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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF BRAHMI GHRITA RASAYANA – AN AYURVEDIC HERBAL FORMULATION FOR VICHARCHIKA (ECZEMA)

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ABSTRACT

Background: *Brahmi Ghrita Rasayana* is traditionally indicated for managing all types of *Kushtha* (including *Vicharchika*) and psychological conditions such as *Unmada* and *Apasmara*, as described in the *Medha Ayushkamiya Rasayana Chikitsa Adhyaya* by *Acharya Sushruta*. However, no prior studies have investigated the efficacy of *Brahmi Ghrita Rasayana* in managing *Vicharchika* (eczema). To ensure the quality of herbal formulations, it is essential to conduct pharmacognostical and pharmaceutical analyses. **Methods:** *Brahmi Ghrita Rasayana* was analyzed using microscopic pharmacognostical evaluation and subjected to physicochemical tests, including loss on drying, acid-insoluble extract, specific gravity, saponification value, iodine value, and high-performance thin-layer chromatography (HPTLC). **Results:** Pharmacognostical analysis revealed distinct identifying features of the ingredients used in *Brahmi Ghrita Rasayana*. Physicochemical evaluation yielded the following results: loss on drying was 0.44% w/w, specific gravity was 0.91 w/w, acid value was 6.17 w/w, saponification value was 234 w/w, and iodine value was 27.27 w/w. HPTLC analysis detected four distinct spots at 254 nm and six spots at 366 nm. **Conclusion:** The pharmacognostical and physicochemical analyses demonstrated that the formulation adheres to standard quality parameters. These

findings provide a foundation for future research to establish the therapeutic efficacy of *Ghrita*-based formulations.

KEYWORDS: *Brahmi Ghrita Rasayana, Vicharchika,* Pharmacognosy, Pharmaceutical analysis.

INTRODUCTION

Brahmi Ghrita Rasayana is recommended by *Acharya Sushruta* in the *Medha Ayushkamiya Rasayana Chikitsa Adhyaya* for the treatment of various types of *Kushtha* (including *Vicharchika*) and psychological disorders such as *Unmada* and *Apasmara.*[1] Studies on its ingredients suggest that *Brahmi Ghrita Rasayana* exhibits pharmacological properties such as antidepressant, antistress, antioxidant, anti-inflammatory, immunomodulatory, and adaptogenic effects, making it a promising formulation for managing *Vicharchika* (eczema).[2]

Therapeutic Properties of *Ghrita*: *Ghrita* holds a unique position in *Ayurveda* due to its extensive medicinal applications. It is classified under *Ajasrik Rasayana,*[3] highlighting its importance as part of a daily diet and as a therapeutic agent in various disorders. Its *Yogavahi* property (enhancing the potency of formulations without altering the pharmacological actions of ingredients) broadens its therapeutic potential. With a melting point of 35°C (below body temperature) and an absorption rate of 96%—the highest among fats and oils—*Ghrita* demonstrates exceptional bioavailability. Additionally, its lower saturated fatty acid content (8%) improves digestibility. The lipophilic nature of *Ghrita* facilitates the transport and cellular delivery of active ingredients to cellular membranes, mitochondria, and nuclear membranes, enhancing therapeutic efficacy.

Need for standardization: For the safe and effective internal administration of herbal formulations, it is imperative to ensure they are free from adulteration and contain appropriate quantities of ingredients. However, identifying herbal drugs in dried or powdered form can be challenging. This necessitates the establishment of robust parameters for the standardization of herbal drugs.

Pharmacognostical and Physiochemical studies: Pharmacognostical studies are crucial for plant identification and standardization of herbal medicines, particularly in traditional systems like *Ayurveda*. Physiochemical analysis provides insights into the pharmacokinetics

and pharmacodynamics of the drug. These methods allow for the differentiation of authentic formulations from adulterants. Techniques like high-performance liquid chromatography (HPLC) and thin-layer chromatography (TLC) are widely employed for analyzing secondary metabolites in plant-based formulations.

Modern analytical approaches: The integration of modern analytical techniques into *Ayurvedic* research is essential for quality control of raw materials and finished products. This enhances the credibility of *Ayurvedic* formulations and supports their global acceptance. In this context, the current study aims to validate the authenticity of *Brahmi Ghrita Rasayana* through pharmacognostical and physiochemical evaluations, while also developing a comprehensive phytochemical and pharmacognostical profile for the formulation.

