders. *Trupti*, or the lack of desire to eat, is a frequent concern among parents of preschool and school-aged children. Various factors, both physiological and psychological, influence a child's hunger and satisfaction, which can occur with or without associated gastrointestinal or extra intestinal conditions. Intermittent anorexia, often non-pathological, is common in children and can negatively impact their growth and development by compromising nutritional intake during a critical period of increased nutritional needs (Vereecken *et al.*, 2009). This condition is known to potentially impair immune function, delay

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wound healing, and alter drug metabolism, ultimately affecting a child's health prognosis.

To address the challenges of taste and acceptability in pediatric care, *Truptighna Mahakashaya* syrup, a polyherbal Ayurvedic formulation, has been developed to enhance appetite in children experiencing agnimandya (non-pathogenic anorexia). The syrup dosage form was specifically chosen to improve palatability and compliance in pediatric administration. This study focuses on the formulation and comprehensive evaluation of *Truptighna Mahakashaya* syrup, assessing its organoleptic, analytical, and microbial characteristics based on classical Ayurvedic concepts and contemporary pharmaceutical guidelines.

The formulation process followed traditional Ayurvedic procedures, incorporating sita (sugar) as a natural preservative to enhance both palatability and stability. The organoleptic attributes such as color, taste, smell, and consistency were systematically evaluated. Physicochemical analyses were conducted to determine parameters such as reducing sugar, non-reducing sugar, total sugar content, and specific gravity. Thin Layer Chromatography (TLC) was utilized for the identification of bioactive phytoconstituents. Compliance with the standards prescribed in the Ayurvedic Pharmacopoeia of India (API) was ensured through rigorous testing. Additionally, preliminary safety evaluations were performed to ascertain the suitability of the syrup for pediatric use.

MATERIALS AND METHODS

Drug Development

The preparation of *Truptighna Mahakashaya* Syrup was carried out in accordance with Standard Manufacturing Procedures (SMP) to ensure the consistency, stability, and efficacy of the final product (Kalsariya *et al.*, 2010). The formulation involved the creation of a concentrated sucrose-based syrup, resulting in a sweet, viscous liquid suitable for pediatric administration (Figures 1 and 2).

The raw materials required for the preparation of *Truptighna Mahakashaya* Syrup were procured from a reputed source for authenticated Ayurvedic herbs. Each ingredient was carefully identified and authenticated in accordance with classical Ayurvedic texts and standard pharmacognostical protocols to ensure quality and purity.

The formulation comprises the following Ayurvedic herbs, all utilized in *churna* (powdered) form:

Shunthi (*Zingiber officinale Roscoe*): Rhizome - 50 g,

Chavya (*Piper chaba* Linn.): Fruit - 100 g,

Chitrak (*Plumbago zeylanica* Linn.): Root - 50 g,

Vidanga (*Embelia ribes Burm. f.*): Dried mature fruits - 100 g,

Murva (*Marsdenia tenacissima*): Stem - 100 g,

Guduchi (*Tinospora cordifolia Miers*): Stem - 100 g,

Vacha (*Acorus calamus* Linn.): Rhizome - 50 g,

Musta (*Cyperus rotundus* Linn.): Rhizome - 100 g,

Pippali (*Piper longum* Linn.): Fruit - 50 g,

Patol (*Trichosanthes cucumerina Roxb*): Leaf - 100 g.

A total of 10 L of water was used to prepare the decoction (Kwatha). To enhance the palatability and ensure preservation, 1400 g of sita (sugar) was added during the syrup formulation process (Kalsariya *et al.*, 2010).

This standardized sourcing and identification process ensured the authenticity, consistency, and therapeutic integrity of the raw materials used in the formulation.

Standardization of Drug

Standardization of Raw Drugs

The raw drug samples used in the preparation of *Truptighna Mahakashaya* Syrup were subjected to standardization procedures in accordance with the Ayurvedic Pharmacopoeia of India (API). The purpose of this evaluation was to ensure the quality, purity, and consistency of the raw materials employed in the formulation (Table 1).

Standardization tests included

1. Loss on Drying - to determine the moisture content,
2. Total Ash Value - to estimate the total amount of inorganic content,
3. Thin Layer Chromatography (TLC) - to detect and profile phytochemical constituents.

