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PHARMACEUTICAL MODIFICATION OF PANCHATIKTA KASHAYA INTO GUDA VARTI AND ITS -ANALYTICAL STUDY

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ABSTRACT

The pharmaceutical industry values dosage forms that are not only more appealing but also possess a longer shelf life, thereby improving patient compliance. Medicines are available in various dosage forms for ease of administration, consumption, convenience, accuracy, and bioavailability. Ayurveda has mentioned different routes of drug administration for the effective application and absorption of medicine for achieving desired therapeutic action. The rectal route is one of them, and within it lies the unexplored potential of Guda Varti as a simple dosage form.

Panchatikta Kashaya, a widely used clinical formulation for fever management, consists of five bitter ingredients, hence called Tiktaka. Variations exist in its ingredients across references, with this specific formulation sourced from Cakradatta Jwara Chikitsa [1]. The modified Panchatikta Kashaya Varti aims to enhance absorption and bioavailability by bypassing first-pass metabolism. It addresses challenges like oral ingestion difficulties in patients, including paralysis or children. By transforming into a Guda Varti, it offers a solution to overcome the bitterness of the Kashaya, aiding in alleviating various types of Jwara.

In the pharmaceutical study, 227 grams of Ghana was obtained from 20 liters of Kashaya, then used for Varti preparation with cocoa butter as base. Panchatikta Kashaya Varti was subjected

for organoleptic, physicochemical, and phytochemical evaluations, setting preliminary standards. Parameters like pH 6, Disintegration time 17.42 minutes, Loss on drying 18.2%, Alcohol soluble extractive 24%, and Hardness 4kg were observed. Phytochemical analysis showed presence of carbohydrates, proteins, glycosides, saponins, flavonoids, and tannins, all with known antipyretic effects. Upon qualitative analysis of Panchatikta Kashaya Varti show the potential therapeutic value, suggesting its promising role as an antipyretic agent.

Keywords: Panchatikta Kashaya, Modification, Varti, Antipyretic effect

INTRODUCTION

The goal of Ayurveda is to correct the imbalance of three very important elements, Vata, Pitta, and Kapha, which make up the Tridosha from which the body originates. When Dosha is impaired, Bheshaja plays an important role. It aids in the restoration of vitiated Doshas to normal levels or in the treatment of diseased conditions, returning the body to a healthy state.

Ayurvedic drugs are derived from natural sources such as plants, animals, and minerals. Ayurvedic compound formulations are classified into two categories: Kashtaushadi (Herbal formulations dealt in Bhaishajya Kalpana) and Rasaushadhi (Metallic and mineral formulations dealt in Rasashastra). The term Bhaishajya Kalpana is formed by the combination of word Bhaishajya (Bheshaja) and Kalpana. The medicine is called Bheshaja, because it is used as instrument by Bhishak (physician) to alleviate disorders. Kalpana means Yojana (planning) or usage of Samskarita Bheshaja. Hence, Bhaishajya Kalpana refers to the science wherein medicinal substances are prepared from raw

materials according to the physician's specific requirements [2].

Panchatikta Kashaya is a widely used formulation in clinical practice, owing to its efficacy in fever management. This contains five herbal ingredients and bitter in taste. So called Tiktaka. This particular formulation is taken from Cakradatta Jwara Chikitsa. As this Kashaya helps in alleviating all types of Jwara, Modified form of Panchatikta Kashaya into a Guda Varti is taken up for the pharmaceutical and analytical study.

The modified form of Panchatikta Kashaya Varti aims to bypass first-pass metabolism, thereby enhancing absorption rates and bioavailability. It also offers a solution for patients facing challenges with oral medication ingestion, such as those who are paralyzed or children. The bitterness of Panchatikta Kashaya, stemming from its five herbal components, can be overcome through the use of Varti dosage form. This study has been undertaken due to the scarcity of research related to the use of

rectal suppositories to evaluate the Jwaraghna effect in Ayurveda.

