

Pharmacognostic Evaluation of *Parkia biglandulosa* bark

Rupesh Pingale^{1*}, Deepak Pokharkar¹, Suvarna P Phadatare², Archana Gorle²

¹NCRD'S Institute of Pharmacy, Nerul (E), Navi Mumbai- 400706, Maharashtra, India.

²NCRD'S Sterling Institute of Pharmacy, Nerul (E), Navi Mumbai- 400706, Maharashtra, India.

Available Online: 12th July, 2016

ABSTRACT

Parkia biglandulosa, (Family: *Mimosaceae*), commonly known as Badminton Ball Tree, is very popular in India with a long history of traditional and folklore medicinal uses. Traditionally, different parts of the plant are used in treating ulcer, antibacterial activity, antifungal activity, anti inflammatory activity etc. A variety of phytoconstituents like tannis, saponins, glycosides, sterols and triterpenoids have been isolated from the plant. The present study was carried out to investigate macroscopical, microscopical and physiochemical parameters of *Parkia biglandulosa*, bark. Some of the diagnostic features of the bark were studied. All the parameters were studied according to WHO guidelines. The determination of these characters will help future researchers in phytochemical as well as pharmacological analysis of this species.

Keywords: *Parkia biglandulosa*, flavonoids, bark, Microscopy.

INTRODUCTION

Parkia biglandulosa, a native of Malaya. The genus is named after Mungo Park. It is a large handsome, evergreen tree. Flowers are small, ball-shaped, and brown initially turning to white, in pendant flower heads on long stalks. Propagation is by seeds. The plant is grown in gardens as ornamental tree and also on roadsides as avenue tree. Fruit pulp is reported to be edible *Parkia biglandulosa* belongs to the genus *Parkia* which belongs to the tribe Parkieae. It consists of about 35 species with a pantropical distribution but there are more five well recognized species *P.filicoidea*, *P. bicolor*, *P. roxburghii*, *P.biglobosa*, *P.madagascariensis*¹. It is flowering only during December-January, appearance of tennis-ball shaped fluffy flower heads makes one realise that this tree has to be *Parkia*. In the winter season, 1½ - 2 ft branches, hanging from the leaf axil, bear rust coloured bead-like flower heads, which gradually gain size of a tennis ball - and the "flowers" bloom to spectacular white electric bulbs. The flowers in round white heads are prominent, hence the native name 'Chendu phul', or ball. Leaves bipinnate with very numerous leaflets; rachis of leaf downy, 1 ft. of more long; pinnae 20-30 pair, 60 to 100 pairs leaflets, rigid, 1/4 in. long. Presence of two glands at the base of leaf, lends this species the name, *biglandulosa*. It is an avenue tree in Chennai. This can grow into a large tree indeed with many spreading branches. The leaves are fine and feathery. The inflorescence is similar to a Badminton Ball hanging at the tip of a long thick stalk - the reason for its common name. The fruits that are flat are in clusters at the tip of long thick stalks. The entire inflorescence has a very soft appearance. However, once the flower is dry the core is pretty hard²⁻⁵. The stem bark is reported to contain tannis, saponins, glycosides, sterols and triterpenoids^{6,7}. The different parts

of the plant shows antiulcer activity, anti inflammatory activity^{9,10}, antibacterial activity, antifungal activity, Malarial fever, skin diseases¹¹ etc. Saponin's from the seed bran of *Parkia biglandulosa* is used medicinally in India for its astringent and detergent properties and also as a fish poison¹². lectins from *Parkia biglandulosa* also have mitogenicity and antiproliferative activity¹³. Some of the diagnostic features of the bark were studied. All the parameters were studied according to WHO guidelines for herbal drug standardization methodologies.

MATERIAL AND METHODS

The bark of *Parkia biglandulosa* was collected from B.Y.K. college, Nashik. then the bark was dried in sunlight, conformaton of plant was done by Dr. Laxminarsimhan, Botanical Survey of India, Pune (Voucher specimen No BSI/WC/2002/2259) and Dr. S. C. Pal, Asst, Professor, H. O. D. Pharmacognosy Dept, College of Pharmacy Nashik. Herbanium of branch was prepared and a photograph was taken.

Macroscopy

The size, color, odour and taste of the bark were studied.

Microscopy

Sectioning: Selected samples of the dried bark were stored in a solution containing formalin (5 ml), acetic acid (5 ml), and 70% v/v ethyl alcohol (FAA) (90 ml). After 24 hours of fixing, the specimens were dehydrated with a graded series of tertiary-butyl alcohol as per the method¹⁴. Infiltration of the specimens was carried out by gradual addition of paraffin wax (50 – 60°C m.p.) until the tertiarybutyl alcohol solution attained supersaturation. The specimens were casted into paraffin blocks. The paraffin embedded specimens were sectioned with the help of a Senior Rotary Microtome, RMT-30 (Radical Instruments,

*Author for Correspondence: rupesh_pingale@rediffmail.com

Table: 1 Results of physiochemical evaluation

Parameter	Value
Total ash	15.6%
Acid insoluble ash	5%
Moisture content	5.4%
Water soluble ash	4.689%



Figure 1: External and Internal surface of bark.