METHOD

Collection, Identification and Authentication of raw drugs

The raw materials used for the preparation of *Brahmi Ghrita Rasayana* were sourced from the pharmacy of the Institute of Teaching and Research in Ayurveda (ITRA), Jamnagar. The identification and authentication of these raw drugs were conducted in the pharmacognosy laboratory of the same institute. Details of the ingredients and the specific plant parts utilized in the formulation are presented in Table 1.

Table No. 1: Ingredients of *Brahmi Ghrita Rasayana.*

Drugs	Latin name	Family	Parts used	Proportion
Brahmi	*Bacopa Monnieri* Linn.	Scropularaceae	Whole Plant	16 Parts
Goghrita	Cow's Ghee	-	-	8 Parts
Vidanga	*Embelia Ribes* Burm. f.	Myrsinaceae	Seed	2 Parts
Vacha	*Acorus Calamus* Linn.	Araceae	Rhizome	1 Part
Guduchi	*Tinospora Cordifolia* Willd.	Menispermaceae	Stem	1 Part
Haritaki	*Terminalia Chebula* Retz.	Combretaceae	Fruit	2 Parts
Bibhitaki	*Terminalia Bellerica* Roxb.	Combretaceae	Fruit	2 Parts
Aamalaki	*Emblica Officinalis* Gaertn	Euphorbiaceae	Fruit	2 Parts

Preparation of *brahmi ghrita rasayana*

Brahmi Ghrita Rasayana was prepared by combining 16 parts of *Brahmi Swarasa* (juice) with 8 parts of *Goghrita* (cow's ghee), along with fine powders of *Vidanga* (2 parts), *Vacha* (1 part), *Guduchi* (1 part), and *Triphala* (6 parts). The mixture was heated until the

characteristic signs of *Sneha Siddhi*[4] (completion of ghee processing) were observed, indicating the formulation was ready. For oral administration, *Madhyama Paka Lakshanas* (moderate processing characteristics) were followed. Once the desired *Sneha Paka Siddha Lakshanas* (indicators of completion) were achieved, the formulation was allowed to cool. After complete cooling, the *Ghrita* was filtered, measured, and stored in sterile bottles under hygienic conditions.

Pharmacognostical study

The pharmacognostical study was divided in to organoleptic study and microscopic study of the finished product.

Organoleptic study: Organoleptic assessment was performed using the sensory organs, providing a rapid and simple method to confirm the identity of each drug. The raw materials and their powders were individually evaluated based on organoleptic properties such as color, odor, taste, and texture. The characteristics of the samples were analyzed at the Pharmacognosy laboratory, ITRA, Jamnagar, Gujarat, India.[5]

Microscopic study: The drug powders were subjected to microscopic examination. The powdered samples were dissolved in water, and both unstained and stained (with Phloroglucinol + HCl) microscopy was performed. Microphotographs of the samples were captured using a Carl Zeiss trinocular microscope to document the microscopic features.

Physico-chemical analysis[6]

Brahmi Ghrita Rasayana was analyzed using various standard physicochemical parameters as outlined in the Ayurvedic Pharmacopeia of India and CCRAS guidelines for *Ghrita* (*Sneha*) formulations. These parameters include loss on drying, specific gravity, acid value, saponification value, and iodine value.

High-Performance Thin-Layer Chromatography (HPTLC)[7]

HPTLC is an advanced analytical technique capable of separating and quantitatively analyzing multiple compounds, even from complex matrices. It is employed for identifying active constituents, detecting impurities, and performing quantitative analysis of active ingredients.

The principle of HPTLC is similar to that of thin-layer chromatography (TLC), relying on the adsorption phenomenon. In this method, one or more compounds are applied to a thin layer

of adsorbent material coated on a chromatographic plate. The solvent in the mobile phase moves through the plate via capillary action, opposing gravitational force. Compounds with higher affinity for the stationary phase travel more slowly, while those with less affinity move faster. This differential movement allows the separation of components based on their affinity for the stationary phase.

RESULTS

The primary objective of the study was to verify the authenticity of the raw materials used in the preparation of *Brahmi Ghrita Rasayana*. To achieve this, the coarse powder of the ingredients underwent organoleptic and microscopic evaluations to confirm their genuineness. Following the preparation of the formulation, a pharmacognostical evaluation was conducted.

Organoleptic evaluation

The organoleptic characteristics, including color, odor, and taste of *Brahmi Ghrita Rasayana*, were documented and are presented in Table 2.

