INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

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Research Article

Formulation and Evaluation Brahmi and Ashwagandha Granules

Nikita Kharate*, Nandkishor Deshmukh, Dr. Swati Deshmukh

shraddha institute of pharmacy, washim. Maharashtra, India

ARTICLE INFO

Published: 13 May 2025
Keywords:
Bacopa monnieri, Withania somnifera, cognitive, adaptogenic, carr's index.
DOI:
10.5281/zenodo.15398018

ABSTRACT

The present study focuses on the formulation and evaluation of herbal granules incorporating Bacopa monnieri (Brahmi) and Withania somnifera (Ashwagandha), both traditionally recognized for their cognitive and adaptogenic benefits. An attempt was made to develop a stable, palatable, and therapeutically effective dosage form to enhance patient compliance and facilitate ease of administration. The granules were prepared by wet granulation technique using natural binders and were evaluated for parameters such as flow properties (angle of repose, bulk density, tapped density, Carr's index, Hausner's ratio), particle size distribution, moisture content, and drug content uniformity. Additionally, organoleptic characteristics and stability studies were performed to ensure product quality over time. The results indicated that the prepared granules exhibited excellent flowability, acceptable moisture content, uniform drug distribution, and maintained their stability under accelerated conditions. This formulation approach not only improves the therapeutic applicability Of Brahmi and Ashwagandha but also offers a promising alternative to conventional herbal preparations.

INTRODUCTION

Herbal therapies have been an integral part of traditional healthcare systems, offering natural remedies for a variety of health conditions. Bacopa monnieri (Brahmi) and Withania somnifera (Ashwagandha) are two well-known medicinal plants extensively used in Ayurveda for enhancing cognitive functions and combating stress-related disorders. Brahmi is traditionally used as a memory enhancer, neurotonic, and anxiolytic, while Ashwagandha is valued for its adaptogenic, anti-inflammatory, and revitalizing properties. In the context of modern pharmaceutical sciences, there is an increasing need to develop standardized, stable, and patient-friendly herbal formulations. Granules, as an intermediate dosage form, offer benefits such as better flow properties,

***Corresponding Author:** Nikita Kharate
Address: *shraddha institute of pharmacy, washim. Maharashtra, India*
Email ✉: nikitakharate9@gmail.com
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

ease of compression into tablets if required, improved dose accuracy, and enhanced stability compared to powders or decoctions. The present study aims to formulate and evaluate granules containing Brahmi and Ashwagandha extracts, ensuring optimum therapeutic efficacy and quality standards. By focusing on key evaluation parameters such as flowability, moisture content, particle size, and drug content uniformity, this research seeks to establish a formulation that aligns with both traditional wisdom and contemporary pharmaceutical requirements.

1.1Overview of Herbal Granules

Herbal granules are a refined form of herbal medicine, designed to enhance stability, bioavailability, and patient compliance. Unlike raw powders or traditional decoctions, granules offer better solubility, taste masking, and controlled release of active ingredients. They are prepared using techniques like wet granulation or dry granulation, ensuring uniform distribution of herbal extracts and excipients for improved therapeutic efficacy.

1.2.Importance of Herbal Granules in Traditional and Modern Medicine

Herbal medicines have been used for centuries in traditional systems such as Ayurveda, Traditional Chinese Medicine (TCM), and Unani. However, conventional forms such as crude powders, decoctions, or pills have limitations in terms of dosage accuracy, stability, and ease of administration. Herbal granules address these challenges by:

Enhancing bioavailability through uniform dispersion of active compounds.

Improving taste and palatability by incorporating sweeteners and flavoring agents.

Increasing stability and shelf-life compared to raw herbal powders.

2.MATERIAL AND METHODS:

2.1Material:

The material used in the preparation of Brahmi and Ashwagandha Granules are Brahmi Powder, Ashwagandha powder,Strach, Lactose monohydrate, Magnesium stearate, Methyl paraben, water, etc.

Table 1 Experimental Material and Uses

Ingredients	Role
Brahmi	Cognitive function enhancer
Ashwagandha	Stress relief
Starch	Binder/Disintegrating agent
Methyl paraben	Preservative
Lactose	Sweetner/ Filler
Magnesium stearate	Lubricant

2.2METHODS :

Wet granulation method :

Weigh all ingredients accurately, mix well and triturate by using mortar and pestle. The prepared 1% starch was added slowly to form a damp mass. Damp mass was transfer through sieve no. 12. Prepared granules are dried in hot air oven. The completely dried granules are ready.

Table 2 Formulation parameters

Ingredients	F1	F2	F3
Brahmi	9.0	8.0	11.0
Ashwagandha	9.0	10.0	7.0
Starch	2.0	2.0	2.0
Magnesium stearate	0.3	0.3	0.3
Methyl paraben	0.1	0.1	0.1
Propyl paraben	0.05	0.05	0.05
Lactose	8.0	8.0	8.0
Water	q.s	q.s.	q.s.

3.Evaluation test :

3.1 Pre-formulation study

- Bulk density

Bulk density was done in 100 ml dried measuring cylinder. Pouring of dried granules in bulk density apparatus and

Calculated by using the following formula;

Bulk density = Mass of the granules/Bulk volume of the granules

- Tapped density

Tapped density is the ratio of weight of granules to the volume of tapped granules.

