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Original Article

Formulation And Evaluation Of A Polyherbal Nutraceutical Powder For Stress Management

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ABSTRACT

Stress is a common physiological and psychological condition that can negatively impact health and well-being. Herbal nutraceuticals offer a natural and safe approach for stress management due to their adaptogenic and neuroprotective properties. The present study aimed to formulate and evaluate a polyherbal nutraceutical powder containing Ashwagandha (*Withania somnifera*), Brahmi (*Bacopa monnieri*), Jatamansi (*Nardostachys jatamansi*), and Shankhpushpi (*Convolvulus prostratus*). The formulation was prepared using the geometric dilution method with lactose and magnesium stearate as excipients. Evaluation included organoleptic properties, pH, moisture content, ash value, and phytochemical screening. The powder showed satisfactory characteristics with a light brown color, aromatic odor, bitter taste, smooth texture, pH of 6.86, moisture content of 6.57%, and ash value of 14%. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, tannins, saponins, carbohydrates, and proteins. The results indicate that the formulated polyherbal nutraceutical powder is stable and may serve as a promising natural supplement for stress management and mental wellness.

Keywords: Polyherbal Nutraceutical, Stress Management, Ashwagandha, Brahmi, Jatamansi, Shankhpushpi, Adaptogen, Phytochemical Evaluation.

INTRODUCTION

Stress is a common physiological and psychological response to challenges that can adversely affect physical and mental health. Prolonged stress has been associated with anxiety, depression, cognitive impairment, weakened immunity, hypertension, diabetes, and other chronic disorders. Although short-term stress may help the body adapt to demanding situations, chronic stress can significantly reduce overall well-being and quality of life. [1]

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease. Ayurveda, the traditional Indian system of medicine, similarly emphasizes the maintenance of physical, mental, and spiritual balance for achieving optimal health. [2]

Herbal medicines have been used for centuries to manage stress and promote mental wellness. Ayurvedic herbs such as Ashwagandha (*Withania somnifera*), Brahmi (*Bacopa monnieri*), Jatamansi (*Nardostachys jatamansi*), and Shankhpushpi (*Convolvulus prostratus*) are well known for their adaptogenic, anxiolytic, neuroprotective, and cognitive-enhancing properties. These herbs help the body cope with stress, improve memory and concentration, and support emotional stability. [3,4]

Therefore, the present study focuses on the formulation and evaluation of a polyherbal nutraceutical powder containing these medicinal herbs as a natural approach for stress management and the promotion of mental well-being.

MATERIALS AND METHODS

Materials

The herbal ingredients used in the formulation were Ashwagandha (*Withania somnifera*) root powder, Brahmi (*Bacopa monnieri*) powder, Jatamansi (*Nardostachys jatamansi*) rhizome powder, and Shankhpushpi (*Convolvulus prostratus*) powder.

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Lactose was used as a diluent, and magnesium stearate was used as a lubricant. All materials were obtained from authenticated herbal and pharmaceutical suppliers.

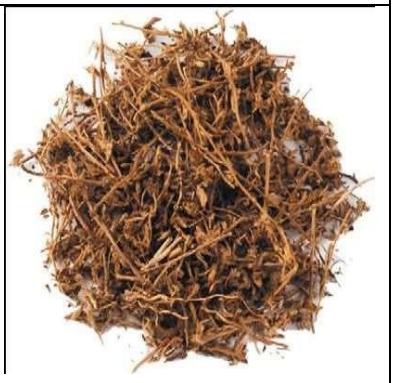
Name	Family	Kingdom	Uses	Figure
Ashwagandha	Solanaceae	Plantae	anti-inflammatory, antioxidant,and immunomodulatory	
Brahmi	Scrophulariaceae	Plantae	Anti-anxiety, antidepressant, anti-inflammatory, and antioxidant	
Jatamansi	Valerianaceae	Plantae	Sedative, stimulant, antipyretic, antispasmodic	
Shankpusphi	Convolvulaceae	Plantae	Relieffrom anxiety, stress and mental fatigue	

Table No. 1: Short information of ingredients used in herbal powder[5]

Method of Preparation of Polyherbal Nutraceutical Powder

Step 1: Collection of Ingredients

The herbal ingredients used in the formulation were Ashwagandha (*Withania somnifera*), Brahmi (*Bacopa monnieri*), Jatamansi (*Nardostachys jatamansi*), and Shankhpushpi (*Convolvulus prostratus*) powders. Lactose and magnesium stearate were used as excipients.[6]

Figure 1: Collection of all ingredients.

Step 2: Weighing of Ingredients

All ingredients were accurately weighed according to the **quantities specified in Table 2.**

Step 3: Blending (Geometric Dilution Method)

- A small quantity of one herbal powder was mixed with an equal quantity of another powder.
- The remaining powders were added gradually in a stepwise manner.
- The mixture was blended thoroughly to ensure uniform distribution of all ingredients.
- Lactose and magnesium stearate were then added and mixed uniformly.[7]

Step 4: Sieving and Homogenization

- The blended powder mixture was passed through sieve No. 60.
- The sieved powder was mixed thoroughly to obtain uniform particle size and homogeneity.[8]

Step 5: Packaging

- The prepared polyherbal nutraceutical powder was transferred into an airtight container.
- The formulation was stored in a cool and dry place and protected from moisture to maintain its stability and quality.[9]