TLC analysis was performed under both fluorescent and Ultraviolet (UV) light to visualize the presence of active phytocompounds. The following table summarizes the results (The Indian Pharmacopoeia, 1985):

These standardization results confirmed that all raw materials met the quality criteria laid out in the API, thereby ensuring the authenticity, safety, and therapeutic potential of the final *Truptighna Mahakashaya* Syrup formulation.

RESULTS

Organoleptic Evaluation

The organoleptic properties of *Truptighna Mahakashaya* Syrup were assessed at Altra Analytical Laboratories, Ahmedabad, Gujarat. The syrup was observed to possess the following sensory characteristics:

Color: Brown,

Taste: Mildly sweet,

Odor: No distinct smell,

Texture: Smooth and fine to touch,

Appearance: Uniform, consistent brown liquid,

These characteristics contribute to the acceptability and palatability of the formulation, especially for pediatric use.

Analytical Evaluation

The analytical assessment was conducted to ensure the physicochemical consistency and safety of the formulation. All tests were performed according to the protocols outlined in the Ayurvedic Pharmacopoeia of India (API), with content assays conducted using UV spectrophotometry (The Ayurvedic Pharmacopoeia of India, 1999).

These results indicate that the syrup meets the safety standards for heavy metal content as prescribed by the API.

The physicochemical evaluation of the syrup revealed reducing sugars (0.573 mg/g), non-reducing sugars (3.289 mg/g), and a total sugar content of 3.862 mg/g. The specific gravity (1.207) and viscosity (17 centipoises) were within the standard limits prescribed by the Ayurvedic Pharmacopoeia of India (API). These parameters are important for ensuring the stability, consistency, and palatability of the formulation (Table 2).

The heavy metal analysis of the syrup demonstrated Lead (Pb) at 2.18 ppm and Arsenic (As) at 0.09 ppm, while Mercury (Hg) and Cadmium (Cd) were not detected. All values were found to be within the permissible limits set by the Ayurvedic Pharmacopoeia of India (API), thereby confirming the formulation's safety concerning heavy metal contamination (Table 3).

Microbiological Analysis

Microbiological quality control was performed to assess the microbial safety of the formulation. The syrup was diluted and cultured on nutrient agar plates, followed by incubation at 30°C for 24 hr (Patwardhan *et al.*, 2017) (Table 4).

The absence of pathogenic bacteria and acceptable total counts confirm the microbial safety and suitability of the syrup for pediatric use (Central Council for Research in Ayurvedic Sciences [CCRAS], n.d.).

Thin Layer Chromatography (TLC) Analysis

TLC profiling of *Truptighna Mahakashaya* Syrup was conducted following API guidelines. A methanolic extract of the syrup was used, and the analysis was performed using:

- Mobile Phase: Toluene: Ethyl acetate: Formic acid (5:4:1),
- TLC Apparatus: CAMAG TLC Scanner 3, Reprostar, and Wincats 1.3.4,
- Chamber Type: CAMAG Twin Trough Glass Chamber,
- Visualization: Under daylight, fluorescent light, and UV light.

Figure 1: Flow Chart of Truptighna mahakahsya Syrup Preparation Method.

Figure 2: Photos of *Truptighna Mahakashaya* Syrup.

Table 1: Standardization of Raw drugs.

Botanical Name	Color	Loss on Drying (%)	Total Ash (%)	TLC R_f Values (Fluorescent / UV Light)
Zingiber officinale	Light Yellow	8.81	5.05	0.91 / 0.68, 0.77, 0.94
Piper chaba	Brown	9.60	5.59	0.89 / 0.54-0.94
Plumbago zeylanica	Brown	9.53	3.97	0.65, 0.94 / 0.68
Embelia ribes	Black	10.78	3.32	- / 0.94
Marsdenia tenacissima	Cream	18.00	6.18	- / 0.71, 0.91
Tinospora cordifolia	Brown	17.51	5.90	- / 0.73, 0.95
Acorus calamus	Brown	20.72	6.37	0.95 / 0.67, 0.81, 0.95
Cyperus rotundus	Black	11.02	4.24	- / 0.43-0.90
Piper longum	Green	19.88	8.35	0.63 / 0.29-0.94
Trichosanthes cucumerina	Brown	11.71	11.77	0.66, 0.79, 0.86 / 0.68, 0.83, 0.90

TLC Findings

Under fluorescent light, seven distinct spots were observed with the following R_f values (Figure 3):

- Spot 1: 0.31,
- Spot 2: 0.35,
- Spot 3: 0.46,
- Spot 4: 0.58,
- Spot 5: 0.73,
- Spot 6: 0.85,
- Spot 7: 0.92.