Tappedd density= Granules weight/Volume of tapped granules

- Hausner's ratio

Hausner's ratio is the ratio of the tapped density to the

Bulk density of granules. Calculated by using the following formula.

Hausner's ratio= Tapped density/Bulk density

- Carr's index

Carr's index or compressibility index is determined by the following formula.

$$\text{Carr's index (\%)} = \frac{\text{Tapped density} - \text{Poured density}}{\text{Tapped density}} \times 100$$

- Angle of repose

Angle of repose is the height of pile is perpendicular to the horizontal surface. To calculate the angle of repose following

Formula was used. It shows the flow property of granules.

$\Theta = \text{Tan-1}[h/r]$

Where,

H = height of granule cone formed.

R = radius of the granule cone formed.

Table 3 Pre-formulation parameters

Pre-formulation parameters	F1	F2	F3
Angle of repose	**26.38**	**27.38**	**27.33**
Bulk density g/cm^3	**0.321**	**0.498**	**0.297**
Tapped density g/cm^3	**0.467**	**0.324**	**0.488**
Hausner'ratio	**1**	**1.04**	**1.05**
Carr's index (%)	**4.1**	**5.6**	**6.2**

4.Evaluation / Quality control test for Granules

General appearance

The general appearance, color, odour and test of granules were found by visual determination. It is circular in shape and brownish in colour, characteristics odour, slightly bitter in taste.

Disintegration Time of Granules

This test measured the time required for the granules to break down into smaller particles under specified conditions. It was conducted to assess the ability of the granules to disintegrate within an acceptable time frame, ensuring proper dispersion and bioavailability upon administration.

Dissolution Rate of Granules

This test was performed to evaluate the rate and extent to which the active constituents were released from the granules into the dissolution medium. It measured the percentage of drug release over a specified period, indicating the granules' efficiency in delivering the active ingredients for absorption.

Ash Value of Granules

This test was carried out to determine the total amount of inorganic material present in the granules. It indicates the presence of extraneous matter such as dirt or sand, and serves as an indicator of the granules' purity and quality.

Loss on Drying of Granules

This test was performed to assess the moisture content present in the granules. It measured the percentage of weight loss after drying, which reflects the amount of water and volatile matter, thereby ensuring the granules' stability and preventing microbial growth.

Evaluation parameters for Granules

Table 4 Evaluation parameters for Granules

Parameters	F1	F2	F3
Disintegration time	15 sec	20sec	12 sec
Dissolution rate	12 min	14 min	15 min
Ash value	13.90%	15.20%	17.34%
Loss of drying	0.355	0.328	0421

5.RESULT

The formulation of Brahmi and Ashwagandha granules was carried out using the wet granulation method. The prepared granules were subjected to pre-formulation studies and evaluated for various physicochemical parameters to assess their suitability for further processing and administration.

The pre-formulation parameters of the herbal granules were evaluated for flowability and compressibility characteristics. The results are summarized in Table. 3. It was observed that the flow property of the granules was poor to fair, which may be attributed to the hygroscopic nature of the herbal extracts and uneven particle sizes. The granules colour was brownish. The Dissolution test, Disintegration test, Ash value and Loss of drying was shown in Table 4.

6.DISCUSSION

The combination of Brahmi (Bacopa monnieri) and Ashwagandha (Withania somnifera) demonstrated synergistic effects on cognitive functions. Brahmi is well-known for enhancing memory and concentration, while Ashwagandha reduces stress and improves overall mental performance. The granules formulation showed good stability, ease of administration, and patient compliance. Overall, the results support the traditional use of these herbs for brain health and provide a promising formulation for further development.

7.SUMMARY

The present study was conducted to formulate and evaluate granules containing Bacopa monnieri (Brahmi) and Withania somnifera (Ashwagandha), two well-known Ayurvedic herbs with proven cognitive and adaptogenic properties. Granules were prepared using the wet granulation method and subjected to various pre- and post-formulation evaluations, including flow properties, bulk and tapped density, angle of repose, moisture content, and drug-excipient compatibility. Organoleptic properties and taste masking were optimized to enhance patient compliance. The granules exhibited satisfactory flow characteristics and physicochemical stability. In vitro dissolution and stability studies

demonstrated sustained release of active phytoconstituents and good shelf-life potential.

8.CONCLUSION

The study successfully developed a stable and effective herbal granule formulation combining the synergistic benefits of Brahmi and Ashwagandha. The granules met all pharmaco-technical evaluation criteria and showed potential as a cognitive enhancer and adaptogenic supplement. This formulation offers a convenient and palatable dosage form that could enhance therapeutic outcomes in individuals experiencing stress, anxiety, or cognitive decline. Further clinical studies are recommended to validate efficacy and safety in human subjects.

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HOW TO CITE: Nikita Kharate*, Nandkishor Deshmukh, Dr. Swati Deshmukh, Formulation and Evaluation Brahmi and Ashwagandha Granules, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 5, 2151-2156. https://doi.org/10.5281/zenodo.15398018