FORMULATION AND EVALUATION

Sr. No.	Ingredients	Quantity (50gm)
1	Ashwagandha (Withania somnifera)	22.75 gm
2	Brahmi (Bacopa monnieri)	4.55 gm
3	Jatamansi (Nardostachys jatamansi)	9.1 gm
4	Shankhapushpi (Convolvulus prostrates)	13.65 gm
5	Magnesium stearate	0.25 gm
6	Lactose	q.s

Table No. 2: Formulation of stress relief powder

EVALUATION PARAMETERS

Organoleptic Evaluation

Organoleptic evaluation was carried out using sensory observations to assess the acceptability of the formulation. Parameters such as appearance, colour, odour, taste, and texture were examined and recorded.[10]

Figure 2: Herbal Powder

pH Determination

The pH of the formulation was determined to evaluate its acidity or alkalinity, which influences stability and physiological compatibility.[11]

Procedure

- Prepare a 1% w/v solution of the herbal powder in distilled water.
- Stir thoroughly and allow the solution to stand for 5 minutes.
- Calibrate the pH meter using standard buffer solutions of pH 4.0, 7.0, and 9.0.
- Immerse the electrode into the sample solution.
- Record the pH value displayed on the meter.[19,20]

Moisture Content (Loss on Drying)[12]

Moisture content was determined to assess the amount of water present in the formulation, which may affect stability and microbial growth.

Procedure[18]

- Accurately weigh 2 g of the sample (W_1) in a pre-weighed Petri dish.
- Place the dish in a hot air oven at 105–130°C.
- Dry for 2 hours or until a constant weight is obtained.
- Cool the sample in a desiccator.
- Weigh the dried sample (W_2).

Formula

Moisture Content (%) = $((W_1 - W_2) / W_1) \times 100$

Where:

- W_1 = Initial weight of sample
- W_2 = Final weight after drying

Significance

- High moisture content may promote microbial growth.
- Low moisture content improves stability and shelf life.

Figure 3: Moisture Content Determination

Ash Value [13]

Ash value determination was performed to estimate the total inorganic residue remaining after incineration and to evaluate the purity of the formulation.

Procedure

- Accurately weigh 2 g of the sample in a pre-weighed crucible.
- Incinerate in a muffle furnace at 600–800°C until white ash is obtained.
- Cool the crucible in a desiccator.
- Weigh the ash residue.[17]

Formula

Ash Value (%) = (Weight of Ash / Weight of Sample) × 100

Significance

- Indicates the presence of inorganic matter.
- Help:s detect adulteration and contamination.

Sr. No.	Phytochemical Constituent	Test Performed	Positive Observation	Inference	Figure No.
1	Carbohydrates	Benedict's Test	Brick-red precipitate	Present (+)	
2	Proteins	Biuret Test	Violet colour	Present (+)	
3	Alkaloids	Dragendorff's Test	Orange precipitate	Present (+)	
4	Flavonoids	Shinoda Test	Pink/Red colour	Present (+)	
5	Tannins	Lead Acetate Test	White precipitate	Present (+)	
6	Saponins	Foam Test	Persistent foam formation	Present (+)	

Table 3 Phytochemical Evaluation of Polyherbal Nutraceutical Powder[14,15,16]

RESULT:

Sr. No.	Test	Parameter	Observation/Result
1	Organoleptic Evaluation	Colour	Light Brown
		Odour	Characteristic, earthy, slightly aromatic
		Taste	Bitter and slightly astringent
		Texture	Fine, smooth powder
		Appearance	Uniform, free-flowing powder
2	pH Determination	pH	6.86
3	Moisture Content (Loss on Drying)	Moisture (%)	W_1 (Weight of empty Petri plate) = 73.530 g
			W_2 (Weight of Petri plate + sample before drying) = 75.5209 g
			W_3 (Weight of Petri plate + dried sample) = 75.390 g
			Initial weight of sample ($W_2 - W_1$) = 1.9909 g
			Final weight of sample ($W_3 - W_1$) = 1.860 g
			Moisture Content (%) = [(1.9909 − 1.860) / 1.9909] × 100
			Moisture Content = 6.57%

Table 4: Evaluation Results of Polyherbal Nutraceutical Powder

Sr. No.	Evaluation Parameter	Result
1	Colour	Light Brown
2	Odour	Characteristic, earthy, slightly aromatic
3	Taste	Bitter and slightly astringent
4	Texture	Fine, smooth powder
5	Appearance	Uniform, free-flowing powder
6	pH	6.86
7	Moisture Content (%)	6.57%

Table 5: Physicochemical Evaluation of Polyherbal Nutraceutical Powder

CONCLUSION

A polyherbal nutraceutical powder for stress management was successfully formulated using Ashwagandha, Brahmi, Jatamansi, and Shankhapushpi. The formulation was prepared by the geometric dilution method and produced a homogeneous, stable, and free-flowing powder. Evaluation studies revealed satisfactory organoleptic properties, a near-neutral pH (6.86), moisture content of 6.57%, and ash value of 14%, indicating good quality, stability, and purity of the formulation.Phytochemical screening confirmed the presence of important bioactive constituents, including alkaloids, flavonoids, tannins, proteins, carbohydrates, and saponins, which are known to possess adaptogenic, neuroprotective, anxiolytic, and antioxidant activities. The synergistic action of these herbal ingredients may help in reducing stress, enhancing cognitive function, and promoting mental well-being.The results suggest that the formulated polyherbal nutraceutical powder is a safe and promising natural alternative for stress management. Further pharmacological and clinical studies are recommended to establish its therapeutic efficacy, safety, and potential for large-scale commercialization.

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