Under UV light, no unidentified spots were observed.

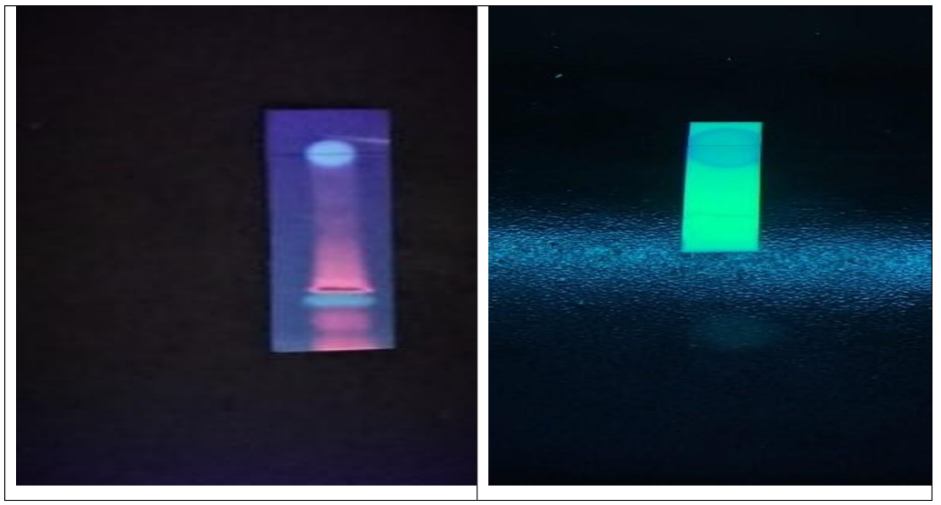
These TLC results support the presence of multiple bioactive phytochemical constituents, contributing to the pharmacological potential and standardization of the formulation.

Table 2: Key Physicochemical Parameters.

Parameter	Result	Permissible Limit
Reducing sugars	0.573 mg/g	-
Non-reducing sugars	3.289 mg/g	-
Total sugar	3.862 mg/g	-
Specific gravity	1.207	As per standard
Viscosity	17 centipoises	As per standard

DISCUSSION

Acharya Charaka, in his foundational Ayurvedic text, enumerated 50 *Mahakashayas* groups of herbs categorized by their therapeutic actions. Each Mahakashaya addresses specific disease conditions, allowing practitioners the autonomy to select formulations according to symptoms and pathogenesis. Among these, *Truptighna Mahakashaya* remains underexplored despite its therapeutic potential in managing "*Trupti*" , a condition



TLC of *Truptighna mahakashaya* under florescent light)	TLC of Truptighna mahakashaya under UV light)

Figure 3: TLC OF of *Truptighna Mahakashaya*.

Table 3: **Heavy Metal Analysis.**

Heavy Metal	Observed Level	Limit (API)
Lead (Pb)	2.18 PPM	Not more than 10 PPM
Arsenic (As)	0.09 PPM	Not more than 3.0 PPM
Mercury (Hg)	Not detected	Not more than 1.0 PPM
Cadmium (Cd)	Not detected	Not more than 0.3 PPM

predominantly associated with *Kaphaja Vikara* characterized by early satiety and a loss of appetite.

Trupti is particularly significant in the pediatric age group**,** where *Kapha Dosha* predominates physiologically. Children are more susceptible to *Kaphaja* disorders such as *Mandagni* (impaired digestive fire), leading to nutritional deficiencies during critical growth phases. *Truptighna Mahakashaya Syrup* **,** formulated as a polyherbal compound, aims to address *Agnimandya* (weak digestive fire) and stimulate appetite in children, in alignment with Ayurvedic principles.

