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Research Article

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Pharmacognostical study of *Bambusa arundinacea* seeds

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ABSTRACT

Bambusa arundinacea family poaceae is highly reputed ayurvedic medicinal tree commonly known as bamboo. various parts of the plant such as the leaves, root, shoot and seeds possesses anti-inflammatory, anti-diabetic, anthelminthic, anti-ulcer, antioxidant and astringent activity. seeds are acrid ,laxative and said to be beneficial in strangury and urinary discharge. However there is lack of information about the use of seeds of bamboo. The more effective the natural drug more its demand and the chances of non-availability increases.to meet the growing demand, the natural drug is easily adulterated with low grade material. In order to ensure the use of genuine and authentic material in the herbal formulations, pharmacognostical methods of standardization of the plants has been carried out in the present work. macroscopic, microscopic and powder microscopic characters of the seeds of Bambusa arundinacea has been carried out. All these pharmacognostical studies can be used as a diagnostic tool for the correct identification.

Keywords: *Bambusa arundinacea*, Pharmacognostic, Plant anatomy, Powder microscopy

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INTRODUCTION

In recent years, focus on plant research has increased all over the world and evidence show immense potential of medicinal plants used in various traditional systems. pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained. Today with the present surge of interest in the phytotherapeutics, the availability of genuine plant material becoming scarce. Since crude plant drugs from the basis for the manufacture of numerous medicinal preparations, accurate determination of drug identity forms an essential part of its study.[1] It becomes extremely important to make an effort towards standardization of the plant material as medicine, the process of standardization can be achieved by stepwise pharmacognostic studies. These studies help in identification and authentication of the plant material.[2] Bamboo is one of the precious plant resources of the earth. *Bambusa arundinacea*(retz) belongs to a family poaceae, a graceful spinous bamboo, distributed throughout india. It flowers gregariously once in life time(30-40 years) often during September-may. Leaves linear, flowers in large panicles, sometimes in the whole culm. Caryopsis(grain)oblong,5-8mm long, grooved on one side. The kani tribes of kanyakumari district used the seeds as food and they believe that the seeds enhance the fertility. Traditionally bambusa leaves, shoot, seeds and root used as astringent, laxative, diretics and also it was reported that the extract of *B.arundinacea* showed anti-inflammatory, antiulcer, antifertility, antimicrobial and hypoglycemic activities[3-6]. The alcoholic seed extract of *Bambusa arundinacea* have revealed the presence of flavonoids,

tannins, phenols, quinines, sterols, carbohydrates and amino acids.[7] However, no pharmacognostic study has been carried out on this plant seed and hence the objective of the present study is evaluate various Pharmacognostic properties including macro and microscopic characterization of the seeds of *Bambusa arundinacea*.

EXPERIMENTAL SECTION

Plant Collection and Identification:
Dried seeds of *Bambusa arundinacea* (Retz) Roxb. were purchased from Suresh Forestry Network, Chickballapur, Karnataka. The seeds and plants were authenticated by Prof. Dr. Jayaraman. Director Plant Anatomy Research Institute, Thambaram, Chennai. A Voucher specimen were kept in the Pharmacology museum, ACS Medical College for future reference. Care was taken to select quality seeds. The seed samples were fixed in FAA (Formalin-5ml+ Acetic acid-5ml + 70% Ethyl alcohol-90ml).After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiary –Butyl alcohol as per the schedule given by Sass, 1940. Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-60 C) until TBA solution attained super saturation. The specimens were cast into paraffin blocks.

Sectioning:
The paraffin embedded specimens were sectioned with the help of Rotary Microtome**.** The thickness of the sections was 10-12 μm. Dewaxing of the sections was by customary procedure (Johansen, 1940). The sections were stained with Toluidine blue as per the method published by O'Brien et al. (1964). Since Toluidine blue is a polychromatic stain. The staining results were remarkably good; and some cytochemical reactions were also obtained. The dye rendered pink colour to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc. wherever necessary sections were also stained with safranin and Fast-green and IKI(for Starch).For studying the stomatal morphology, venation pattern and trichome distribution, paradermal sections (sections taken parallel to the surface of seed) as well as clearing of seed with 5% sodium hydroxide or epidermal peeling by partial maceration employing Jeffrey's maceration fluid (Sass, 1940) were prepared. Glycerine mounted temporary preparations were made for macerated/cleared materials. Powdered materials of different parts were cleared with NaoH and mounted in glycerine medium after staining. Different cell component were studied and measured.

