



Bacopa rejuvenator cultivation and Importance to human beings

BY

Dr. Aradhana Dohroo,¹ Dr. D.R. Thakur²,

¹ Asstt. Professor, Baddi University of Emerging Sciences & Technology, Makhnumajra, Baddi, Distt. Solan (HP)-173205, INDIA

² Former JDA (Agriculture) and Head Baddi University of Emerging Sciences & Technology, Makhnumajra, Baddi, Distt. Solan (HP)-173205, INDIA



Article History

Received: 10/07/2023

Accepted: 14/07/2023

Published: 16/07/2023

Vol – 2 Issue – 7

PP: - 14-16

Abstract

B. monniera Brahmi plant is an aromatic and medicinal plant grown in most of the countries and is historically important. Brahmi is derived from word Brahma which means a creator of the universe. This article highlights the package of practices of Brahmi, chemical constituents, and pharmacological effects of *B. monniera*.

Keywords: Brahmi, Herb, *B. monniera*, Bacoside, Package of Practices.

Introduction

Bacopa monnieri is a perennial herb with purple flowers. It is native to Southern and Eastern India, Australia, Europe, Africa, Asia, North and South America. Common names of this medically important plant are many viz., water hyssop, Brahmi, thyme-leaved gratiola, herb of grace, and Indian pennywort. The plant is a non-aromatic herb with succulent, oblong, 4-6mm thick, oblanceolate, and actinomorphic arranged leaves. It is commonly cultivated in marshy areas. Bacoside is an active phytochemical that is present in the plant parts. It belongs to a family Scrophulariaceae. Brahmi is derived from word Brahma which means a Hindu God referred to as creator of the universe. *Bacopa monnieri* has a massive potential in the amelioration of various neuropharmacological depressions and other disorders. The extract of brahmi i.e., methanolic and ethanolic plays a pivot role in treatment of human disorders when used in varying concentrations. Ethanolic extract of *B. monnieri* plays an important role in the treatment of diabetes. The leaves of the plant are also helpful in the treatment of neurodegenerative diseases like Alzheimer's and Parkinson diseases which are related to central nervous system of human beings. This article highlights the package of practices, chemical constituents, and pharmacological effects of *Bacopa monniera*.

Package of Practices

The plants of *Bacopa* are annual or perennial depending upon types. The leaves are oppositely arranged while the flowers are either solitary or in pairs with five each of sepals and petals and are either white, blue, or purple. The dispersal and propagation is either by seeds or often by stem fragments. The crushed leaves sometimes have lemon fragrance. *Bacopa monnieri* is a perennial creeping herb. There are eleven different *Bacopa* species reported. It produces abundant blooms from early spring until autumn. However, in cool weather, it behaves as an annual. The roots of the plant can be planted where there is enough light. It is even best suited in hanging baskets. The trailing roots can be planted during spring in containers containing potting soil with supplements.

Moisture can be provided by regularly watering. The plants grow best where there is morning sun and afternoon shade. The idle temperature for the growth of the plants is 15^o-30^oC with pH of 5.5-6.0. The plants are sensitive to high temperature. If possible, liquid fertilizer can be used. Overwatering results in root rot and similar problems while powdery mildew appearance under high humidity has been noticed. Stem cuttings is the best approach to [propagate *Bacopa*. There are different varieties of *Bacopa* like Giant Snowflake, Snowstorm Blue, Gold N Pearls, Blue topia, Blue Showers, Snowstorm Pink, Great Deep Violet, Copa Dark

Blue, Bacopa Mega Copa Series, etc. The Central Institute of Medicinal and Aromatic Plants situated at Lucknow has developed three varieties viz., Subudhak, Pragyashakti (Orissa), and Jagriti which are perennial plants with two harvests. The crop can be harvested after three months of planting during September to October. The post harvest management involves drying by spreading on the floor. The percentage of total bacosides is to an extent of 5.6%. The fresh crop yield has been recorded at 20-22 t/ha.

