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PHARMACEUTICO-ANALYTICAL PROFILE OF A SUBSTANTIAL FORMULATION KANCHANAR GHANAVATI

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ABSTRACT

Ayurveda is a comprehensive life science system that not only focuses on treating illnesses but also emphasizes maintaining health and well-being. This ancient system comprises various branches, one of which is *Dravyaguna*, comparable to modern pharmacology, focusing on the properties, actions, and therapeutic benefits of medicinal plants. It integrates principles of both pharmacognosy and pharmacology. Another important branch is *Bhaishajya Kalpana*, which involves the systemic preparation of Ayurvedic medicines, aiming to improve palatability, shelf life, and therapeutic value. *Bauhinia variegata Linn.*, referred to as *Kanchanar* in classical texts, is a well-regarded plant in Ayurveda for managing glandular swellings and related conditions. *Kwatha Kalpana* – a decoction- based formulation – holds significant importance, though it presents challenges such as limited shelf life, bitter tastes, and inconvenience in preparation, storage, and transportation. To address these limitations without compromising therapeutic efficacy, *Kwatha Kalpana* is often converted into *Ghanavati* (solid tablet form). The present study focuses on developing a comprehensive pharmaceutico-analytical profile of *Kanchanar Ghanavati*, aiming to preserve the formulation's effectiveness while improving its practicality.

KEYWORDS: Kanchanar, Ghanavati, Kwatha Kalpana, Pharmaceutical evaluation, HPTLC

INTRODUCTION

Ayurveda, one of the world's oldest systems of medicine, holds a vast treasure of medicinal knowledge gathered through centuries of clinical experience and observation. This time-honoured science offers a diverse range of herbal remedies, rich in bioactive compounds, capable of managing a variety of health conditions. Among these, Kanchanar (*Bauhinia variegata Linn*.) holds a significant place in traditional Ayurvedic practice, especially for ailments affecting the neck region such as Galaganda, Gandamala and Apachi.[1]

Bauhinia variegata Linn., commonly known as Mountain Ebony or Camel's Foot Tree, belongs to the Fabaceae family. It is a fast-growing shrub or small tree, frequently planted along roadsides for shade and admired for its attractive blossoms, making it a popular choice in gardens as well. Classical Ayurvedic texts detail its properties, describing it as Grahi (absorbent), Krimighna (anti-parasitic), Kushthagna (useful in skin disorders), Gandamala nashaka (effective against glandular swellings), Vranaropaka (wound-healing),

Mehaghna (anti-diabetic), and Raktapittashamaka (useful in bleeding disorders).[2]

Modern research has extensively explored the phytochemical and pharmacological properties of this plant, revealing activities such as anti-diabetic, anti-ulcer, antioxidant, nephroprotective, anti-cancer, hepatoprotective, anti-inflammatory, immunomodulatory, anti-bacterial, and anti-microbial effects.

In present study, Kanchanar has been selected and processed into a formulation known as Kanchanar Ghana Vati. While there is no direct mention of this exact preparation in the classical texts, the concepts are derived from Kashaya Kalpana, with Ghana representing a concentrated extract form prepared by reducing a decoction (Kwatha) to a solid mass.

According to Bhavaprakash Nighantu, within the context of Kwatha Kalpana, Kanchanar is recommended for conditions such as Krimi, Kushtha, Gudabhramsha, Gandamala, and Vrana. The current research focuses on formulating Kanchanar Ghana Vati and performing its analytical evaluation.[3]

The concept of Rasakriya described in Sharangdhara Samhita, involves gently heating a liquid preparation until it reduces to semi-solid form, which is then referred to as Rasakriya, Ghanasara, Ghanasattva, or Ghanavati. This concentrated form, a modification of Kwatha Kalpana, is intended for internal therapeutic use. In this study, Vati Kalpana – solid, pill-like preparations – has been chosen for its practical benefits, including ease of storage, transport, and administration.

With these considerations, the objective of this study is to develop Kanchanar Ghana Vati for effective use in managing Hypothyroidism and to assess its pharmaceutical and analytical characteristics. The physico-chemical analysis conducted on Kanchanar Kashaya Ghanvati demonstrated that all parameters complied with API standards, confirming the formulation's quality, safety, and purity.

AIMS AND OBJECTIVES

1. To prepare *Kanchanar Ghanavati* from *Kanchanar Kwatha*.
2. To evaluate its pharmaceutico-analytical profile, including physico-chemical and HPTLC parameters.

