

## FORMULATION AND EVALUATION OF ASHWAGANDHA (WITHANIA SOMNIFERA) AND BRAHMI (BACOPA MONNIERI) ANTI-STRESS TABLET: A REVIEW

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### Abstract

The study of medicine is a science as well as art. Pharmaceutical oral solid dosage forms have been used widely for delivery for decades mainly due to their convenience of administration and their suitability for delivery of drugs for systemic effects. Nowadays, tablets are the most commonly used dosage form, making up over 70% of all manufactured ethical pharmaceutical formulations. Withania somnifera is member of solanaceae family popularly known as Ashwagandha, Indian ginseng or winter cherry has been used in Ayurveda, Indian system of traditional medicine. It is classified as a Rasayana (rejuvenation) and accepted to increase longevity and vitality. Brahmi (Bacopa monnieri) is a traditional herb commonly used in ayurvedic medicine, known for its potential cognitive- enhancing properties. It has been celebrated for centuries in India as a brain tonic, believed to support memory, concentration and overall mental clarity.

**Keywords:** Ashwagandha, Withania somnifera, Brahmi, Bacopa monnieri, Formulation.

### INTRODUCTION

#### About tablet

Pharmaceutical tablets are solid, flat or biconvex dishes, in unit dosage form, prepared by compressing a drug or a mixture of drugs, with or without diluents. The tablet is defined as a compressed solid dosage form containing medicaments with or without excipients. They vary in shape and differ greatly in size and weight, depending on the amount of medicinal substances and the intended mode of administration. Tablets are the most popular dosage form, about 70% of the total medicines are dispensed in the form of tablets. Tablets had different shapes, sizes, as well as weights depending on medicinal substances and the intended mode of administration.

#### About Ashwagandha

Ashwagandha is a shrub found in drier regions of India, Sri Lanka, Congo, South Africa, Egypt, Morocco, Pakistan, Afghanistan and Jordan. It is also known as 'White Somnifera' or 'Winter Cherry'. In Sanskrit, ancient language of India, Ashwagandha means 'horse's smell' whereas 'ashwa' means 'horse' and 'gandha' means 'smell'. It is believed that when ashwagandha is consumed it provides power like horse. In Ayurveda and indigenous medicine, Ashwagandha is used as an important medicinal plant from past 3000 years. Alkaloids and lactones are important biochemical constituents of ashwagandha, a class of constituents collectively termed as withanolides. About more than 40 withanolides, 12 alkaloids and several sitoindosides are isolated and identified from aerial parts, roots and berries of withania species. Soindosides is a withanolide with glucose molecule at carbon 27. Ashwagandha have anti-inflammatory, anti-stress, anti-oxidant, neuroprotective, anti-cancer, immunomodulatory, adaptogenic and endocrinological activities.

Ashwagandha roots is used as narcotic, diuretic, stimulant, aphrodisiac, tonic and anthelmintic. Ashwagandha is Indian native and it is grown in other parts of world as well such as Africa, Cape of good hope, Australia, the Himalayan areas and Canary Islands. Several studies claimed that Ashwagandha as a supplement can exhibit neuroprotective activity, anti-inflammatory, antibacterial, immunomodulatory, cardioprotective properties and also beneficial to treat obsessive compulsive disorder, infertility, sleep disorders, anxiety, hypothyroidism. Additionally, it also boosts muscle strength and recovery. Ashwagandha is a quality plant in traditional Indian system of medicine and it is evergreen shrub that grows 4 to 5 feet tall. It also has nearly more than 100 formulations in Ayurveda, Unani and Siddha. The roots of Ashwagandha used as anti-inflammatory drug for medical issues such as tumors, rheumatism, swelling, scrofula and as a sedative and hypnotic in anxiety. It's leaf is abundant of antibacterial, anti-inflammatory and hepatoprotective properties. It's fruit and seed are diuretic. It's berries are used as replacement of rennet, to coagulate milk in cheese forming process. Herbalists also identifies ashwagandha as Indian ginseng, because the role of ashwagandha in ayurvedic medicine is similar as ginseng in traditional Chinese medicine.