Photomicrographs:
Microscopic descriptions of tissues are supplemented with micrographs wherever necessary. Photographs of different magnifications were taken with Nikon labphoto 2 microscopic Unit. For normal observations bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Since these structures have birefringent property, under polarized light they appear bright against dark background. Magnifications of the figures are indicated by the scale-bars. Descriptive terms of the anatomical features are as given in the standard Anatomy books (Esau, 1964).

Macroscopic Characters:
Caryopsis(grain) oblong,5-8mm long, grooved on one side and covered with thick seed coat.

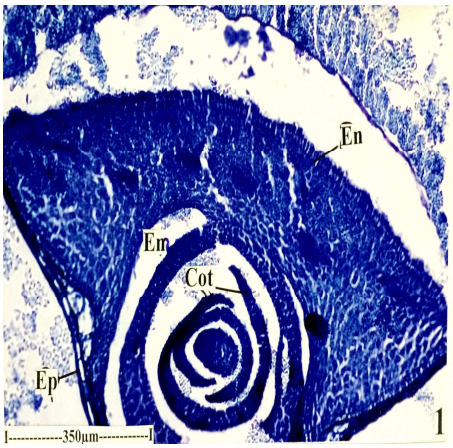
Macroscopic characters of *B.arundinacea*

Fig1. 1 caryopsis with lemma and palea enclosing the grain 2.The grain in surface view with longitudinal groove. 3.lemma 4.palea

(Em – Embryo, Gr- Groove, le-lemma,pa-palea,s- seed)

RESULTS AND DISCUSSION

The fruit of bambusa is known as caryopsis. It consists of a basal bowl shaped stalk called rachilla which bears two perianth lobes called lemma and palea. Enclosed within the lemma and palea Occurs elliptically oblong, smooth, brown grain. There is a longitudinal groove on one side of the grain (fig1.1,2,3&4).The rachilla is a bowl shaped cup bearing the lemma and palea enclosing the grain (fig2.2)The grain consists of the embryo on its lower lateral part. The embryo has folded cotyledons which appear as thin curved leaf like structures enclosing the embryo proper. Surrounding the embryo is starchy endosperm (fig2.1). The grain consists of a thick walled epidermal layer, followed by two layers of large, compact square shaped inner cell layers. Inner to the cell layers is the endosperm which is in the form of dense disassociated starch grains (fig 3.1 &2).



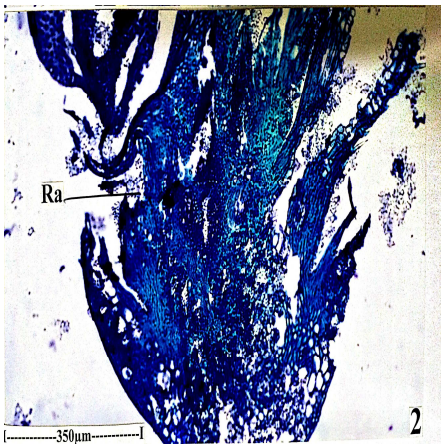


Figure-2 .1 **Figure-2.2**

Fig 2.1. Embryo located within the embryonic chamber of the grain.
2.Rachilla bearing perianth members

(En-Endosperm, EP- Epidermis cot – cotydelon, Ra- Rachilla, Em – Embryo).

