

# A Review on Phytoconstituents of Brahmi and their Relation to Improve Nervous System

## ABSTRACT

Ayurveda is a well-known practice for treating number of diseases from ages. It is a natural system from old age for the balancing of various body systems through herbs. There are lot of herbs used in curing the diseases and one among them is Brahmi. It has the ability to boost up the memory. Morphologically, it is a small sized succulent herb that have number of branches. This herb is well known for strengthening memory, brain functions and cooling properties. In this review paper, brief detail about its phytoconstituents and medicinal uses are discussed.

**Keywords:** *Ayurveda; Antioxidants; Anxiety; Stress; Medicinal*

## 1. INTRODUCTION

Brahmi (*Bacopa monnieri*) is a perennial herb (4) which is remembered because of its memory enhancing feature. It is derived from the name of Brahman and Goddess Sarasvati. Its tea is usually consumed by brewing, leaves help to fight from cold, chest congestion and bronchitis. This occurs by removing the mucus from the air passages which helps in easy breathing (5). Also found to reduce pain and, inflammation in throat and respiratory tracts due to its anti-inflammatory property. The powder of this plant along with milk helps to improve brain functions by preventing brain cell damage caused by free radicals that shows the impact of its antioxidant property (6). It is also used as a brain tonic for children that helps in improving cognition. Its oil is very effective to prevent hair loss, nourishes and provides strength to them. Acts as disinfectant on the skin and speeds up the healing process when applied externally. Excessive intake of Brahmi should be avoided as it may cause nausea and dry mouth. It is widely used in the western countries and developing countries therapeutically and is becoming increasingly popular. The herb is described in many Ayurvedic books including Charaka Samhita and Sushruta Samhita (4). It is a non-tropic herb that shows properties of an astringent, cardiogenic, diuretic, analgesic, antipyretic, anti-inflammatory and antiepileptic agent. In ancient Ayurvedic ages, the super physicians described Brahmi's role as Ayushya (longevity), Hridhay (Heart) Madhya (intellect), Balya (strength especially mind), and Rasayana (Rejuvenation) (7). Many active constituents (Table Number 1) like saponins, flavonoids and saponin etc are found in this plant (8).

### 1.1 Taxonomic Classification

Kingdom – Plantae

- 30 Division – Anthophyta  
 31 Class – Dicotyledoneae  
 32 Order – Scrophulariales  
 33 Family – Scrophulariaceae  
 34 Genus – *Bacopa*  
 35 Species – *monnieri*

36 **Table Number 1: Active Constituents of Brahmi**

Chemical constituents	Contents	Reference
Saponins	Monnierin , D- mannitol, Bacoside A , Bacoside B , Bacosaponins , Acid A	(4,9)
Flavonoids	Luteonin, Apigenin	(4,9)
Alkaloids	Isobrahmic acid, Brahaminoside, Brahamoside, Brahmic acid	(4,9)
Glycosides	Thanakunicide, Asiaticoside	(4,9)
Phytochemicals	Stigmasterol, Beta-sitosterol, oroxindin, wogonin, Betulic acid, Betulinic acid	(4,9)
Sapogenin	Isobrahmic acid, Brahaminoside, Brahamoside, Brahmic acid	(4,9)
Other Constituents	Isobrahmic acid, Brahaminoside, Brahamoside, Brahmic acid	(4,9)

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38 **1.2 Distribution of *Bacopa monnieri***

39 *Bacopa monnieri* originated from tropical Asia, and now is widespread throughout the sub tropics and  
 40 tropics. It is also found across the Asia, Africa, Arabian Peninsula, Australia, America, Caribbean and  
 41 is invasive in Singapore, Portugal, Cayman Islands, Japan and Spain. In India, it is widely distributed  
 42 in Uttar Pradesh, Panjab, Haryana, Bihar, Bengal, Karnataka, Kerala, Tamil Nadu, in the foot hills of  
 43 Himachal Pradesh and Uttaranchal [7, 23].

## 44 2. MEDICINAL USES OF BRAHMI

### 45 2.1 Boosts Memory Power

46 Brahmi (*Bacopa monnieri* Linn.) is a naturally occurring herb found in India. Since long time it is used  
47 in Ayurvedic medicine for treatment of numerous disorders but mainly includes weak memory  
48 problem and anxiety issues (10). Many western countries adapted this plant which act as a memory  
49 boosting agent. Main constituents of this herb are Bacosides A and Bacosides B, Steroidal saponins  
50 and active constituents like saponins and alkaloids (11).

