A comparative study of roots of *bacopa monnieri* (L.) Pennel and *bacopa floribunda* (R.Br.) Wettst.

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**ABSTRACT**

*Bacopa monnieri* a well known herbal drug, extensively using as memory enhancer all over the world. In Ayurveda Bhavaprakash nighantu described Brahmi (*Bacopa monnieri*) as Medhya, Ayushya, Rasayana. In Rajanighantu as Vatastra pittajit, buddhi, prajna, Medhya , Ayushyavardhini. Still utilizing from thousands of years due to lack of knowledge & availability, improper identification we are using *Bacopa floribunda* and other species in the name of *Bacopa monnieri*. Present study differentiated *Bacopa monnieri* & *Bacopa floribunda* in morphology, root TS, powder microscopy. Morphological character shows colour difference in flower, stem, root & leaf, also shows difference in microscopic study and also in powder studies.

**Key words:** *Bacopa monnieri, Bacopa floribunda*, Morphology, Pharmacognosy.

**INTRODUCTION**

Today urbanization & industrialization have taken the world into 21st century. National resources are being utilized at a larger extent for the development of industries. Ayurvedic medicines are completely dependent on the natural sources. People are now realizing preventive, Promotive and curative effect of Ayurveda. Lack of conservation of natural habitats of plants will live into shortage. Due to this people are using alternative or different species in the name of original plant. Moreover, people are supplying either the substitutes or the adulterants of the medicinal plants. *Bacopa monnieri* well accepted as Brahmi, is a promising plant to enhance the memory by activating neurons of that area. It has a wide range effect on CNS activity, but is most popularly considered a memory enhancer. Other pharmacological properties of the extracts include sedation & Cardiotoxic, Vasoconstriction, anti inflammatory activity. In Ayurveda Bhavaprakash nighantu described Brahmi (*Bacopa monnieri*) as Medhya, Ayushya, Rasayana. In Rajanighantu Brahmi is described as Vatastra pittajit, buddhi, prajna, Medhya, Ayushyavardhini.

**MATERIALS AND METHODS**

Collection of the drug-Whole plant of *Bacopa monnieri* was collected from Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore in the month of December and *Bacopa floribunda* was collected from Jamnagar in December. Both the plants were identified & authenticated in Pharmacognosy dept. IPGT&RA, GAU, Jamnagar.

Macroscopic evaluation/Organoletic evaluation:

- Various parameters of the plant material, such as size, shape, odour, colour, taste of root were recorded. Microscopic evaluation-Thin free hand sections of roots were made and washed with water and diagnostic characters in section and powder of both roots were studied with and without staining. The microphotographs were taken under Corlezzin binocular microscope attached with camera.

Aims and objectives

i. Macroscopic, Microscopic study root of *Bacopa monnieri* and *Bacopa floribunda* and its powder.

ii. Comparision between both the roots and its powder.

**RESULT AND DISCUSSION**

Organoleptic character: Various parameters of the plant material, such as size, shape, odour, colour, taste of root were recorded and are depicted in Table.1. *Bacopa Monnieri*

- Plant morphology: A creeping herb with ascending branches, rooting at nodes. Leaves sessile, upto 2.5x0.6 c.m, oblong or obovate, entire, obtuse at apex. Flowers solitary, axillary, pedicelled. Calyx c. 6mm long; upper sepal broadly ovate, lateral sepals linear lanceolate. Corolla 5-6mm long, white or pale violet-blue. Capsules ovoid, apiculate. The plant is succulent when fresh but becomes shrivelled on drying; slightly bitter in taste, without any characteristic odour and composed of crumpled, matted broken pieces of roots, branching stems, leaves, flowers and few tender fruits (fig.B).

- Root morphology: Fragments of dried main roots are cylindrical, about 5mm in diameter, longitudinally wrinkled and white in colour (fig.15).

T.S of Root: Diagrammatic TS of the root is irregularly circular to angular at places in outline, shows outermost...
piliferous layer, parenchymatous cortex with intervening air spaces and a centrally located solid core of xylem encircled by narrow phloem. Detailed TS shows piliferous layer occasionally at places getting replaced by formation of cork cells, cortex is wide, parenchymatous, traversed with simple and compound starch grains and intervened with air spaces, endodermis is distinct, a narrow band of phloem & its fibres, properly arranged xylem along with parenchyma surrounding the centrally located solid core of irregularly arranged collapsed xylem composed of parenchyma & fibres covering central portion of the root without any medullary rays (fig 2,3,4).

Table 1: Organoleptic Characters

<table>
<thead>
<tr>
<th>Character</th>
<th>Bacopa monnieri</th>
<th>Bacopa floribunda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Brown</td>
<td>Greenish</td>
</tr>
<tr>
<td>Odour</td>
<td>Pungent</td>
<td>Odourless</td>
</tr>
<tr>
<td>Taste</td>
<td>Bitter-Astringent</td>
<td>Bitter</td>
</tr>
</tbody>
</table>

With these morphological characteristics, a comparative study was conducted to identify the superior character of Bacopa monnieri and Bacopa floribunda. The study concludes that Bacopa monnieri shows much more superior characters as compared to Bacopa floribunda. To overcome from controversy it needs proper identification while utilizing in commercial drug preparation.
1. Fresh roots of B.F
2. Cork, Cortex, Aerenchyma, Vascular bundle
3. Phloem, xylem fibres
4. Collapsed xylem vessels
5. Simple Fibre
6. Trichome
7. Spiral vessels
8. Starch grain with hilum
9. Pitted & Scalariform vessels
10. Tannin content material
11. T S of B.M root
12. Aerenchyma with vascular bundles
13. Prismatic crystals with oil globule
14. Endodermis, Phloem, Xylem fibres
15. Fresh roots of B.M
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