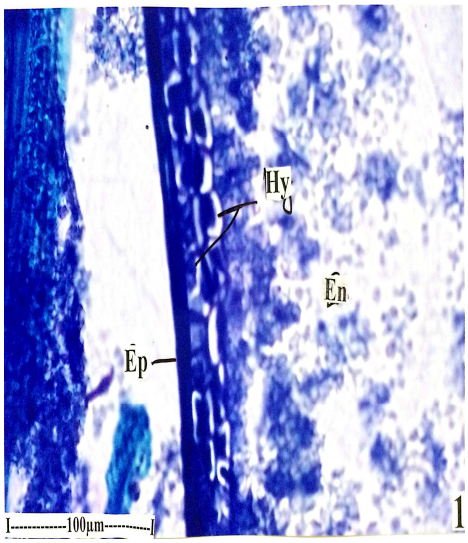


Figure-3.1

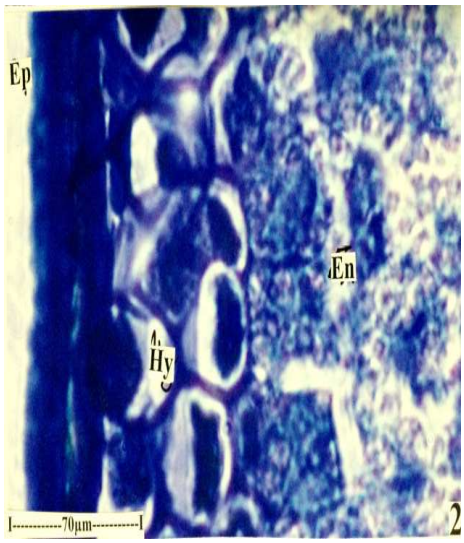


Figure-3.2

Fig 3.1. 1.L.s of seed showing the seed coat
2.seed coat cell layers enlarged.
(En- Endodermis, Ep- Epidermis, Hy – Hypodermis)

Powder Microscopy

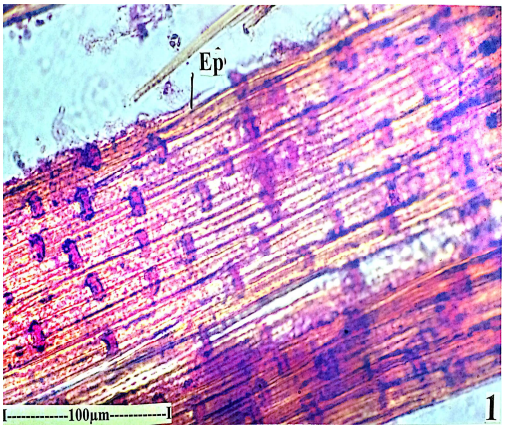


Figure-4.1

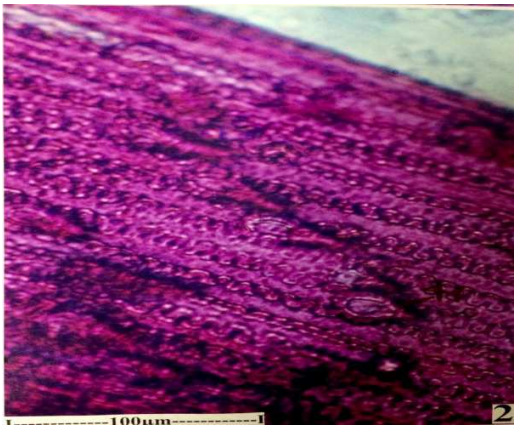


Figure-4.2

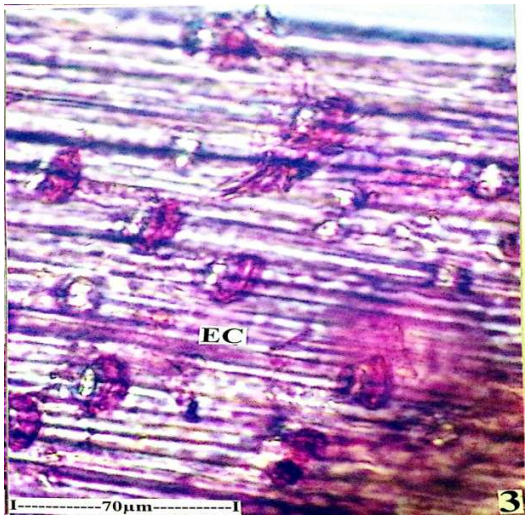


Figure-4.3
Fig 4.1. & 3. Surface view of the perianth with silica cells are cork cells.
2.Conical trichomes on the perianth
(EC-Epidermal cells, Ep – Epidermis , Tr- Trichome)

