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# PHARMACOGNOSTIC AND PHYTOCHEMICAL INVESTIGATION OF *Bacopa monnieri*(L.)Wettst.*(Scrophulariaceae)*

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## INTRODUCTION

*B.monnieri(L.)Wettest.* Is commonly called as "Brahmi" in the indigenous system of medicine , prescribed as nerve tonic . In ancient period the name Brahmi is also used to refer to another plant species "C.asiatica(L.)"of *Umbeliferae family* commonly known as "Mandukparni"(1). However these two plants are distinctly different , Brahmi occurs in marshy areas near streams ,ponds and ditches and Mandukparni is a common weed of the crop land as well as waste lands present throught India (2). According to Charak Samhita both these plants promotes cognitive function , but considered that Brahmi is superior to Mandukparni. Both these plants are rich in saponins . *B.monnieri* contains saponins like bacosides A and B having biological activity(3) while madecassoide and asiaticoside are important saponins of *C.asiatica*. Both these plants are used as medhya rasayan or brain tonic(4). Brahmi is used to treat specific mental disorder such as insanity and epilepsy(5) while mandukparni is used as a brain tonic to improve mental health(6). Therefore for correct identity of the true Brahmi Plant the results of present study will generate relevant morphological, anatomical and phytochemical data of *B.monnieri(L.)Wettest* to confirm the identification and authentification for the benefit of Taxonomists and Common Man.

## MATERIAL AND METHODS

The fresh plant material was collected from various localities of Parbhani District in the month of August-September by visiting various places . The plant was identified by using various floras (7,8) and the voucher specimen(SVS-827) was deposited in the herbarium of Department of Botany ,Shri.Shivaji College , Parbhani for further references.

The fresh plant material is used for the anatomical study of root, stem and leaf carried out by double staining method. The stomata, trichomes and vessels were stained by aq. Saffranin stain(1%). The fresh as well as shade dried material of root, stem and leaf is used for histochemical and physicochemical analysis (09).

## RESULT AND DISCUSION:-

## MACROSCOPIC CHARACTERS

*B.monneiri (L)Wettest.* Is a small creeping succulant , herb with numerous branches and rooting at nodes. The roots are thin wiry, small cream/yellow in colour. Steam is thick green or purplish green , soft , glabrous with prominent nodes and internodes . Leaves are simple , opposite decussate ,obovate-oblong, green ,sessile,slightly bitter in taste. Flowers are small white-purple in colour,solitary axillary. Fruits are capsule 5-6mm long ovoid , glabrous ,acute . The capsules are included in the persistant calyx(Pate 1 ).

## MICROSCOPIC CHARACTERS

Transverse section of the root shows single layer of epidermis followed by 6-8 layered collenchymatous outer cortex , inner cortex is parenchymatous with large air cavities ,endodermis and pericycle is single layered distinct . Secondary tissue consists of outer sec. phloem and inner sec.xylem (Plate 2).

Transverse section of the stem shows unilayered epidermis followed by wide parenchymatous cells with large intercellular spaces.Endodermis is single layered with casparian thickenings, pericycle is 1-2 cell layers. Vascular ring is continous composed of a narrow zone of phloem towards periphery and a wide ring of xylem towards centre. The centre is occupied by small, parenchymatous pith with distinct intercellular spaces.Starch grains are present in the few cells of cortex and endodermis (Plate 3).

Transverse section of the leaf shows presence of lower and upper epidermis. The cells of upper epidermis are bigger in size ,covered with thick cuticle. Stomatas are confined to both leaf surfaces ,they are anisocytic type with 9.9 stomatal index. Trichomes are multicellular ,non glandular,dendroid type. A narrow collenchymatous band is located below both the epidermis in the midrib region. In the leaf centre conjoint collateral vascular bundle encircled by parenchymatous sheath is present .Mesophyllcomposed of homogenous chlorenchymatous tissue with vascular strands. Calcium oxalate crystals are embedded throughout the parenchymatous cells of the leaf . Midrib is not distinct (Pate 4)

Vessel elements of the Root and Stem were studied by maceration technique (09) and the maceratd tissue of root shows presence of extremely small vessels are more than short and medium sized vessels and in stem medium sized vessels are higher than ext.short and short vessels(10). Vessels have spiral, reticulate and annular thickenings.(Plate 5).

## HISTOCHEMISTRY

Histochemical tests in the fresh section of the root ,stem and leaf shoes presence of starch,protein,fat,saponins and alkaloids except tannins .(Table 1)

### Physicohemistry

The physicochemical studies showed the average value of water content in Brahmi is 5.8%W/W. Total ash content is 1.9%W/W. Acid insoluble ash content is 1.3%W/W while water soluble ash content is 1.4%W/W. The water soluble extractive value is 20.95%W/W and the ethyle alcohol soluble extractive value is 14.54% respectively .

## CONCLUSION

Pharmacognostic and physicochemical studies of *Bacopa monnieri (L)Weetest.* Provides specific parameters that will be useful in scientific evaluation ,identification and authentification of the original Medhya rasayan drug plant –Brahmi- *B.monnieri(L.)Wettest.*

Table No. 1- Histochemical Analysis of *Bacopa monnieri (L.)Wettest.*

| Sr.No. | Tests | Root | Stem | Leaf |
|---|---|---|---|---|
| 1 | Starch | + | + | + |
| 2 | Proteins | + | + | + |
| 3 | Tanins | - | - | - |
| 4 | Saponins | + | + | + |
| 5 | Fats | + | + | + |
| 6 | Glucosides | + | + | + |
| 7 | Alkaloides | + | + | + |

Plate 1

Plate 2

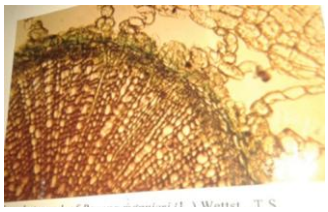

Plate 3

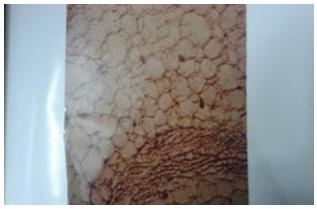

Plate 4

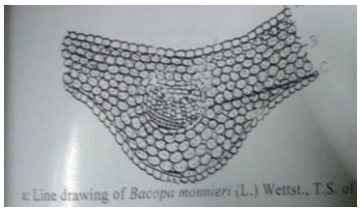


Plate 5

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