Phytochemical Nature:

Alkaloid present is Brahmine, Nicotine, Herpestine, bacosides A and B, Saponins A, B, C, triterpenoid, Stigmastanol, β -sistosterol, betulinic acid, D-mannitol, α -Alanine, Aspartic acid, Glutamic acid, Serine, and pseudo-jujubogenin glycoside. It has a component of medhyarasayana which is good for the treatment of epileptic disorder. Studies carried out by Singh and Dhawan in 1997 reported two active saponins A and B that were present in plant extract having cognition effect. Sumathy et al. (2001) reported hepatoprotective activity of *Bacopa monniera* in alcohol extract by administering it to mice orally that resulted in inhibition of antioxidant enzyme and reduction in GSH level in rats whereas fresh juice of *Bacopa monniera* has antiulcerogenic activity. Chakravarty et al. in 2003 reported three new triterpenoid glycosides from *Bacopa monniera*. Singh et al., (2012) reported phytochemical analysis of *Bacopa* leaves as it contains tannins, flavonoids. Chakravarty et al., (2001) reported dammaranes of triterpenoid saponins with pseudojujubogenin glycosides or jujubogenin glycosides as a major chemical constituents from *B. monnieri*.

Medicinal effect

Being Ayurvedic plant, every part of plant has medicinal effect including stem, leaves, and flowers. It carries various medicinal properties that have different medicinal properties including memory enhancement, tranquilization, cardiovascular effectiveness. Other properties include sedative effect, antidepressant, antioxidant, anticancerous, antiarthritic, antimicrobial effects. It helps in curing skin diseases and also epilepsy disorders. Stough et al., (2001) reported saponins and bacosides that enhance nerve transmission and repair damaged neurons by enhancing kinase activity. Samiulla et al., (2001) reported *in vitro* study of methanol extract of *Bacopa* that possessed potent mast cell stabilizing activity when compared with disodium cromoglycate. Goel et al., (2003) reported extract of *Bacopa* that has antimicrobial activity for the *Helicobacter pylori* that is responsible for gastric ulcers. Michelli et al., (2017) reported *Bacopa* effectiveness against neurodegenerative disease and disorders like depression, anxiety, and Schizophrenia as it releases IL-6 and TNF- α from LPS (lipopolysaccharide)-activated microglia and also inhibits the enzyme activity of MMP-3 and Caspase 1 and 3.

Anti-inflammatory property

Kumar et al., (2013) reported methanol extract of *Bacopa monnieri* that has anti-inflammatory role. Symptoms of inflammation include redness, stiffness, and swollen joints.

Hossain et al. (2014) reported anti-inflammatory activity by evaluating methanolic extract. Further histamine-induced oedema test carried on mice in which dose of 400mg/kg extract showed high anti-inflammatory activity.

Antimicrobial effect

Sampathkumar et al., (2008) carried out diethyl ether extract test on bacteria like *Staphylococcus aureus* and *Proteus vulgaris* which were gram-positive in nature. Besides, ethanolic extract exhibited antifungal activity against *Aspergillus niger* and *Candida albicans*. These extracts were taken from aerial parts of *Bacopa monnieri*. Khan et al. (2010) carried out anti-bacterial activity by taking into account disc diffusion method against both gram-positive and gram-negative bacteria for which ethyl acetate and methanol extract of *Bacopa monnieri* were taken.

Cardiovascular effect

Kamkaew et al., (2011) studied effect of intravenous *Bacopa monnieri* extract administered in the dose of 20-60 mg/kg on arterial blood pressure and heart rate of anaesthetized rats was recorded. This extract decreased systolic and diastolic pressure without disturbing heart rate. Blood pressure reduced partly via releasing nitric oxide from endothelium and partly by actions on vascular smooth muscle Ca^{2+} homeostasis.

Analgesic effect

Vohra et al., (1997) studied the effect of bacosine from aerial parts of *Bacopa monnieri* and revealed that it possessed analgesic effect which was opioidergic in nature. Siraj et al (2012) investigated the analgesic, antidiarrhoeal, and cytotoxic activity of ethanolic extract of *Bacopa monnieri*.

