TLS
Trends in Life Sciences
An International Peer-Reviewed Journal
www.sciencejournal.in

STUDY ON ASSESSEMENT OF PURITY STANDARDS OF *BUTEA MONOSPERMA* (LAMK.) TAUB. BARK

Kare M. A.*, Londhe D. K. and Bhuktar A. S****
*Pratishthan Mahavidyalaya, Paithan, District Aurangabad, (M S), India.
Vivekanand Arts S. D. Commerce and Science College, Aurangabad, (M S), India.
(E-mail: drmakare@gmail.com)

ABSTRACT
At present ayurvedic drugs became popular because of its effectiveness and less side effects than allopathic drugs. Number of plants, their parts and extracts are utilizing in formulation of ayurvedic drugs. *Palash* (*Butea monosperma (Lamk.) Taub*.) is one of the most important medicinal plants. Bark of *Butea monosperma (Lamk.) Taub*. is extensively utilized in formulating the ayurvedic drugs. Chemical components of bark is extensively used in treating dyspepsia, diarrhoea, dysentery, intestinal worms, bone fractures, rectal diseases, gonorrhoea, ulcers, tumours, and diabetes. It is also useful in abdominal tumours, colic, bleeding piles, haemorrhage, amenorrhoea and dysmenorrhoea. The bark is bitter, acrid, hot, oily, astringent, appetiser, anthelmintic, aphrodisiac, alterative. The crude bark of *palash* is supplied by traders to manufacturer. Malpractices could be possible. Therefore identification of pure bark is important in laboratory. The pure bark materials leads in formation of quality drugs. In present investigation, attempts were made to study morphology, anatomy, and phytochemistry of *palash* bark for its identification. The studies on various parameters on *palash* bark could helpful for maintenance of quality drugs.

KEYWORDS: Ayuvedic, Bark, *Butea monosperma* (Lamk.) Taub.,

INTRODUCTION

Butea monosperma (Lamk.) Taub. belongs to family Fabaceae. It is popularly known as *Palash, Kimsuka, Raktapuspaka, Gaccha, Kesudo, Khakharo, Khakhapado, Dhak, Muttuga, Muttala, Plasu, Camata, Plas, Palas, Dhak, Tesu, Purasu, Modugu, Chettu and Palaspapda*. It occurs in the dry deciduous forests, open grass lands and scrub forests of the tropical zone. In India it is chiefly found in the dry deciduous forests of central and western India. It is more common in the plains and ascends to an elevation of 900 m in the outer Himalayas and up to 1500 m in southern India. The bark is used in various ayurvedic preparations.

The bark of *Butea monosperma* is used in various ayurvedic preparations. The bark is reported to be used to treat dyspepsia, diarrhoea, dysentery, intestinal worms, bone fractures, rectal diseases, gonorrhoea, ulcers, tumors, and diabetes. The bark is also bitter, acrid, hot, oily, astringent, appetizer, anthelmintic and aphrodisiac, alterative. It is useful in abdominal tumours, colic, bleeding piles, haemorrhage, amenorrhoea and dysmenorrhoea. It lessens inflammations and biliousness. It is useful in diseases of anus and hydrocoel. Decoction of bark is given in cold cough, fever and menstrual disorders Shrivastava (1964). It is also used in thermogenic, emolient, aphrodisiac, digestive, constipating and tonic, vitiated conditions *pitta* and *kapha*, anorexia, dyspepsia, diabetes Varriers, (1996). The bark of this tree furnishes a very important exudation which is generally known as *butea gum* which is very rich in tannin and gallic acid and excellent astringent, well adapted to children and vulnerable females, erysipelatus, ring worms Nadkarni, (1998), blood pressure Misra and Kumar (2001 A), leprocy, gastrointeritis, menorrhagia, snakebite, wounds, tuberculosis, goiter Shrivastava and Jain (2005), night blindness syphilis, contraceptive Varma *et. al.*, (2003), antifungal Bandara *et. al.*, (1989), indigestion and blood purifier Misra and Kumar (2001 B), diarrhoea and piles Gupta and Kumar (2002).

