

NEERBRAHMI: A NATURAL BRAIN BOOSTER

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The human brain is a very intricate structure that serves as a body's control center. It is responsible for our feelings, ideas, behaviors, and relationships with the outside world.

Many plants are known to control our brain responses in various ways by altering various neural pathways and chemicals and may enhance memory or cause sedation and intoxication. Many plants such as Bacopa (*Bacopa monnieri*), Gotu kola (*Centella asiatica*), Walnut (*Juglans regia*), Maidenhair tree (*Ginkgo biloba*) Rhodiola (*Rhodiola rosea*), Ashwagandha (*Withania somnifera*), etc. are reported to be useful for retention of cognition or for enhancing our memory, focus and adaptogenic response.

Bacopa, known as *Neerbrahmi* in Hindi, is one of the best medicinal herbs used in traditional Ayurvedic medicine for brain related problems. It is widely used for improving memory, focus and reducing anxiety. Bacopa, botanically known as *Bacopa monnieri*, is a member of the Plantain family (Plantaginaceae) of flowering plants.

Names in Different Languages

- **English:** Brahmi, Herb of grace, Indian pennywort, Thyme-leaved gratiola, Water hyssop

- **Hindi:** Neerbrahmi, Brahmi, Jalbuti, Jalnim
- **Sanskrit:** Brahmi, Tiktalonika
- **Assamese:** Brahmi
- **Bengali:** Brahmisaka
- **Gujarati:** Baam, Brahmi, Jalanevari, Kadavi luni
- **Kannada:** Brahmi, Jala brahmi, Niru brahmi
- **Malayalam:** Brahmi
- **Marathi:** Brahmi, Jalabrahmi, Nirbrahmi
- **Oriya:** Brahmi, Prusni parnni
- **Tamil:** Nir-p-pirami, Piramiyam, Taray
- **Telugu:** Sambrani aku

(Source: Flowers of India Website)

Distribution: Bacopa is widely distributed in wetlands and muddy areas of Tropical and Subtropical parts of the world.

Morphology: Bacopa is a perennial creeping herb with branches growing up to 50 cm long. The glabrous branches are succulent and frequently root at nodes. Leaves are opposite, sessile, oblong-oblongate, 0.8-2 cm X 3-6 mm in size and succulent.

Leaf margin is entire or rarely dentate and has rounded apex. Flowers are mostly white or sometimes purplish in colour and are arranged singly in the leaf axils.



Sepals are 5, lanceolate to linear in shape and pale green in colour. Petals are 5, mostly white or rarely purplish, 8-10 mm in size and obscurely 2-lipped. Fruit is a narrowly ovoid capsule enveloped in persistent sepal-cup. Seeds are yellowish-brown in colour and ellipsoid in shape.

Chemical Constituents: Fifty-two bioactive phytochemicals have been isolated from bacopa which include saponins, alcohols, steroids, alkaloids, glycosides, sterol glycosides, phenylethanoid glycosides, sugars, flavonoids, cucurbitacins, and amino acids. Bacoside A & B (tetracyclic triterpenoid saponins) are the most bioactive components of Bacopa monnieri and play essential roles in brain health. Bacoside A (most effective) contains four saponin glycosides viz. bacopaside II, bacopaside X, bacoside A3 and bacopasaponin C, while Bacosides B varies in optical rotation only with bacoside A and consists of bacopaside IV, V, N1 and N2.

Medicinal Uses

- 1. As a Nervine Tonic:** In Ayurveda, bacopa is considered as a nervine tonic that enhances memory, learning and reasoning. It is also used for treating neurological conditions such as epilepsy and insanity. Recently, this has also been proved through scientific experimentation on different laboratory animals.
- 2. Useful in Parkinson's Disease:** Parkinson's disease is a degenerative neurological disorder characterized by progressive degeneration of nerve cells. Bacopa is reported to exhibit decreased aggregation of α -synuclein protein and prevent dopaminergic neurodegeneration in animal models (in *Caenorhabditis elegans* and *Drosophila*).
- 3. Helpful in Alzheimer's Disease:** Alzheimer's disease, characterised by cognitive impairment and dementia, is caused by the accumulation of β -amyloid peptides in the brain. Bacopa has been reported to suppress the accumulation of β -amyloids in brain in experimental studies and thus helps in memory retention and recovery. In silico studies have shown that Bacopasaponin G and Bacopasaponin N2 (saponins) might be responsible for the biological activity of bacopa.
- 4. Ani-Depressant Activity:** Bacopa is shown to exhibit anti-depressant activity in animal models through modulation of neurotransmitters such as serotonin, dopamine and GABA.



(Photograph source: Amazon India)

5. Anti-Cancer Activity: Bacopa is reported to exhibit anti-tumor activity in animal models. This activity is due to induction of apoptosis, inhibition of cell proliferation and angiogenesis and modulation of cancer-related signaling pathways.

6. Anti-Inflammatory Activity: Bacopa is reported to possess anti-inflammatory activity. This property is mediated through inhibition of the production of pro-inflammatory cytokines, reduction in the activity of inflammatory enzymes and suppression of immune cell activation.

7. Anti-Ulcerative Property: Recent studies have shown anti-ulcerative property of bacopa. It increases mucin secretion, enhances mucosal defense factors and promotes healing.

8. Antioxidant Properties: Bacopa contains many phytochemicals including bacosides. These bioactive phytochemicals have antioxidant potential that helps in protecting against cell damage caused by free radicals.

9. Sedative Activity: Bacopa possesses sedative properties and thus promotes relaxation and sleep. It is reported to express itself by modulating GABA receptors in the central nervous system.

Toxicity and Safety Concerns: Use in moderate quantity (3-5 g daily) is generally safe. In higher doses, it may cause nausea, diarrhea and gastrointestinal problems.

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