### 51 2.2 Wound Healing

52 Brahmi leaves help in the process of wound healing due to the presence of triterpenoids present in  
53 the extract of Brahmi leaves. It helps to increase the overall amount of collagen in cell layer  
54 fibronectin thereby healing the wound [12]. The collagen in wound synthesis can be remodelled by a  
55 substance named peptidic hydroxy proline which is increased by Asiatic acid extracted from Brahmi  
56 leaves [13,14].

### 57 2.3 Anxiolytic Effect

58 This herb exhibits anxiolytic impact which was shown through couple of experiments. In which the  
59 higher dosage of *Bacopa monnieri* separate had prominent anxiolytic impact as compared to  
60 lorazepam. It also showed a memory advancing activity on human beings [7].

### 61 2.4 Effect of Brahmi on Cancerous Activity

62 Ayurvedic and herbal medications are more effective and safer than the pharmaceutical medicines  
63 (15). Brahmi is a wonder herb and plays down its role in curing tumour (16) due to its constituents like  
64 Bacopsides that are being used to cure cancer disease. *Bacopa* is also used in phytoremediation of  
65 various metals like lead, mercury, chromium and cadmium (17).

### 66 2.5 Helps in Reducing Stress and Anxiety

67 The active ingredients composition of this herb impacts the balance of stress hormones in our body  
68 by inducing a calm and relaxed state (18). It is done naturally by simply direct chewing of 2 – 3 leaves  
69 of this herb that contains bacopsides (19, 20). This process is very effective and significant as it  
70 reduces any dependency on other pharma products (10).

### 71 2.6 Hepatoprotective Activity

72 *Bacopa monnieri* has hepatoprotective property, that can be credited to presence of bacoside-A. Pre-  
73 treatment with ethanolic extract of this herb against carbon tetrachloride have defensive impact. It  
74 protects liver from liver-cirrhosis in an experiment on mice, rodents and framework models of human  
75 [23].

### 76 2.7 Endocrine Effects

77 In a couple of studies Brahmi treats irregularities related to endocrine. CDRI-08 exhibit to control  
78 release of thyroid in an experiment on male mice. The consumption of Brahmi enhanced the union of  
79 T4 chemical by 41% [7].

## 80 **2.8 Anti Stroke Effect**

81 Brahmi has intense therapeutic capacity in treating Parkinson's disease and Alzheimer's disease. In  
82 the trial experiments on mice, to treat ischemic cerebrum, herb showed defensive impact and reduced  
83 infarct size. It resulted in catalase movement and development of muscle coordination in rodents.  
84 Also, the cerebral blood stream expanded by 25% without affecting the circulatory strain. Thus,  
85 Brahmi is quite effective in treating neurological problems [7, 23].

## 86 **2.9 Anti nociceptive activity**

87 Fluid concentrate of *Bacopa monnieri* shows pain relieving movement through numerous aggravation  
88 pathways [7] for example inclusion of  $\alpha 2$  – adrenergic, 5-HT and  $\beta 1$ -adrenergic receptors. Moreover,  
89 the mixing of concentrate with naloxone didn't increase the inactivity to relieve pain. Narcotic  
90 receptors may have played a role behind pain relieving movement [7].

## 91 **2.10 Cardiovascular Activity**

92 Ethanolic concentrate of *Bacopa monnieri*, showed cardiovascular burdensome action on left  
93 ventricular contractility, pulse and coronary stream in heart of rabbit. It additionally showed that  
94 defensive impact of this herb on pneumonic conduit and aorta [7].

## 96 **2.11 Anti-inflammatory Action**

97 The leaves of Brahmi show anti-inflammatory activity. These are rubbed and applied on the body part  
98 that is affected by inflammation. Constituents like Bacopsides A and Bacopsides B [21], extracted  
99 from this herb are used in curing the swelling and inflammation. It is also beneficial for various pains  
100 like joint pain (arthritis) and gout also (10, 22).

101

## 102 **3. CONCLUSION**

103 Brahmi is no doubt a medicinal wonder herb with numerous uses and benefits that are unmatched  
104 with any other plant available on earth. However, the area of research from the therapeutic point of  
105 view still remains unexplored although some of the uses have been found which remain hidden, as  
106 Brahmi was more explored by the Ayurveda. Brahmi is a great source, that could have many other  
107 therapeutic uses to heal many diseases that is still unknown. It could increase the human memory  
108 power as well without any side effects. Thus, more experimental and clinical trials can be conducted  
109 to known other therapeutic aspects of this wonder plant.

110

## 111 **Conflict of Interest**

112 The author declares that there is no conflict of interest and ethical issues.

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