The quality of bark available in the form of pieces or fine powder in market is questionable. The bark can be easily adulterated. As the supply of crude drug is inadequate, traders adulterate this genuine crude drug with low grade material. Attempts were made in present investigation to standardize the morphological, anatomical and phytochemical attributes of bark.

MATERIALS AND METHODS

In present study, the pure bark of Butea was collected from authentically identified tree. The morphological features were studied under stereoscope. The anatomical studies were carried out as per standard procedures suggested by Esau (1960, 1965). The chemical analysis of bark was carried out by adopting procedure suggested by and Sadasivam and Manickam, (1992), Mungikar (1999) and Dhabe (2003).

RESULTS AND DISCUSSIONS

Morphology : Thickness of fresh bark is 10 to 15 mm and dried bark 7 to 11 mm, hard, outer surface ash gray to silver brown, curved rough due to presence of rhytedomes and scattered dark brown spots of exudates; rhytedomes 2 mm thick, usually peels off exposing light brown surface, exfoliation of cork and presence of shallow longitudinal and transverse fissures; inner surfaces smooth, light yellow and finely striated; fracture hard, irregular fibrous, taste slightly astringent, shape single quelling (plate 01). The Phytochemistry of Bark shown in Table 1. And their extractive values shown in Table 2. The distribution Phenolic Acid showed in table 3.

Table 1. Phytochemistry of bark

Chemical composition	% of DM
Dry Matter (DM)	34.5
Bulk Density mg/cm^3	406
Total Ash	7.05
Nitrogen (N)	1.83
Water soluble Nitrogen (WSN)	0.20
Carbohydrates	77.52
Total Sugar	6.24
Reducing Sugar	5.40
Non Reducing Sugar	0.64
Crude Fibre (CF)	32.30
Crude Fat (C Fat)	4.0
Cellulose	25.70
Hemicellulose	22.5
Lignin	5.7
Tannins	9.56
Gross Energy Kcal/gm	3.69
Calcium (Ca)	1.87
Phosphorus (P)	0.120
Potassium (K)	0.604

Table 2. Extractive values

Solvents	Percentage
Water	16.98
Methanol	13.8
Alcohol	13.8
Benzene	4.0
Petro. Ether	0.56
Chloroform	1.04
Acetone	0.84

Table 3. Distribution of Phenolic Acid

Phenolic acid	Status
Vanilic acid	+
Syringic acid	+
Ferulic acid	-
Protocatechuicacid	-
P-hydroxy benzoic acid	-
P-coumaric acid	-
Phloretic acid	-
Melilotic acid	+

Anatomy: Mature bark in T.S. shows rhytidoma, cork, secondary cortex and phloem tissue, which are all dead. Cork cells are thick walled 10-25 layered; rectangular dark brown coloured 20 x 35µ is average size. Cork cambium 3-5 layered rectangular, radially elongated cells of similar kind with cork cells. Cork is composed of rounded or polygonal cells irregular in outline. Moderately thick walled, some tanniniferous cells are randomly distributed single or in groups of 2-3 cells.