**History and Background of Ashwagandha:** In Ayurveda, ashwagandha roots are boiled in milk. Also, roots can be crushed into fine powder and termed as 'churna' and this churna can be consumed by blending with milk, honey, water. Ashwagandha leaves, seeds, shoots and berries is also used for health benefits and increase longevity. Also, in ayurvedic practice ashwagandha is also known as 'rasayana' means 'toinc', beneficial for slow aging, enhance memory power, improve immunity. Tibetan system of medicine (TSM) is admired in northern regions of India i.e. Ladakh, Lahul and Spiti and is followed by Amchis, herbal doctors. In TSM Ashwagandha is also identified as Asgandnagori or Baddzigandha and used to heal respiratory disorder, hepatic disorders, maintaining hemoglobin range and body strengthening.

In China, Ashwagandha is identified as ginseng. In Chinese traditional system (CTS) it is categorized as 'Tonify Qi' and 'Tonify Blood and Essence'. Based on research China is more successful in promoting the health and medicinal benefits of various herbs including Ashwagandha. In Africa, Ashwagandha leaves utilized for dressing for infections and inflammations. The fine powder of ashwagandha roots mixed with fat of animals and used for sores and abscesses as ointment. The roots also utilized to treat infections of rectum and pyrexia. African practitioners used it for fever, cold, asthma, typhoid and diarrhea. It is also has antihelminthic, sedative, hypnotics and antirheumatism properties.

### About Brahmi

The significance of Brahmi (*Bacopa monnieri* Linn.) in improving memory and learning skills was first published in 1982 (Singh and Dhawan, 1982). Since then various studies have been conducted in animals to determine various properties exhibited by the medicinal herbs. The potential of Brahmi in shielding neuronal structure and function has been evaluated in several growing studies. Although many chemical compounds have been isolated from Brahmi, the active fractions of this medicinal plant contain bacoside-A and bacoside-B. Several other phytochemicals such as alkaloids, glycosides, flavonoids, saponins etc. are the constituents of Brahmi.

**History and Background of Brahmi:** Brahmi (*Bacopa monnieri*) has been used in the form of memory enhancer for many years. The accreditation of the traditional assertion of Brahmi was initiated by investigating the effect of an alcoholic extract of this herb on acquisition, consolidation and retention in different conditioning response. Brahmi is another important herb in Ayurvedic medicine, with a history that spans thousands of years. It has been celebrated for centuries in India as a brain tonic. Brahmi is rich in bioactive compounds, particularly bacosides, which are thought to play a role in promoting neurotransmitter function and protecting against oxidative stress

### DRUG PROFILE

#### Ashwagandha (*Withania somnifera*)

Common Name: Ashwagandha, Indian Ginseng, Winter Cherry

Scientific Name: *Withania somnifera*

Family: Solanaceae

Primary Active Compounds: Withanolides, Alkaloids, Fatty Acids

Traditional Use: Adaptogen, Stress relief, Energy booster



Fig. 1. Ashwagandha

#### Brahmi (*Bacopa monnieri*)

Common Name: Brahmi, Water Hyssop

Scientific Name: *Bacopa monnieri*

Family: Plantaginaceae

Primary Active Compounds: Bacosides, Alkaloids, Saponins

Traditional Use: Cognitive enhancer, Anti-stress, Memory booster



Fig. 2. Brahmi

### MATERIALS AND METHODS

Table 1. Experimental Materials and Uses

| Ingredients            | Role                                            |
|------------------------|-------------------------------------------------|
| Ashwagandha            | Drug 1 (Rejuvenates Mind and Antistress Effect) |
| Brahmi                 | Drug 2 (Antistress Effect)                      |
| Lactose                | Diluent                                         |
| Tragacanth             | Binder                                          |
| Magnesium Stearate     | Lubricant                                       |
| Carboxymethylcellulose | Disintegrant                                    |
| Talc                   | Glidant                                         |