MATERIALS AND METHODS

The present study was conducted in two principal phases:

1. **Pharmaceutical Study**:

a. Collection of Raw Materials:

* The barks of Kanchanar (*Bauhinia variegata Linn.*) were sourced from local herbal markets located in Vadodara, Gujarat.

b. Drug Identification and Authentication:

* The procured raw material underwent identification and verification at the Department of Dravyaguna at Parul Institute of Ayurveda. Experts authenticated the sample as Kanchanar (*Bauhinia variegata Linn.*) through macroscopic evaluation in accordance with the internal Standard Operating Procedure (SOP) and herbarium comparison. Further authenticated and certification were carried out by Biotrik Organization Private Limited, Midnapur, West Bengal. Once confirmed, the material was approved for the pharmaceutical process.

c. Preparation of Ghanavati:

* The preparation process for Kanchanar Ghanavati was executed at the GMP Certified – Parul Ayurved Pharmacy, Parul Institute of Ayurveda, Limda, Vadodara, Gujarat.

* The following steps were involved in the preparation of Ghanavati:

a. Preparation of Kanchanar Kwatha (decoction)

b. Preparation of Kanchanar Ghana

c. Preparation of Kanchanar Ghanavati (tablet form)

Preparation of Decoction (Kwatha):[4,5]

The dried bark of Kanchanar, procured from local markets, was thoroughly washed with tap water, shade-dried, and then coarsely powdered using a disintegrator. This coarse powder was combined with sixteen times its quantity of water and heated gently with occasional stirring, ensuring the vessel remained uncovered. The mixture was simmered until its volume reduced to one-eighth of the initial quantity. Once reduced, the decoction was filtered through a double-layered, clean cloth into a stainless-steel container, and the remaining residue was discarded.

Preparation of Ghana:[6,7]

The Kanchanar Kwatha prepared earlier served as the base for formulating Kanchanar Ghana.

The kwatha (decoction) was reheated on a mild flame with continuous, occasional stirring until it reached a semi-solid consistency. Then, the contents were indirectly heated on a water bath with constant stirring to avoid burning. Heating was stopped when most of the water evaporated.

The semi-solid mass, now a dark brown, sticky Ghana, was transferred to a stainless-steel plate and dried in a hot air oven at a controlled temperature of approximately 50°C until it achieved a pourable, semi-solid form.

Preparation of Pills (Ghanavati):

→The formulation of Vati (pills) from the prepared Ghana was carried out following classical Ayurvedic pharmaceutics protocols.

→The semi-solid Ghana was first transformed into granules by passing it through a 16-number sieve.

→These granules were then shaped into uniformly round Vatis and subsequently dried in a tray dryer for 10 to 12 hours, maintaining a controlled temperature between 50°C to 60°C.

→Once adequately dried, the pills were compressed to achieve a uniform weight of 500 mg each, using a single-punch tablet press.

→The finished Ghanavatis were stored in airtight containers, protected from light and moisture to preserve their quality and therapeutic properties.

d. Physico-chemical Analysis:

→The physico-chemical analysis of Kanchanar Ghanavati was conducted at Vasu Research Centre, Makarpura, Vadodara, Gujarat, India, following standardized procedures.

→The following parameters, explained in the result section, were followed as per the PLIM guidelines:

I.Organoleptic analysis (Tablet description, Diameter, Width).

II. Physicochemical parameters (Hardness, Average weight, Friability, Disintegration time, Water Soluble Extractive, Total ash).

III. HPTLC (High-Performance Thin-Layer Chromatography).

RESULTS

I. Pharmaceutical Study

Table No: 01 Pharmaceutical study observations

Kanchanar (KC) Kwatha Choorna Preparation	
Weight of kanchanar tree bark taken	30kg
Weight of KC kwatha choorna	29.830kg
Loss in gms	170gms
Kanchanar Kwatha Preparation	
Initial quantity of Kwatha churna taken (kg)	29.830kg
Total quantity of water taken(litres)	480 litres
Total time taken for Kwatha (hrs)	12-13hrs
Final quantity of Kwatha obtained (litres)	62.7 litres
Colour	Dark Brown
Kanchanar Ghana Preparation	
Total quantity of Kwatha obtained in litres	62.7 litres
Total quantity of KC Ghana obtained in kg without drying	15.3kg
Total time taken for drying	10 days
Total quantity of KC Ghana obtained in kg after drying	6.1kg
Kanchanar Ghanavati (KG) Preparation	
Quantity of KC Ghana	6.1kg
Final quantity of tablet obtained (kg)	5.8kg
Loss in residue in tablet making	300grams

II. Physio-chemical analysis of Kanchanar Ghanavati

a. Organoleptic Characteristics:

Table No: 02 Organoleptic Characteristics

Sl No:	Parameter	Features observed
1	Colour	Dark brown
2	Taste	Bitter
3	Shape	Round
4	Smell	characteristic
5	Touch	Rough, hard
6	Diameter	11.39mm
7	Width	6.94mm

b. Physico-chemical Analysis:

Table No: 03 Physico-chemical analysis

Sl No:	Parameters	Results
1.	Uniformity of Weight	654.6 mg
2.	Total ash value	9 %
3.	Water soluble extract	84.00 %
4.	Friability	0.82 %
5.	Hardness	4.9 kg/cm^2
6.	Disintegration time	17 min 54 sec

c. Phyto constituent Assay of Kanchanar Ghanavati

Table No: 04 Phyto constituent Assay of Kanchanar Ghanavati

Sl No:	Parameters	Kanchanar Ghanavati
1.	Alkaloid	+
2.	Glycoside	-
3.	Flavonoids	++
4.	Tannins	+++
5.	Saponins	-
6.	Steroids	-

7.	Triterpenoids	+
8.	Carbohydrates	+
9.	Protein	-
10.	Starch	-

d. HPTLC screening of Kanchanar Ghanavati:

It is one of the sophisticated instrumental techniques for qualitative and quantitative analysis of the herbs and herbal drugs. In the current research study, the quantification of the phytoconstituents has not been carried out.

Preparation of Test Solution (T):

The chromatographic techniques are detailed in the Materials & Methods section. We used a solvent system designed for HPTLC: Toluene (7): Ethyl acetate (2): Glacial acetic acid (1) for HPTLC studies. Preparation of Spray Reagent (Anisaldehyde-sulfuric acid reagent):

Details of HPTLC profile of all tracks at 254 nm.

Under the 254 nm wavelength - Track -1 of K.G.- 5 spots were detected and starts with respect to retardation factor 0.12, 0.44, 0.56, 0.73 and 0.79.

Details of HPTLC profile of all tracks at 366 nm.

Under the 366 nm wavelength - Track -1 of K.G.- 6 spots were detected and starts with respect to retardation factor 0.56, 0.60, 0.70, 0.73, 0.79 and 0.83.

Details of HPTLC profile of all tracks at 540 nm.

Under the 540 nm wavelength - Track -1 of K.G.- 6 spots were detected and starts with respect to retardation factor 0.12, 0.34, 0.44, 0.56, 0.73 and 0.79.

DISCUSSION

Kwatha Kalpana holds a significant position among the Panchavidha Kashaya Kalpana, recognized as one of the essential primary formulations in Ayurvedic pharmaceutics. Modifying the form of a drug while preserving its therapeutic efficacy is often necessary to enhance its shelf life, improve palatability, and simplify dosage administration. In this research work, the formulation of Ghanavati was adopted to address these limitations associated with liquid preparations.

Kanchanar (*Bauhinia variegata Linn.*) has long been acknowledged in classical Ayurvedic texts for its effectiveness in managing Granthi (nodular swellings) and related glandular disorders. Phytochemical screening of the plant confirmed the presence of valuable bioactive compounds such as tannins, alkaloids, flavonoids, triterpenoids, and carbohydrates, which contribute to its medicinal properties.

As part of the analytical study, the total ash content was determined to assess the presence of inorganic impurities, potential adulterants, or contaminants. A lower total ash value typically indicates minimal inorganic matter, including silica and extraneous material. In this study, Kanchanar Ghanavati exhibited a total ash content of 9% w/w, which is well within the acceptable limits specified by the Ayurvedic

Pharmacopoeia of India (API), where the maximum permissible value is 23%.

Overall, this research focused on the pharmaceutical preparation of Kanchanar Ghanavati and its subsequent physico-chemical evaluation, confirming that the formulation meets the required quality parameters for safety, purity, and therapeutic efficacy.

CONCLUSION

This research work was undertaken to develop a pharmaceutical preparation of Kanchanar Ghanavati and to carry out its comprehensive physico-chemical evaluation. In the present era, where the acceptability, shelf life, and ease of administration of medicinal product are of paramount importance, the adoption of modified dosage forms has become essential. With a commitment to preserving classical Ayurvedic principles, the formulation of Ghanavati was thoughtfully chosen for this study.

A fundamental aspect of any pharmaceutical research is the confirmation of the identity, purity, and quality of the raw materials being used. This crucial step was meticulously performed through proper identification and authentication processes. The preparation of Kanchanar Ghanavati was carried out in accordance with the established procedures documented in classical Ayurveda literature, adhering to standard operative protocols.

Subsequent to the preparation, the formulation was subjected to various analytical assessments, including phytochemical screening, organoleptic evaluation, Physico-chemical parameters, and HPTLC confirmed its safety, purity, and stability.

This study not only reinforces the potential Kanchanar Ghanavati as a modified dosage form but also lays a strong foundation for its future standardization and clinical validation. The findings serve as valuable baseline data for further pharmacological and therapeutic investigations, contributing to the evidence-based practice of Ayurvedic medicine in contemporary healthcare.

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