Objectives

1. To modify Panchatikta Kashaya into Guda Varti
2. To analyze the Panchatikta Kashaya Varti

MATERIALS AND METHODS

The methodology of work was classified into following sections

1. Pharmaceutical study
2. Analytical study

The pharmaceutical study was divided into following sections

A. Collection of the drugs

B. Authentication of the raw drugs

C. Preparation of Panchatikta Kashaya Varti

Collection of drugs

The drugs required for the preparation of Panchatikta Kashaya Varti was collected from K R Govinda Shetty merchant, Mysore and Kiratatikta was procured from HHRC Amritsar pharmacy, Punjab, Shunti were taken from Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

Table 1: Ingredients of Panchatikta Kashaya Varti [3]

S. No.	DRUGS	BOTANICAL NAME	PARTS USED	PROPORTION (V/V)
1	Guduchi	<i>Tinospora Cordifolia (Wild.) Miers</i>	Stem	500ml
2	Kantakari	<i>Solanum xanthocarpum Schrad & Wendl.</i>	Fruit	500ml
3	Kiratatikta	<i>Swertia chirata (Buch-Ham)</i>	Whole plant	500ml
4	Shunti	<i>Zingiber officinale Roscoe.</i>	Rhizome	500ml
5	Pushkaramula	<i>Inula racemose Hook.f</i>	Root	500ml

Quantity of water taken – 20 Liters

B. Authentication of the raw drugs

The authentication of raw drugs was done at department of Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan.

C. Preparation of Panchatikta Kashaya Varti

Materials:

Vessels, Scale, Gas Stove, weighing machine, Measuring jar, Sieve, Tray, Beaker, Khalva Yantra, Storage bottles with lid.

Method:

The preparation of Panchatikta Kashaya Varti was done at the practical lab of Department of Rasashastra & Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan. The process involved the following steps:

1. Preparation of Panchatikta Kashaya
2. Modification of Kashaya into Ghana
3. Preparation of Varti

The process can be explained as follows:

1. Preparation of Panchatikta Kashaya

The drugs are individually powdered & 500 ml of each drugs was taken for the preparation of Panchatikta Kashaya.

Total of 2500ml of the drugs were soaked overnight in 20 Liters of potable water for better extraction of the contents. The following day, it was heated on LPG stove. The heating was over mild flame until the volume of water reduced to one-fourth of the initial quantity. The appropriate reduction was confirmed using a clean stainless-steel scale. After appropriate reduction, the flame was extinguished, and the Kashaya was filtered through a double-layered cloth and used for the preparation of Ghana. Temperature readings were noted at regular intervals.

2.Modification of Kashaya into Ghana

The Kashaya was further processed by further processed by heating in Mandagni to achieve Rasakriya (semi-solid consistency), after which it was allowed to cool. Subsequently, the Ghana was transferred to a clean crucible and placed in a hot air oven set at 60°C to dry. Upon removal from the hot air oven, it had acquired a thin film-like consistency. The film was then powdered using a mortar and pestle. The resulting dark brown powder was stored in airtight glass vessels for further processing.

3.Preparation of Varti

The above obtained powder was sieved through No. 80 sieve to get fine powder.

Appropriate quantity of cocoa butter was melted at 34°C to get 30% of total quantity of finely powdered drugs. The melted cocoa butter and finely powdered drugs were made into homogenous mixture in a mortar and pestle, and Varti of 1.9 gm weight and 5cm of length were prepared by hand-rolling method. The Varti were then set aside for drying and preservation.

Analytical study

Organoleptic characters

Organoleptic characters of the test sample were documented by means of examination using sensory organs.

Physico chemical parameters

The study was carried out according to standard analytical parameters prescribed by CCRAS [4]. The prepared Varti samples were assessed using the following analytical parameters: pH, disintegration time, uniformity of weight, loss on drying, alcohol soluble extractive, water soluble extractive, friability, hardness, acid insoluble ash, and total ash.

