Pharmaceutical Standardization

Analytical profile of Brahmi Ghrita: A polyherbal Ayurvedic formulation

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Introduction

Brahmi being a Medhya drug is recommended for various psychosomatic and psychiatric disorders. Most of the formulations acting on psyche are ghee based. It is well established that, the drugs to have its action on brain should have the capacity to cross the blood–brain barrier and for that purpose ghee is the best drug vehicle. Brahmi Ghrita is recommended for the management of Unmada (Insanity), Alakshmi (Inauspicious), Apasmara (Epilepsy), Papavikaras (Diseases due to sinful acts), Vacha, Kushtha, Shankhapushpi through pharmacognostical and physico-chemical studies.

Aims and objectives

1) Pharmacognostical study of individual components of Brahmi Ghrita.
2) Physico-chemical analysis of Brahmi Ghrita.

Materials and Methods

Collection and authentication of raw drugs

Whole plant of Brahmi (Bacopa monnieri (L.) Pennel) was collected from Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore in the month of December 2011. Other ingredients of Brahmi Ghrita[Table 1] were procured from Pharmacy, Gujarat Ayurved University. All these were identified and authenticated in Pharmacognosy Laboratory, IPGT and RA, Gujarat Ayurved University, Jamnagar, Gujarat, India.

Method of preparation of Brahmi Ghrita

Brahmi Swarasa was extracted by exerting mechanical pressure on fresh Brahmi. In a large vessel Go-Ghrita was poured, when it liquefies under moderate flame, Kalka of Vacha, Kushtha, Shankhapushpi made in Brahmi Swarasa was added, followed by

Abstract

Brahmi Ghrita, a polyherbal Ayurvedic formulation is recommended in the management of various psychological disorders like Unmada, Apasmsara and Graharogas. The present study deals with the pharmacognostical identification of ingredients of Brahmi Ghrita and its physico-chemical analysis. Pharmacognostical study containing both macroscopic and powder microscopy of raw drug revealed the quality and genuineness of all the constituents of Brahmi Ghrita. Organoleptic features of coarse powder made out of the crude drugs were within the standards prescribed. Acid value was 0.16075, saponification value 184.17, Refractive Index value 1.467 at room temperature, iodine value 26.715, Specific gravity at room temperature was 0.9133. HPTLC was carried out after organizing appropriate solvent system in which maximum 9 spots were distinguished and most of the Rf values were identical in alcoholic extract which shows the presence of certain definite constituents in Brahmi Ghrita.

Key words: Brahmi Ghrita, HPTLC, pharmacognosy, physico-chemical analysis
addition of Brahmi Swarasa. To get final product, the contents were subjected to heat till up to Sneha Siddhi Lakshanas were observed.[8]

Pharmacognostical evaluation of ingredients of Brahmi Ghrita

Organoleptic study
Individual powders were subjected for various sensory characters like color, taste odor, etc., and were carefully noted down.[9]

Powder microscopy
The powders of respective parts of [Table 1] Brahmi, Vacha, Kushtha, Shankhapushpi were studied separately with and without staining. The microphotographs were taken under Corlzeiss binocular microscope attached with camera.[10,11]

Physico-chemical study
Brahmi Ghrita was analyzed using various standard physicochemical parameters such as Acid value, saponification value, Refractive Index value, iodine value, specific gravity. High Performance Thin Layer Chromatography (HPTLC) was carried out after making appropriate solvent system with methanolic extract of Brahmi Ghrita[12] at Pharmaceutical chemistry laboratory, IPGT and RA, Jamnagar.

Preparation of sample solution
The Ghrita sample was adsorbed on silica gel. The mixture was extracted with hexane. Hexane fraction was discarded. The material was extracted with methanol. Process was repeated for 3 times. The methanol layer was collected, filtered, and evaporated off. The dried material was again dissolved in methanol and used for Thin Layer Chromatography (TLC) identification.

Chromatographic conditions
1) Stationary phase: Silica gel GF254(E. Merck) precoated TLC plates
2) Mobile phase: Dichloromethane: methanol: water (4.5:1.0:0.1 v/v/v)
3) Sample volume: 5 μl
4) Sample for HPTLC: Methanol extract of Brahmi Ghrita
5) Spray reagent: Vaniline-sulfuric acid

Instrumental conditions
Camag HPTLC instrument catalog No 0276481(Switzerland) was used for experiment
Application mode: Camag Linomat V
Development chamber: Camag twin trough chamber.
Plates: Precoated silica gel GF254 plates.
Chamber saturation: 30 min.
Development time: 30 min.
Development distance: 7 cm.
Scanner: Camag scanner III.
Detection: Deuterium lamp, Tungsten lamp
Data System: Win cats software

Procedure
Before spotting, the plates were prewashed with methanol. Sample solutions were applied to the plates as sharp bands by means of Camag Linomat V sample applicator. The spots were dried in a current of air. The mobile phase (20 ml) was poured into a twin trough glass chamber whole assembly was left to equilibrate for 30 min and the plate was placed in the chamber. The plate was then developed until the solvent front had travelled at a distance of 80 mm above the base of plate. The plate was then removed from chamber and dried in a current of air. Detection and quantification was performed with Camag TLC scanner 3 at a wavelength of 254 and 366 nm.

Observations and Results
Pharmacognostical analysis
Organoleptic characters were noted down and are depicted in Table 2.

Microscopic characters: Powder microscopy of Brahmi Ghrita ingredients was studied and microphotographs were placed at respective figures.