Figure1. T.S. of bark with Medullary rays

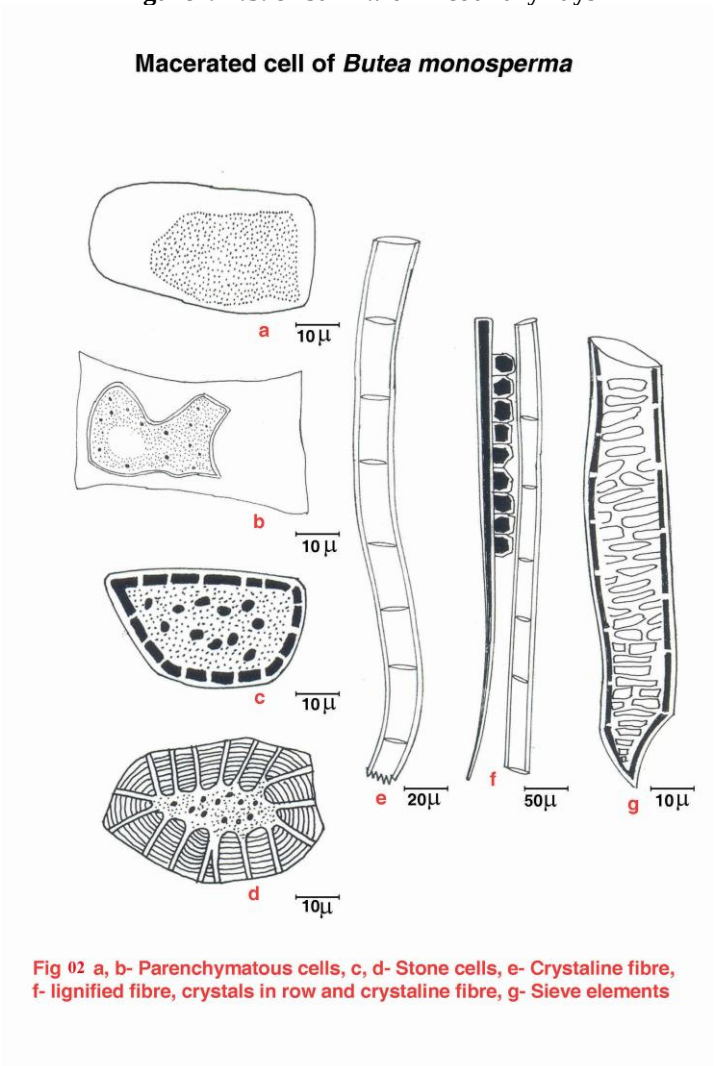

Fig 02 a, b- Parenchymatous cells, c, d- Stone cells, e- Crystaline fibre, f- lignified fibre, crystals in row and crystaline fibre, g- Sieve elements

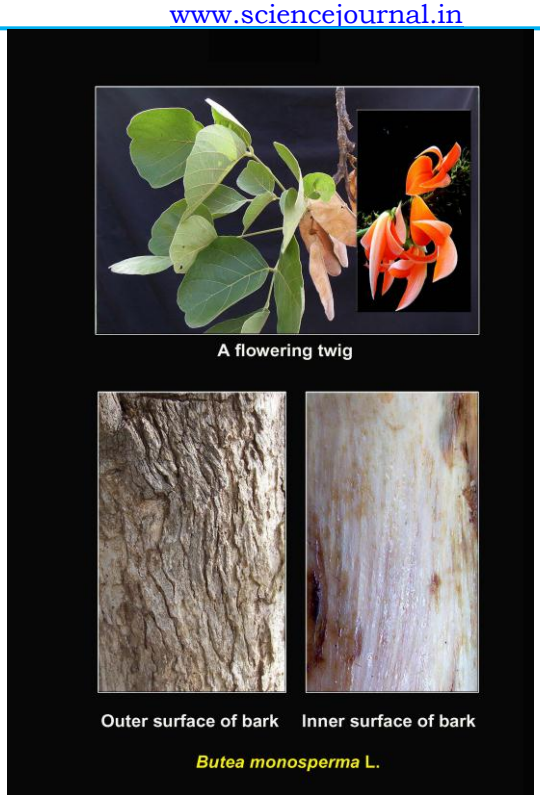

Plate 1. A flowering twig; Outer and inner surface of bark of the *Butea monosperma L.*

Some large confined in groups of 2-34, are of mucilagenous or secretory cells are also distributed in this zone. Some cortical cells of 4-8 layers, cells of this layer are radially arranged, tangentially rectangular which are followed by 2-4 layers of stone cells. Stone cells are polygonal thick and double walled having 10-20µ in diameter. Diameter of the secretory cells 60-70µ. Secondary phloem consists of sieve tubes, companion cells, phloem parenchyma, phloem fibers. Crystal fibers in the outer and middle phloem region, sieve elements get crushed and from tangential bands of ceratenchyma, Phloem fibers arranged in tangential bands alternating with sieve tubes and phloem parenchyma. Sieve tubes are 50-70µ in diameter. Most of the fibers contain prismatic crystals of calcium oxalate. Phloem rays multiseriate, 3-8 cells wide 30-50 cells in height. The phloem rays with radially elongated cells. Phloem parenchyma and ray parenchyma cells are impregnated with starch grains. The starch grains simple or 2-3 grains aggregated. Starch grains 5-10µ in diameter, Tanniniferous cells and secretary cavities also occur in secondary phloem (Figure 1).