Phytochemical analysis of Panchatikta Kashaya Varti [5]

Phytochemical analysis of Panchatikta Kashaya Varti was conducted using both alcoholic and aqueous extracts to identify the various constituents present.

OBSERVATIONS AND RESULTS

Pharmaceutical study

Table 2: The observations recorded during the preparation of Kashayam

Time	Changes observed	Temperature
9.30 am	Kantakari, Kiratatikta, Guduchi were floating	46°C
10.03 am	Water become warm & Froth began to appear	58°C
10.28 am	Froth increased	64.5°C
10.45 am	Froth, Aroma of Guduchi and Shunti appreciated	69.1°C
11.30 am	Tikta Rasa on vapours observed	72.4°C
11.44am	Boiling started, colour changed to light brown	78°C
12.47pm	Drugs soaked in the water completely	76.2°C
2.30pm	Volume reduced to 5.5 cm; colour changed to dark brown	71.9°C
3.45pm	4.5 cm reduced in volume; froth decreased	70°C
4.15pm	Kashaya thicker in consistency. Switched off Agni.	-

The colour of the Kashaya was dark brownish in colour. There was a layer of Kashaya found sticking at the edge of the vessel. The residue obtained after filtering of the Kashaya was discarded. It was viscous in nature. Taste was Tikta, Kashaya. Total quantity of water taken was 20 Liters and the process of Kashaya preparation took 6.45 hrs. The final product obtained was 5.200 Liters. 200 ml was taken for further analysis of Kashaya.

Modification of Kashaya into Ghana and then to dry power

During the Ghana preparation process, it was observed that the colour of Kashaya changed from dark brown to black as it became semi-solid. Initially, there was significant froth, which gradually reduced over time. Paka continued until it reached the Ghana stage, taking around 6 hours to complete. Towards the end of Paka, the drugs exhibited a sticky nature. The obtained Churna was dark brown in colour.

Table 3: Preparation of dry Panchatikta Kashaya Ghana

Parameters	Observations
Quantity of Kashaya	5 litres
Time taken for total evaporation	6 hours
Temperature of heat given	60-70°C
Total weight of Ghana obtained	316g
Total weight of Ghana obtained after drying	227g
Loss of weight after drying	89g
Temperature kept during drying (hot air oven)	60°C
Total duration for drying	4 hours

Preparation of Varti with cocoa butter

The above obtained powder was sieved through an 85mesh sieve to achieve a fine consistency. During the melting of cocoa butter, a good aroma like chocolate was noted. A total of 68.1 grams of melted cocoa

butter was added to the drugs and moulded into Varti weighing 1.9 grams and 5cm length each by hand-rolling method. Kept for drying under shade and preserved in an air tight glass container.

Analytical study

Table 4: Observations of organoleptic characters of Panchatikta Kashaya Varti

Organoleptic characters	Observations
Colour	Black
Appearance	Wick shape (Elongated with tapering ends)
Odour	Chocolate fragrance
Texture	Smooth
Taste	Tikta

Table 5: Results of physical & chemical parameters for Panchatikta Kashaya

Parameters	Panchatikta Kashaya
Specific gravity	1
pH	5.8
Refractive index	1.343
Viscosity	40.99 cP
TSS	2.8

Table 6: Results of physical & chemical parameters for Panchatikta Kashaya Varti

Parameters	Panchatikta Kashaya Varti
Disintegration time	17.42 minutes
Uniformity of weight	15.45% relative standard
Loss on drying	18.2%
Alcohol soluble extractive	24%
Water soluble extractive	48%
pH	6
Friability	1.04%
Hardness	4 kg
Acid insoluble Ash	2%
Total ash	11%