Table 2: Organoleptic characters of *Brahmi Ghrita Rasayana.*

Sr. No.	Characters	Results
1	Colour	Reddish
2	Odour	Unpleasant
3	Test	*Tikta*
4	Touch	Smooth
5	Texture	Liquid

Microscopic evaluation

The diagnostic microscopic features observed included brown content and groups of spongy parenchyma in *Brahmi*, oleoresin content and scalariform vessels of *Vacha*, lignified stone cells, starch grains, and tannin content in *Vidanga*, lignified collenchyma, surface cork, pitted vessels, and simple starch with hilum and concentric lines in *Guduchi*, epicarp cells, pitted sclereids, and stone cells in *Haritaki*, stone cells and trichomes in *Bibhitaki*, as well as mesocarp cells and silica deposition in *Amalaki*.

Physio-chemical parameters

The physicochemical parameters, including loss on drying, specific gravity, acid value, saponification value, and iodine value, were found to be within the acceptable range. Detailed results are presented in Table 3.

Table 3: Physico-Chemical analysis of *Brahmi Ghrita Rasayana.*

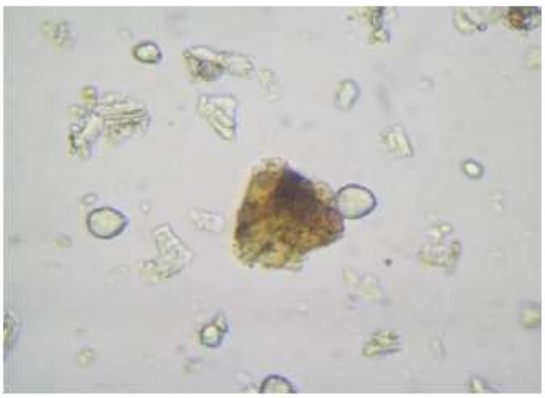
S. N.	Parameters	*Brahmi Ghrita Rasayana*
1	Loss on drying	0.44 % w/w
2	Acid value	6.1702 w/w
3	Specific gravity	0.9145 % w/w
4	Iodine value	27.275 w/w
5	Saponification value	234 w/w

High performance thin layer chromatography

Densitometric scanning of the HPTLC pattern revealed four distinct spots at Rf values of 1.2, 0.15, 2, and 0.25 under short-wave UV light (254 nm), and six spots at Rf values of 0.4, 0.05, 1.5, 0.18, 3.1, and 0.38 under long-wave UV light (366 nm) (Table 4). While it is not possible to identify specific chemical constituents based solely on the spots observed, the resulting pattern can serve as a reference standard for future quality control research.

Table 4: Rf Values of *Brahmi Ghrita Rasayana.*

Extract	Solvent system	Wave length	No of Spots	Maximum Rf value
Methanol extract	Toluene:ethyl acetate : Acetic acid (14 : 4: 2)	At 254 nm At 366 nm	4 6	1.2,0.15, 2,0.25 0.4,0.05, 1.5,0.187,3.1,0.387