Table 2: Results of Preliminary phytochemical analysis of *Parkia biglandulosa*

Test	Methanol	Petroleum Ether
Alkaloids	-	-
Tannins	+	-
Saponins	+	-
glycosides	+	-
Sterols	-	+
Triterpenoids	-	+
Flavonoids	-	-

India). The thickness of the sections was kept between 10 and 12 μm . The dewaxing of the sections was carried out as per the procedure described by Johanson¹⁵. The section was stained with phloroglucinol-hydrochloric acid (1: 1) and mounted in glycerin. Photomicrograph: Microscopic descriptions of the selected tissues were supplemented with micrographs. Photographs were taken with digital camera. For normal observations, a bright field was used. For the study of crystal, stone cells, and lignified cells, polarized light was employed. As these structures have a birefringent property under polarized light they appear bright against a dark background¹⁶. Physicochemical evaluation Physicochemical parameters of *P. biglandulosa* bark powder were determined¹⁷ and reported as total ash, water-soluble ash and acid-insoluble ash. Alcohol and water-soluble extractive values were also studied. Preliminary phytochemical screening The coarse bark powder (25 g) was subjected to Soxhlet for solvent extraction using Pet. Ether, and Methanol. The extract was concentrated and subjected to various chemical tests to detect the presence of different phytoconstituents^{18,19}.

RESULT

Pharmacognostic study

Macroscopical characters

Colour- Brown

Odour- Characteristic

Taste- Astringent

Shape- Flat

Surface- Externally wrinkles are present

Length- 2-5 cm

Width- 1-2 cm

Microscopy

T. S. of stem bark of *Parkia biglandulosa* shows following characters.

Cork

Consist of 13-14 layers of thin walled cells

Phellogen

Two layers of thin walled rectangular cells without any cell content.

Cortex

5-6 layers of thin walled cells are present. Scattered stone cells are also present. Some cells contain brownish colour substance which are tannins.

Pholem region

this region comprises of parenchyma cells and medullary rays. some of the parenchyma cells contain brownish colour substance which are tannins.

Powder characteristics

the powder of bark was boiled in sodium hypochlorite solution till all the colouring matter was removed. the decolourised powder was taken on the glass slide and mounted with a drop of glycerin. the slide was observed under microscope to study powder characteristics. the microscopic examination revealed cortex cells, fibres and stone cells.

Physicochemical parameters

The results of physicochemical evaluation are presented in Table 1

Preliminary phytochemical studies

The result of Preliminary phytochemical analysis of *Parkia biglandulosa* are summarized in Table 2

DISCUSSION

The macroscopic study of the bark indicated that its color, odor, and taste may be an important characteristic feature for identifying the plant. The microscopic study of the powder revealed the presence of cork cells, parenchymatous tissue, lignified fibers, stone cells. The physical constant evaluation of drugs is an important parameter in detecting adulteration. The total ash is particularly important in the evaluation for the purity of the drugs than acid insoluble and water soluble ash. Preliminary phytochemical analysis showed the presence of various phytoconstituents in the extract such as tannins, saponins, glycosides, sterols and triterpenoids. [Table 2]. The pharmacognostic constants for the barks, the diagnostic microscopic features, and the numerical standards reported in this study can be useful for the compilation of a suitable monograph of *Parkia biglandulosa* for its proper identification.