#### Method of Preparation

- Extraction:** Standardized extracts of Ashwagandha and Brahmi are prepared, ensuring a consistent amount of active constituents.
- Blending:** Ashwagandha extract, Brahmi extract and excipients are mixed in a suitable blending.
- Granulation:** A wet granulation method is used where water is added to powder mixed to form a granule, which is then dried and sieved.
- Compression:** The dried granules are compressed into tablets using a tablet press machine.



Fig 3. Processing Steps in Wet Granulation

**Table 2. Formulation Parameter**

| Ingredients            | F1   | F2   |
|------------------------|------|------|
| Ashwagandha            | 6g   | 6g   |
| Brahmi                 | 6g   | 6g   |
| Lactose                | 8g   | 8g   |
| Tragacanth             | 0.1g | 0.4g |
| Magnesium stearate     | 0.1g | 0.4g |
| Carboxymethylcellulose | 0.3g | 0.9g |
| Talc                   | 0.1g | 0.4g |

## Evaluation Parameters

### a. General appearance

For general acceptance, control of lot-to-lot uniformity, and management of tablet-to-tablet uniformity a tablet's overall design, identity and elegance are crucial. Size, form, colour, odour, taste etc. are all measured as basis of parameters of overall appearance.

### b. Weight variation

Take 20 tablets, each to be weighed separately. Calculate the average weight before comparing it to the weight of each tablets.

### c. Hardness

To withstand mechanical handling during production, packaging and shipping, tablets need to have a specific level of strength or hardness and resistance to friability. The strength of a tablet's crushing is typically measured by hardness.

### d. Friability

Friability of a tablets can determine by Roche Friabilator. The friabilator consists friabilator, which is then operated for 100 revolutions. The tablets are reweighed. Compress tablets loss less than 0.5% to 1.0% of tablet weight are considered acceptable.

## Extraction Methods

### Ashwagandha

**a. Preparation:** If using whole Ashwagandha roots, chop them into small pieces. For powder, no chopping is needed. The typical ratio 1-2 teaspoons of root powder for 1 cup of water.

**b. Boiling:** Place the Ashwagandha root into a pot. Add the appropriate amount of water and bring the water to a boil.

**c. Simmering:** Once the water starts boiling, reduce the heat to low and let it simmer for 15-20 minutes. This will allow the water to absorb the active compounds from the Ashwagandha.

**d. Straining:** After the simmering process, strain the liquid to remove the root material.

### Brahmi

**a. Preparation:** Use about 1-2 teaspoons of Brahmi powder or a small handful of dried leaves for 1 cup of water.

**b. Boiling:** Place the Brahmi powder or dried leaves in a pot and bring it to a boil.

**c. Simmering:** Once the water boils, reduce the heat to low and simmer for 5-10 minutes. Brahmi is usually a lighter herb, so a shorter decoction time is sufficient.

**d. Straining:** After simmering, strain the liquid to remove the plant materials.

## CONCLUSION AND DISCUSSIONS

Ashwagandha and Brahmi antistress tablets have shown promising benefits in reducing stress, enhancing cognitive function, and improving overall mental health. Their synergistic effects make them a valuable natural remedy for people dealing with anxiety, fatigue or mental strain. However, individual responses may vary, and it's always advisable to use such supplements under the guidance of a healthcare professional. Both herbs have been linked to mood stabilization. Ashwagandha may alleviate anxiety and depression by balancing stress hormones, while Brahmi might enhance mental calmness and emotional stability. The combined use of Ashwagandha and Brahmi may offer a holistic approach to stress management by addressing both the physical and mental aspects of stress. Together, they support relaxation, improve sleep quality and promote an overall sense of well-being.

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