A.Brown contant of *Brahmi*

B. Scalariform vessels of *Vacha*

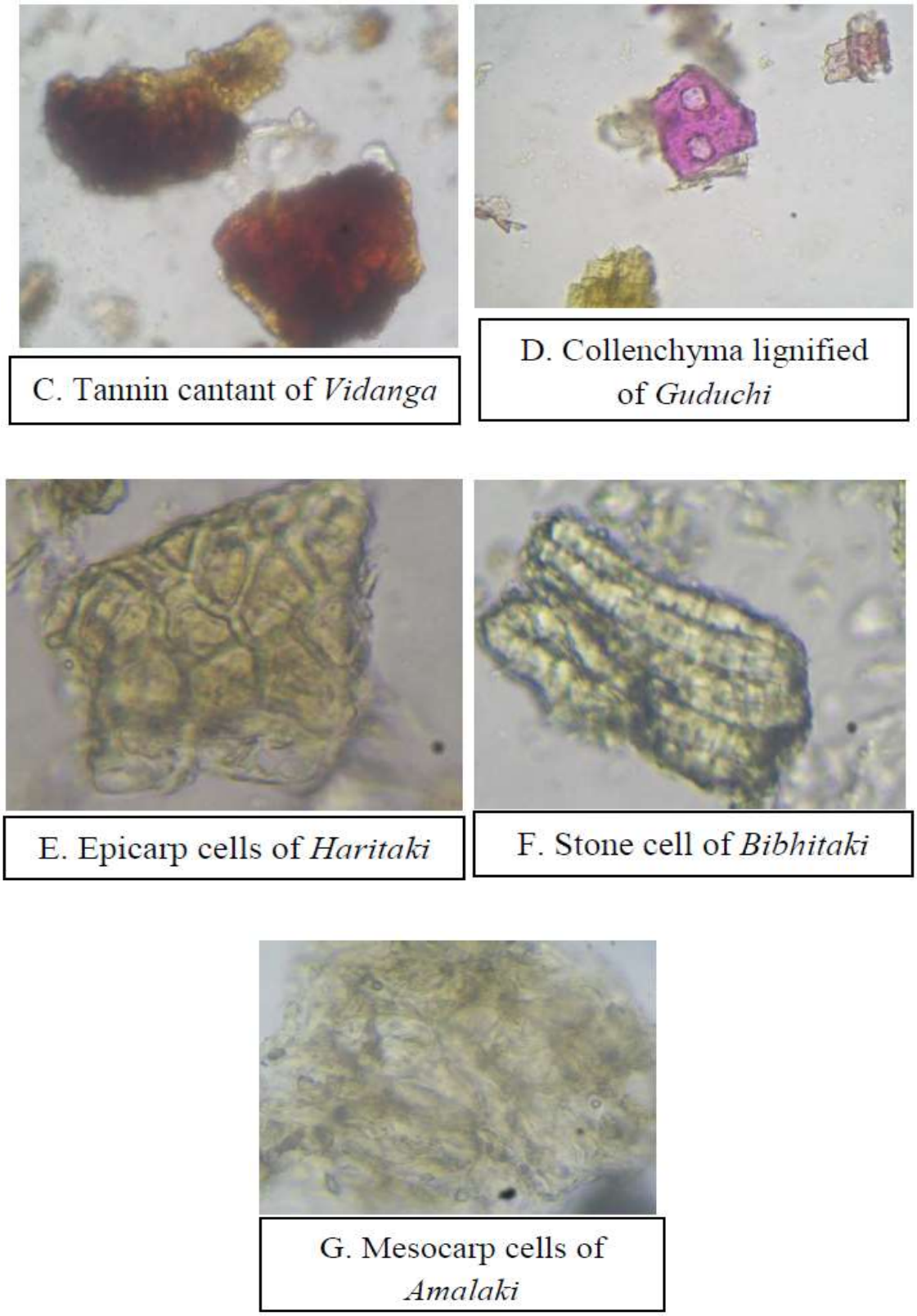


Fig. 1: Microscopic characters of *Brahmi Ghrita Rasayana.*

DISCUSSION

The study on *Brahmi Ghrita Rasayana* represents an important step toward the pharmacognostical and pharmaceutical standardization of the formulation. The

pharmacognostical analysis identified key diagnostic features of the ingredients used in *Brahmi Ghrita Rasayana*, including A) Brown content of *Brahmi* B) Scalariform vessels of *Vacha*, C) Tannin content of *Vidanga* D) Lignified collenchyma of *Guduchi* E) Epicarp cells of *Haritaki* F) Stone cells of *Bibhitaki* and G) Mesocarp cells of *Amlaki*. (Fig 1) These findings confirm the presence of all the raw drug ingredients in the final product, with no significant changes observed in the microscopic structure of the raw materials during the pharmaceutical preparation of the *Ghrita*, thus verifying the authenticity of the final product. The results also indicate that *Brahmi Ghrita Rasayana* is free from unwanted organic compounds and was produced under conditions that minimized contamination from dust or other solid matter. The physicochemical parameters, including loss on drying (0.44% w/w), specific gravity (0.91 w/w), acid value (6.17 w/w), saponification value (234 w/w), and iodine value (27.27 w/w), were found to be within normal reference ranges. In the HPTLC study, four spots were observed at 254 nm and six spots at 366 nm, which may correspond to the active constituents or matrix components responsible for the therapeutic effects of the formulation. This study successfully standardized the quality of *Brahmi Ghrita Rasayana*.

CONCLUSION

The pharmacognostical and physicochemical analyses of *Brahmi Ghrita Rasayana* confirm the purity and authenticity of the formulation. In the absence of a standard fingerprint for this product, the study has provided a comprehensive pharmacognostical and physicochemical profile, which can serve as a reference standard for future quality control research and further studies in this field.

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