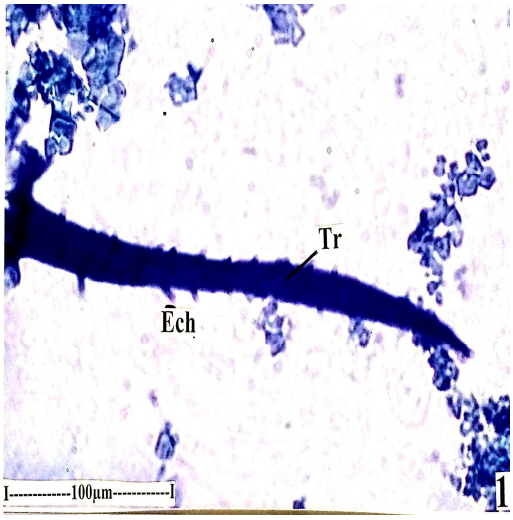


Figure-5.1

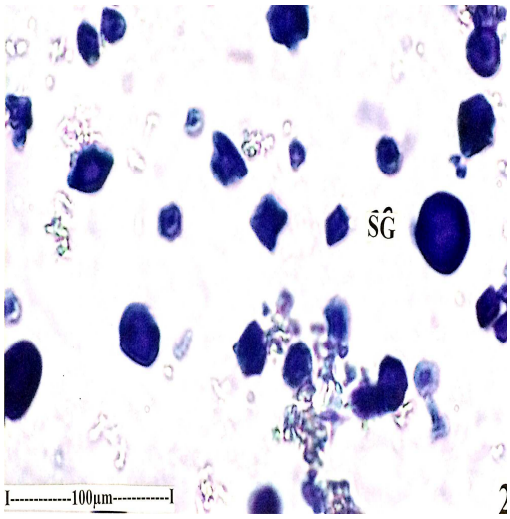


Figure-5.2

Fig 5.1. Epiermal trichomes with echinate spines
2.Starch grains stained with iodine.
(Ech- Echinate spines, scr- starch grains, Tr- Trichomes)

Figure-6.1

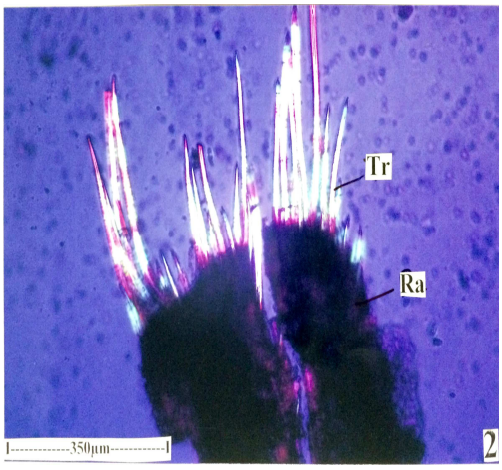


Figure-6.2

Fig 6.1 Marginal trichomes on the perianth.
2.Trichomes along the outer margin of the rachilla as seen under polarized light
(MTr- Marginal trichomes, Ra – Rachilla, Tr – Trichomes)

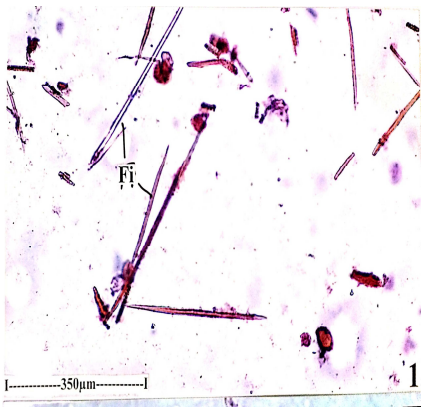


Figure-7.1 Fibres If The Perianth

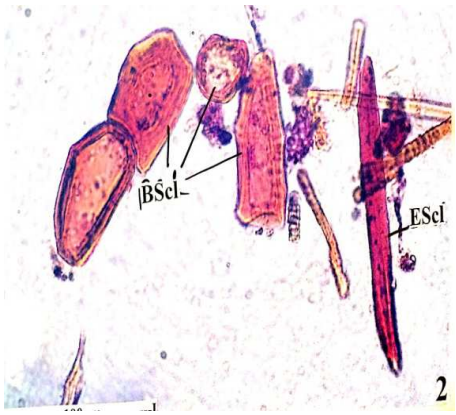


Figure-7.2 Sclereids Of Different Types

(BSd- Brady sclereids, Escl- Elongated sclereids, Fi- Fibres)