References

1. Chakravarty A.K., Garai S, Masuda K, Nakane T, Kawahara N. (2003). Bacopasides III-IVP, three new triterpenoid glycosides from *Bacopa monnieri*. Chem. Pharm. Bull. 51:215-217.
2. Chakravarty, K.A, Sarkar, T, Nakane, T, Kawahara, N, Masuda, K, and Shiojima, K. (2001). Bacopaside I and II: two pseudojujubogenin glycosides from *Bacopa monnieri*. Phytochemistry. 58: 553-556.
3. Goel, R.K., Sairam, K., Babu, M.D. (2003). *In vitro* evaluation of *Bacopa monnieri* on anti-*Helicobacter pylori* activity and accumulation of prostaglandins. Phytomedicine. 10: 523-527.
4. Hossain, H, Al-Mansur, A, Akter S, Sara U, Ahmed, M. R., Jahangir, A.A. (2014). Evaluation of anti-inflammatory activity and total tannin content from leaves of *Bacopa monnieri* (Linn.). IJPSR 5: 1246-1252.
5. Kamkaew, N, Scholfied, C.N., Ingkaninan, K., Manesai, P., Parkington, H.C., Tare, M., Chootip, K. (2011). *Bacopa monnieri* and its constituents is hypertensive in anesthetized rat and vasodilator in various artery types. J. Ethnopharmacol. 137: 790-795.

6. Khan, A.V., Ahmed, Q.U. (2010). Antibacterial efficacy of *Bacopa monnieri* leaf extracts against pathogenic bacteria. *Asian Biomed.* 4: 651-655.
7. Kumar, S, Bajwa, B.S., Kuldeep, S., Kalia, A.N. (2013). Anti-inflammatory activity of herbal plant. A review. *Int. J. Adv. Pharm. Biol. Chem.* 2: 272-281.
8. Michelle, D., Nemetcheck, A. A., Stierle, D.B., D.I.L. (2017). The Ayurvedic plant *B. monnieri* inhibit inflammatory pathway in the brain. *J. Enthopharmacol.* 197: 92-100.
9. Rao, C.H.V., Sairam, K., Goel, K.K. (2000). Experimental evaluation of *Bacopa monnieri* on rat gastric ulceration and secretion. *Indian J. Physio. Pharmacol.* 44:435-441.
10. Samiulla, D.S, Prashanth, D, Amit, A. (2001). Mast cell stabilising activity of *Bacopa monnieri*. *Fitoterapia*72: 284-285.
11. Sampathkumar P, Dheebea, B, Vidhyasagar, Z.V., Arulprakash,T, Vinothkannan, R. (2008). Potential antimicrobial activity of various extracts of *Bacopa monnieri* (Linn.). *Int. J. Pharmacol. Research* 4: 230-232.
12. Singh, H. K. and Dhawan, B. N. (1997). Neuro-psychopharmacological effects of the ayurvedic nootropic *Bacopa monnieri* Linn. (Brahmi). *Ind. J. Pharmacology* 29: S359-S365.
13. Singh, S.K. (2012). Phytochemical analysis of leaf callus of *Bacopa monnieri* L. *International Journal Science Research Publication* 2, 1-3.
14. Siraj, M.A., Chakma, Rahman, M, Malik, S., Sadhu, S.K. (2012). Assessment of analgesic, antidiarrhoeal, and cytotoxic activity of ethanolic extract of the whole plant of *Bacopa monnieri* Linn. *Int. Res. J. Pharma.* 3: 98-101.
15. Stough, C., Lloyd, J., Clarke, J. (2001). The chronic effects of an extract of *Bacopa monnieri* (Brahmi) on cognitive function in healthy human subjects. *Psychopharmacology* 156: 481-484.
16. Sumathy, T, Subramanian S, Govidasamy S, Balakrishna KG. (2001). Protective role of on morphine-induced hepatotoxicity in rats. *Phytoether Res.*15: 643-645.
17. Vohora, S.B., Khanna, T., Athar, M., Ahmad, B. (1997). Analgesic activity of bacosine, a new triterpenes isolated from *Bacopa monnieri*. *Fitoterapia* 68: 361-365.