Table 1: Ingredients of Brahmi Ghrita

| Name             | Botanical name                  | Part used     | Form   | Part |
|------------------|--------------------------------|---------------|--------|------|
| Brahmi           | Bacopa monnieri (L.)Pennel       | Whole plant   | Juice  | 4 l  |
| Vacha            | Acorus calamus Linn.            | Rhizome       | Powder | 85 g |
| Kushtha          | Saussurea lappa C.B.Clarke      | Root          | Powder | 85 g |
| Shankhapushpi    | Convolvulus pluricaulis Choisy  | Whole plant   | Powder | 85 g |
| Go-Ghrita (cow’s ghee) | -                               | -             | -      | 1 Kg |

Table 2: Organoleptic characters of ingredients of Brahmi Ghrita

| Observation | Kushtha          | Shankhapushpi   | Brahmi       | Vacha           |
|-------------|------------------|-----------------|--------------|-----------------|
| Color       | Dark brown       | Grayish brown   | Greenish grey| Creamish        |
| Odor        | astringent       | Characteristic  | Pungent      | Aromatic        |
| Taste       | Bitter astringent| Slight astringent| Astringent-Bitter | Bitter ends in sweet |
Brahmi: Prismatic crystals, fiber, fragments of annular vessels, stomata, fragments of pallside parenchyma, tannin contents, and fragments of pitted vessels [Figure 2a–d].

Vacha: Tannin, simple starch grains, oleoresins, parenchyma cells with starch grains, fiber with lumen, fragments of annular and pitted vessels [Figure 3a–d].

Shankhapushpi: Simple unicellular trichome, stellate trichome, prismatic crystals, fragments of spiral vessels, lignified fibers, stomata, fragments of pitted vessels, tannin, starch grains in group [Figure 4a–d].

**Physico-chemical analysis**

*Brahmi Ghrita* was analyzed using various standard physico-chemical parameters such as acid value, saponification value, RI value, iodine value, specific gravity at room temperature, and rancidity test.

| Test                              | Result  |
|----------------------------------|---------|
| Acid value                       | 0.16075 |
| Saponification value             | 184.17  |
| RI value                         | 1.467   |
| Iodine value                     | 26.715  |
| Specific gravity at room temperature | 0.9133  |
| Rancidity test                   | Negative|

**Table 3: Physicochemical parameters**

*Brahmi Ghrita* was analyzed using various standard physico-chemical parameters such as acid value, saponification value, RI value, iodine value, specific gravity at room temperature, and rancidity test.

| Test                              | Result  |
|----------------------------------|---------|
| Acid value                       | 0.16075 |
| Saponification value             | 184.17  |
| RI value                         | 1.467   |
| Iodine value                     | 26.715  |
| Specific gravity at room temperature | 0.9133  |
| Rancidity test                   | Negative|

**Figure 1:** Powder microscopy of *Brahmi Ghrita* ingredients Kushtha (a) Prismatic crystals (b) Tannin (c) Annular vessels (d) Pitted vessels

**Figure 2:** *Brahmi* (a) Prismatic crystals (b) Fragments of annular vessels (c) Stomata (d) Fragments of pitted vessels

**Figure 3:** *Vacha* (a) Oleoresins (b) Parenchyma cells with starch grains (c) Fiber with lumen (d) Fragments of annular and pitted vessels

**Figure 4:** *Shankhapushpi* (a) Stellate trichome, (b) Prismatic crystals (c) Stomata (d) Fragments of pitted vessels
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On analyzing under densitometer at 254 nm, the chromatogram showed 9 peaks, while at 366 nm the chromatogram showed 6 peaks. And after spray the chromatogram showed 8 peaks. [Table 4], [Figure 5a–c]. Three dimensional (3d) densitogram at 254 nm shows comparative Rf value of sample with standard [Figure 6a–c].

**Discussion**

Pharmacognostical study reveals authentication of individual raw drugs of Brahmi Ghrita and is cross verified.[3-6] The oleoresins, pitted vessels, tannin, prismatic crystals, stomata, fiber are observed in ingredients. All the physico-chemical parameters, acid value, saponification value, RI value, iodine value, specific gravity analyzed were within the normal reference range.[13] In HPTLC one spot was detected at Rf value 0.78, which indicates presence of Bacoside in Brahmi Ghrita.[14] All the results show that the prepared Ghrita formulation is not rancid (after 10 months of preparation) and the quality of the Ghrita is standard.

**Conclusion**

Pharmacognostical study findings confirm the ingredients present in the Brahmi Ghrita. Identified phytochemical components like bacoside support the intended action of the formulation. Under densitometer at 254 nm 9 peaks and under 366 nm 6 peaks were found and after spray, 8 peaks were found. It is inferred that the formulation meets maximum qualitative standards. The results of this study may be used as the reference standard in further research undertakings of its kind.

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Hindi Saransh

ब्राह्मीघूट के घटकों का द्रव्यपरिचय एवं रासायनिक विश्लेषण

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प्रस्तुत अध्ययन में ब्राह्मीघूट के घटकों का द्रव्य परिचय एवं रासायनिक विश्लेषण किया गया है। द्रव्यपरिचयात्मक अध्ययन, ब्राह्मीघूट के घटकों के स्थूल स्तरीय एवं चूर्ण के सूक्ष्मदर्शीय अध्ययन द्वारा उनकी गुणवत्ता एवं शुद्धता को दर्शाता है। सभी घटक द्रव्यों के परिचयात्मक नाम, अक्षरों लक्षण सामान्य परिवहन अन्तर्गत पाये गए। ऑक्शनयनतन्त्र तैयार करने के बाद HPTLC किया गया, जिसमें अधिकतम 9 बिंदु पाए गए। अखलविश्लेषण तत्त्व का रामन अधिकारशाल एक समान पाया गया, जो कि ब्राह्मीघूट में निश्चित तीर पर कुछ प्रभावशाली तत्त्वों की उपस्थिति को सिद्ध करता है।