Powder Microscopy:
Small pieces of epidermal cells of the perianth members of the grains are seen in the powder. In surface view the periantrh members are composed of long, narrow thick walled fibres compactly arranged. On the surface are also seen diffusely distributed pairs of silica cells and cork cells. Silica cells are white and transparent and cork cells are darkly staried (fig 4.1 &3).There are also triangular, thick walled conical trichomes with pointed ends (fig 4.2).There are thick long pointed trichomes seen in the powder. There trichomes have short , curved echinate spines (fig5.1). Strach grains are abundant in the powder. The starch grains are spherical or squarish. They are simple type (fig5.2) Along the margins of lemma and palea there are long dense trichomes which are directed towards the tip. These trichomes have thick, smooth walls(fig 6.1) similar type of trichomes are also seen along the margin of the rachilla. The trichomes are thick walled and lignified (fig 6.2).Long, narrow, thick walled pointed fibres are abundant in the powder. They have thick lignified walls and narrow lumen. (fig 7.1) Brachy sclereids are abundant in the powder. These sclereids are polygonal or rectangular. There are also elongated cylindrical scleroids (fig 7.2). The scleroids have very thick lignified walls with numerous canal like simple pits. The lumen is very wide.

CONCLUSION

The pharmacognostic standard for the seed laid down for the first time in this study. morphological and anatomical studies of seed will enable to identify the crude drug. this can be used as reliable aid for detecting adulteration. These simple but reliable standards will be useful to a person in using the drug as a home remedy. also the

manufacturers can utilize them for identification and selection of the raw material for drug production. So further study should be carried out in future to isolate the specific chemical constituents as well as detailed pharmacological activity will be carried out in proper scientific way.

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REFERENCES

[1] Sumitra Chanda, *Journal Of Pharmacognosy And Phytochemistry* **2014**; 2 (5): 69-73.
[2] J.B Harbone,Phytochemical Methods.A Guide to Modern Techniques Of Plant Analysis,**1976**,Pp78
[3] Vishal soni,Arun kumar Jha,D.Jaya wivedi:Traditional uses,Phytochemistry and Pharmacological of *Bambusa arundinacea* Retz:a review.Association of Humanitas Medicine :August **2013**,Vol 3(3),PP.20.1-20.6.
[4] D.Rathod jaimik ,L.Pathak Nimish ,G.Patel Ritesh ,N.P.Jivani,M.Bhat nayna :*Journal of Applied Pharmaceutical Science*. 01(10);**2011**:PP.27-31.
[5] Ajay kumar Rathaur: *International Journal of Research in Pharmacology &Pharmacotherapeutics*:**2013**,vol 2(1)PP 48-56.
[6] S.Kiruba ,S.Jeeva ,Sam Manohar Das,D.Kannan : *Indian Journal of Traditional Knowledge*:Jan **2007**,Vol 6(1),PP 199-203.
[7] S.Thamizharasan, S.Umamaheswari, Rajeswari Hari,V.Ulagaratchagan, *International Journal Of Recent Trends In Science And Technology*, **2015**,Vol(14)Pp288-290.
[8] A.A.Bele ,A.khale : *International journal of Pharmacy*.**2011**:2(12):56-60.
[9] K.R.Khandelwal ,Practical Pharmacognosy.16 Ed,Nirali prakashan,Pune,**2007**,149-156.
[10] J.S.Gamble,Flora Of The Presidency Of Madras,Botanical Survey Of India,Calcutta India.**1935vol**-I,II&III.
[11] D.A.Johansen,Plant Microtechnique,Mc Graw Hill Book Co,Newyork,Pp523.
[12] A.N.Henry ,G.R.Kumara,V.Chitra ,Flora Of Tamilnadu,Botanical Survey of India, Southern Circle, Coimbatore, India, **1987**, Pp258.
[13] K.M.Mathew, The Flora Of Karnataka,India,Polypetalae,Vol-1,Pp688.
[14] C.R.Metacalfe,L.Chalk,Anatomy Of Dicotyledons,Clarendon Press, Oxford,**1979**,Pp276.
[15] T.P.O'Brien, N.Feder and M.E Cull,Polychromatic Staining of Plant Cell walls by toluidine blue-O.Protoplasma;**1964** ,vol.59:364-373.
[16] J.E.Sass, Elements of Botanical Microtechnique. McGraw Hill Book Co; New York. **1940**, pp.222.
[17] T.E.Wallis. Text Book of Pharmacognosy, CBS Publishers and Distributors, Shahdara, Delhi, India.**1985**.pp 170.
[18] S.N.YogaNarasimha,Medicinal Plants of India..Tamailnadu. Regional Research Institute (Ay.) Bangalore, India.**2000**, Vo1.II,p.715.
[19] K.Esau.Plant Anatomy.Jhon Wiley Publications,Newyork.**1964**,Pp.767.