Maceration: Maceration shows following cells. Parenchymatous cells are of two types, one is smaller, rectangular blunt at corners 25-30 x 80-90µ (Figure 1a) and another cell is larger rectangular 45-60 x 90-110µ (Figure 1b). Stone cells are of two types, one is a rectangular with large lumen and measuring 25-30 x 30-55µ (Figure 1c), another cell are polygonal with small lumen and very thick striated walls measuring 35-40 x 50-80 (Figure 1d). Crystalline fibres are of two types, one is thick, 25µ wide, septete (Figure 1e), another with 10-12µ width. Lignified fibres 15-20µ thick, very tapering at ends with large lumen measured in few hundred microns (Figure 1f). Prismatic crystals of calcium oxalate in a row which are polygonal (Figure 1f). Sieve elements 20-25µ wide, 170-230µ long. Simple perforations seen at one end. Elongated pits on lateral wall (Figure 02).

Phytochemistry:- The studies on various chemical compositions of bark are summarized in table 01. The bark was extracted and their respective values are given in table 02. Presence of distribution of phenolic acid recorded in table 03. Similar phytochemical studies were also carried in genus *Alysicarpus* by Dhabe (2003).

The extract of bark of *Butea monosperma is* generally used in formulating ayurvedic drugs. The identification of pure *palash* bark in laboratory is essentially important in manufacturing of quality drugs. In this connection, these morphological, anatomical and phytochemical studies on bark could helpful in the assessment of the purity.

ACKNOWLEDGEMENT

Authors are thankful to Prof. A. M. Mungikar for his guidance, Dr. S. D. Shastri, Principal and Head and Dr. M. N. Mohrir, Department of Botany, Pratishthan Mahavidyalaya, Paithan, District Aurangabad for providing laboratory facilities and constant encouragement during the course of investigation.

REFERENCES

Bandara M., Kumar N. S. and Samaranayake K. M. (1989). An antifungal constituent from the bark of *Butea monosperma*. *J. Ethanopharmacol* 25 (1): 73-75.

Dhabe A. S. (2003). Morphologoical, floral biological and chemical studies in relation to taxonomy of genus *Alysicarpus* Desv, Vol I and II, Ph.D. Thesis Dr. B.A.M. University, Aurangabad.

Esau Katherine (1960). Plant Anatomy, John Wily and Sons, Inc., New York, London.

Esau Katherine (1965). Plant anatomy, 2nd ed, John Wiley, New York, pp 767.

Gupta Ritu and Ashwani Kumar (2002). Searching for antidiabetic agent among ayurvedic crude drugs. *Int. J. Mendel.* 19 (1-2) 9-10.

Misra Ajanta and Ashwani Kumar (2001 A). Medicinaly important trees of Rajasthan. *Int. J. Mendel.*18 (1-2):37-38.

Misra Ajanta and Ashwani Kumar (2001 B). Stuidies on Ayurvedic crude drugs for the care of urinary track stones. *Int. J. Mendel.*18 (1-2) 41-42.

Mungikar A. M. (1999). Intercropping fodder crops, Sarswati printing press, Aurangabad (M.S.) India.

Nadkarni K. M. (1998). Indian Plants & Drug, with their medicinal properties and uses, Asiatic Publishing House, New Delhi.

Sadasivam S. and Manickam A. (1992). Biochemical methods for agricultural sciences, Wiley Eastern Limited, New Delhi.

Shrivastava Neerja and Suchita Jain (2005). Ethnomedicinal flora of Alnia River banks of Kota Districts in Rajasthan. Int. *J. Mendel*. 22 (1-2) 27-28.

Srivastava L. M. (1964). Anatomy, chemistry and physiology of bark. *Int. Rev For. Res* 1:204-277.

Varriers P. S. (1996). Indian Medicinal Plants, a Campendium of 500 sp., Volume-III, Orient Longman Ltd. Madras.