CONCLUSION

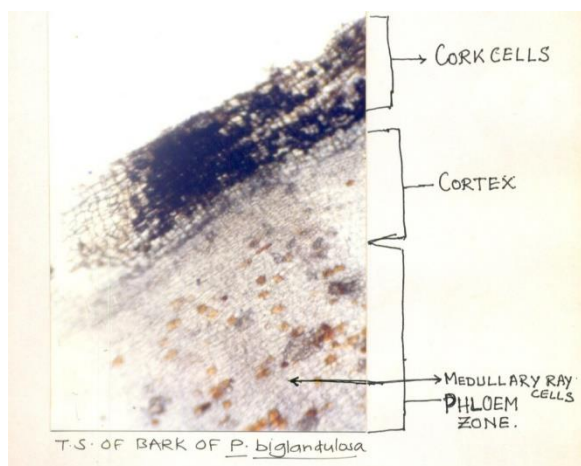


Figure 2: T. S. of Bark of *P. biglandulosa*

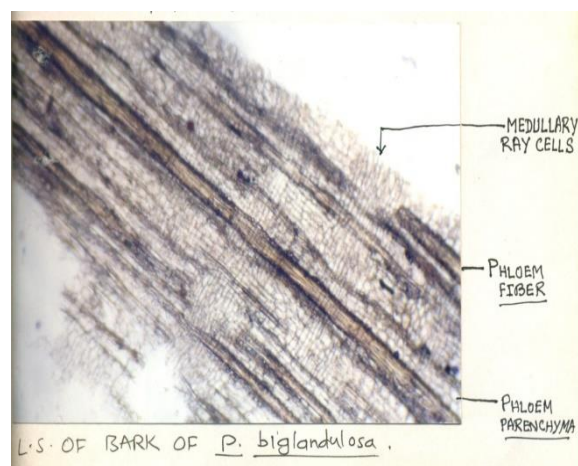


Figure 3: L. S. of Bark of *P. biglandulosa*

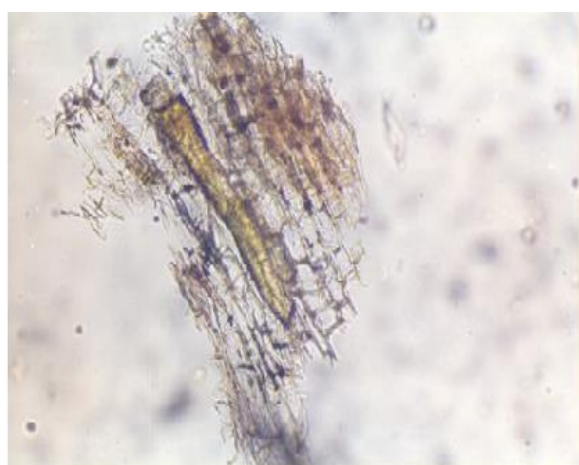


Figure 4: Stone Cell



Figure 5: Fiber

The present study on the pharmacognostic evaluation of the barks of *Parkia biglandulosa* will be useful with regard to its identification and standardization.

ACKNOWLEDGMENT

The authors are thankful to the Management College of Pharmacy, Nasik for their constant help and support.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interests regarding the publication of this article.

REFERENCES

1. Keay RWJ. Trees of Nigeria. Oxford University Press, New York: 1989, 476.
2. Anonymous, "The Wealth of India, Raw material," 1991, PID, CSIR, New Delhi, Vol.-III, 264.
3. Trease G. E. and Evans W. C., "Pharmacognosy", 1989, ELBS Publication, 13th edition, 647-651.
4. Kirtikar K. R., and Basu B. D., "Indian Medicinal Plants", Published by Lalit Mohan Basu, India. 1984, IInd edition, Vol.-II, 902-903.
5. Cooke T., "The Flora of presidency of Bombay", 1964, Botanical survey of India, Calcutta, IInd Reprinted edition, 486.
6. Krasuss G.Y.J., and Reinbothe H., "Phytochemistry", 1973, 12(1), 125-142.
7. Gmelin R., Susilo R., and Fenwick G.R., "Phytochemistry", 1981, 20(11), 2521-3.
8. Harborne J. B., "Phytochemical methods", 1973, published by Champman and Hall, 111.
9. Rupesh Pingale, Deepak Pokharkar, S.C. Pal, G K Dash. Anti-inflammatory and antiulcer activity of methanolic extract of bark of *Parkia biglandulosa* on albino rats (wistar). IJPRD;2013: 4(11).
10. Samnt, A.R., J.P. Tiwari, D.V. Derle, S.B. Kasture, V.S. Kasture and S.C. Pal, 1998. Antiulcer activity of *Parkia biglandulosa*, Indian drugs, 35: 204-207
11. L T Ajibade, P O Fatoba, U A Raheem and B A Odunuga. Department of Geography, University of Ilorin, Ilorin, Nigeria, 2004.
12. Rupesh P, Pal SC, Pavani A, Gadge MS. Quantitative estimation of the active constituents of *Parkia biglandulosa* by using HPTLC and FTIR. *International Journal of Pharma and Bio Sciences* 2010; 1 (4): 315-22.
13. Kaur N, Singh J, Kamboj SS, Agrewal JN, Kaur M. Two novel lectins from *Parkia biglandulosa* and *Parkia roxburghii*: isolation, physicochemical characterization, mitogenicity and antiproliferative

- activity. *Protein and Peptide Letters* 2005;12(6): 585-95.
14. Sass JE. New York: Mc Graw Hill; 1940. Elements of Botanical Microtechnique.
15. Johanson DA. New York: Mc Graw Hill; 1940. Plant Microtechniques.
16. Esau K. New York: John Wiley and Sons; 1964. Plant Anatomy.
17. The Ayurvedic Pharmacopoeia of India. 1999; 1:191–2.
18. Khandelwal KR. Pune, India: Nirali prakashan; 2005. Practical book of Pharmacognosy.
19. Harborne JB. London: Chapman and Hall; 1998. Phytochemical Methods.