Table 7: Phytochemical analysis of Panchatikta Kashaya Varti

S. No	Phytochemical constituents	Test done for identification	Results
1	Alkaloids	Mayer's test	-
		Wagner's	
		Dragandroff's test	
2	Steroids	Salkowaski test	-
3	Carbohydrates	Benedicts test	+
		Fehling's test	
4	Proteins	Biuret test	+
5	Glycosides	Borntranger's test	+
6	Flavonoids	Sulphuric acid test	+
7	Tannins	Lead acetate test	+
		Bromine water test	
8	Saponins	Foam test	+

DISCUSSION

The study aimed to evaluate the pharmaceutical properties of Panchatikta Kashaya Varti. Kashaya was prepared by boiling 500 ml (V/V) of coarse powders of Kiratikta, Kantakari, Guduchi, Shunti, and Pushkaramula in 20 liters of water, reducing it to 5 liters. Using coarse powder increased surface area, aiding in the complete

dissociation of active principles and easier filtration. Pushkaramula was difficult to pound due to its hardness. The drugs in Panchatikta Kashaya Varti have Madhyama hardness, so a 1:8 drug-to-water ratio was used and reduced to 1/4. It was boiled over mild heat to allow the active principles to dissociate in the water. This process

extracted the water-soluble active principles from the drugs.

Initially, drugs like Guduchi, Kantakari, and Kiratatikta floated but settled later after absorbing water. The aroma of Guduchi and Shunti was noticeable during boiling, likely due to their essential oils. Froth appeared during boiling because of the starchy content in Guduchi and Shunti. The Kashaya turned brown, may be due to the multiple constituents from the combined drugs.

Before preparing the Kashaya, the drugs were soaked overnight in a specified quantity of water. Soaking extended the contact time between the drugs and water, allowing some loosely bound constituents to dissolve through hydrolysis. The water turned light brown, indicating the presence of dissolved constituents.

The quantum of heat applied for the preparation of Kwatha was Mrudu Agni. Acharya Adhamalla commented on Sharangadhara opinion, stating that Mrudu Agni is needed for Samyak Virya Utkrishata [6]., meaning most alkaloids and other substances might deteriorate at high temperatures. The average temperature maintained for Kashaya preparation was 78°C. The Kashaya was filtered through a double-layered cloth and used for the preparation of Ghana.

The obtained Kashaya was boiled again and reduced to a semi-solid consistency, maintaining a medium temperature and

continuous stirring to evenly distribute heat and prevent charring. Initial froth formation was likely due to the starch content in Guduchi and Shunti. After the process, 316 g of Ghana was obtained, which was then dried to remove moisture, resulting in 227 g (71.8%) of churna. The weight loss after drying was 89 g (28.2%) due to moisture content loss.

Cocoa butter was chosen as the base for the Varti due to its ability to melt at body temperature, facilitating rapid release and absorption of the medicine. Its feasibility and availability made it a suitable fatty base for the study.

Panchatikta Kashaya Varti was black in colour with an ogive shape and a smooth surface. The Odor resembled chocolate due to the cocoa butter base. Panchatikta Kashaya Varti exhibited Tikta Rasa, as most ingredients in this formulation impart a bitter taste.

In physico-chemical analysis, both Panchatikta Kashaya and Panchatikta Kashaya Varti were analysed. The specific gravity of Panchatikta Kashaya was 1, indicating it has the same density as water. Specific gravity ensures consistency and uniformity. Variations in specific gravity can indicate formulation inconsistencies. The refractive index of 1.343, indicating how much it bends light serving as a quality control parameter to ensure consistency and uniform concentration of dissolved solids

and monitor the stability over time. Changes in the refractive index during storage could indicate degradation or contamination, signaling potential shelf-life issues. Viscosity of Panchatikta Kashaya was 40.99 cP indicates the specific thickness of the Kashaya and is used as a quality control parameter to ensure batch-to-batch uniformity. A TSS value of 2.8% indicates a significant herbal residues and particulate matter which reflect the effectiveness of the extraction process and the presence of active herbal components.