To ensure both efficacy and safety, the formulation underwent a comprehensive standardization process. The raw drugs used in the formulation were evaluated using parameters such as loss on drying, total ash value, and Thin-Layer Chromatography (TLC), in accordance with the Ayurvedic Pharmacopoeia of India and CCRAS guidelines (CCRAS, n.d). These tests are essential for confirming the identity, purity, and quality of botanical materials, minimizing the risks of adulteration or variation in potency.

The final formulation was evaluated according to the standard parameters for Sharbat/Manappagu Kalpana (syrup formulations). Further assessments for heavy metal contamination and microbial load were conducted, ensuring that the syrup

Table 4: **Microbial Load Results.**

Microbial Parameter	Result	Permissible Limit
Total bacterial count	310 cfu/mL	Not more than 100,000 cfu/mL
Yeast and mold count	Negligible	Not more than 1,000 cfu/mL
E. coli	Absent	Absent
Staphylococcus aureus	Absent	Absent
Salmonella spp.	Absent	Absent
Pseudomonas aeruginosa	Absent	Absent

meets safety thresholds for human consumption, particularly for children. Organoleptic evaluation is especially relevant in pediatric formulations, where palatability and sensory appeal significantly influence treatment adherence. The syrup's brown color, mildly sweet taste, smooth texture, and lack of strong odor were observed to be favorable, supporting its acceptability among children. This enhances its suitability for repeated or long-term administration, a critical factor in managing chronic digestive disorders.

The microbiological analysis demonstrated that *Truptighna Mahakashaya* syrup is free from potentially pathogenic organisms such as *Escherichia coli, Staphylococcus aureus, Salmonella* spp., and *Pseudomonas aeruginosa*. The total viable bacterial count remained well within acceptable pharmacopoeial limits, and no yeast or mold growth was observed. These findings highlight the efficacy of preservation techniques and manufacturing hygiene, ensuring that the product remains safe for pediatric use.

TLC analysis provided a phytochemical fingerprint of the formulation, enabling the identification of bioactive markers and ensuring batch-to-batch consistency. The detection of seven distinct R_f values under fluorescent light affirms the presence of multiple phytoconstituents contributing to the formulation's therapeutic potential. While no additional spots were observed under UV light, the TLC profile remains a crucial tool for quality assurance in polyherbal preparations, especially during scale-up and commercialization.

The present study offers a foundational understanding of *Truptighna Mahakashaya* syrup from both traditional Ayurvedic and modern analytical perspectives. The integration of organoleptic evaluation, physicochemical standardization, and microbial safety testing provides a validated framework for future clinical investigations.

Further clinical trials are warranted to evaluate the formulation's efficacy in managing Agnimandya and Trupti in pediatric populations. Additionally, phytochemical profiling can aid in isolating active constituents, which may pave the way for the development of targeted formulations or evidence-based nutraceuticals. The fusion of classical Ayurvedic wisdom with contemporary scientific validation represents a robust model for the advancement of Ayurvedic pharmacology and may serve as a blueprint for future research in the domain of traditional medicine.

CONCLUSION

This study assessed the organoleptic, analytical, and microbiological qualities of *Truptighna Mahakashaya* Syrup, formulated for managing Agnimandya and Trupti in the pediatric population. Microbial testing confirmed the absence of pathogens including *E. coli, S. aureus, Salmonella* spp., and *P. aeruginosa*, with total bacterial and fungal counts within pharmacopoeial limits, indicating effective preservation and manufacturing hygiene. Heavy metal analysis showed lead (2.18 PPM) and arsenic (0.09 PPM) levels below permissible limits, with no detectable mercury or cadmium, confirming safety for pediatric use. The syrup demonstrated an acceptable sugar profile (reducing sugars: 0.573 mg/g, non-reducing sugars: 3.289 mg/g, total: 3.862 mg/g) and a specific gravity of 1.207, ensuring stability and palatability. TLC profiling revealed multiple chemical markers, supporting quality control and standardization. Overall, the formulation meets key safety and quality benchmarks, suggesting it is a safe, palatable, and potentially effective Ayurvedic preparation for pediatric digestive disorders, with scope for future clinical validation.

ABBREVIATIONS

TLC: Thin Layer Chromatography; **UV:** Ultraviolet; **mg/g:** Miligram /Gram; **ppm:** parts per million; **API:** Ayurvedic Pharmacopoeia of India; **cfu/mL:** Colony Forming Units per milliliter; **R_f values:** Retention Factor.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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