The pH values of 5.8 for Panchatikta Kashaya and 6 for Panchatikta Kashaya Varti balance acidity and alkalinity, minimizing drug decomposition and tissue irritation risks. This optimal pH ensures stability and efficacy during storage and administration. Friability, indicating the tendency to crumble under mechanical stress, reflects physical integrity and stability. A friability value of 1.04% suggests structural integrity, ensuring consistent dosing and effectiveness. Hardness measures resistance to deformation, with a value of 4 kg for Panchatikta Kashaya Varti, meeting requirements for proper disintegration and dissolution, ensuring the product's quality and efficacy. These value falls within an acceptable range, indicating the product meets quality standards and is suitable for use.

Total ash content of 11% in Panchatikta Kashaya Varti indicates the proportion of inorganic residues after incineration, consisting of minerals like calcium, magnesium, potassium, and silica. Acid-insoluble ash content of 2% represents residues remaining after acid treatment and incineration. Weight uniformity ensures each suppository has the correct dosage, crucial for effective treatment. The non-compliance of Panchatikta Kashaya Varti with the specified limit could be attributed to the hand-rolling method employed during preparation. Alcohol and water-soluble extractives were 24% and 48%, respectively, indicating higher solubility and bioavailability in water. This extractability reflects the concentration of soluble compounds, suggesting better absorption in an aqueous medium.

The disintegration time of 17.42 minutes for Panchatikta Kashaya Varti in distilled water at 37°C is significant as it provides insights into the formulation's performance and effectiveness particularly for treating conditions like pyrexia where prompt action is needed. Proper disintegration enhances patient compliance and comfort, as delays can prolong discomfort. Cocoa butter, used as the suppository base, dissolves quickly at rectal temperature, aiding appropriate disintegration. The loss on drying (LOD) value of 18.2% reflects moisture content, crucial for stability and shelf-life,

preventing microbial growth and degradation of active ingredients.

The Phytochemical tests done using water soluble and alcohol soluble extract of Panchatikta Kashaya Varti revealed the presence of carbohydrates, proteins, glycosides, saponins, and flavonoids.

In research studies, gingerol and shogaols, the two most active constituents of ginger-based preparations, have demonstrated antipyretic, anti-emetic, analgesic, and anti-inflammatory activities [7]. Flavonoids, known for their strong antipyretic and antioxidant properties, also have the ability to inhibit pain perception. Furthermore, flavonoids and related compounds inhibit arachidonic acid peroxidation, which reduces prostaglandin levels and consequently lowers fever [8].

CONCLUSION

In this study, an attempt was made to convert Panchatikta Kashaya into a modified form of Guda Varti and assess its Jwaraghna (antipyretic) effect based on analytical parameters, prepared according to the Cakradatta Jwara Chikitsa reference. The evaluation of Panchatikta Kashaya Varti through organoleptic, physicochemical, and phytochemical parameters provided preliminary standards, establishing a foundation for its quality and efficacy.

Key findings included a pH of 6, a disintegration time of 17.42 minutes, a loss

on drying of 18.2%, an alcohol-soluble extractive of 24%, and a hardness of 4 kg. Phytochemical analysis revealed the presence of carbohydrates, proteins, glycosides, saponins, flavonoids, and tannins, all of which are known to exhibit antipyretic effects. Based on these analytical parameters Panchatikta Kashaya Varti showed antipyretic effect. These findings suggest that further research and clinical studies are warranted to fully validate and standardize this traditional formulation.

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Kantakari



Pushkaramula



Guduchi



Kiratatikta



Kantakari (After pounding)



**Pushkaramula (After
pounding)**



Guduchi (After pounding)



**Kiratatikta (After
pounding)**



Shunti



Shunti (After pounding)



Drugs soaked in water



Boiling of Kwatha



Preparation of Ghana



Dried ghana



**Adding melted cocoa butter
to powderd ghana**



Varti of desired size

Figure 1: Method of preparation of Panchatikta Kashaya Varti