

Standardization of *Diospyros Melanoxylon* Roxb. Bark

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ABSTRACT:

Diospyros melanoxylon Roxb. belongs to family Ebenaceae. It is known as Tembhurna, Temru, Tendu, Kalskanda. The bark is used in the treatment of diarrhoea, dyspepsia, astringent, dysentery, ulceration of cornea and post natal pains. The quality of bark available in the market is doubtful. Therefore attempts were made to standardize the bark by studying its morphology, anatomy and phytochemistry. By employing these parameters in combination the bark of *Diospyros melanoxylon* Roxb. can be standardized.

KEYWORDS: *Diospyros melanoxylon*, Bark, Standardization.

I. INTRODUCTION:

Bark is one of the most important plant parts which is used medicinally as a remedy for various human ailments. The term bark refers to all tissues outside the vascular cambium of the axis, in either a primary or secondary state of growth (Shrivastav, 1964), Jackson (1990) defined the term bark as "The outer integument of the wood and exterior to it i.e. all tissues outside the cambium." According to him the bark is frequently restricted to the periderm and the tissue external to it (Esau, 1960). The bark has been reported to be used as astringent, bitter and treat dyspepsia, colic flatulence, cough, asthma, bronchitis, skin diseases, pectoral diseases, intermittent fevers and inflammations. It has thermogenic, carminative, lithotriptic, stimulant, detergent, expectorant, demulcent, depurative, antiperiodic (Varier's 1998).

Bark is astringent and styptic and used in dysentery and intermittent fevers. A paste made from the bark is applied to boil and tumours (Joshi, 2000). It is also useful in acria, cooling, anti-vitiated conditions of pitta, burning sensation, inflammations, diarrhoea, leprosy, skin diseases, pruritus, dyspepsia, haemorrhage, burns, diabetes,

spermatorrhoea, and vaginal disorders (Varriers, 1996). The barks have astringent properties and chronic dysentery (Nadkarni, 1998). The bark of tree possesses astringent properties and is used as decoction in diarrhoea and dyspepsia as a tonic. In dilute form it is used as an astringent lotion for the eyes (Bhattacharjee 2000).

II. RESULT AND DISCUSSION:

Morphology: Thickness of fresh barks 14 to 19 mm and dried bark 8 to 12 mm, hard; external surface ash grey to silver black. Rhytidomes large rectangular to linear; fissures deep longitudinal and transverse, rhytidomes layers prominent, outer bark brown to black and inner bark yellow brown; smooth, distinctly striated, fibrous; fracture soft, irregular; taste sweet and astringent, shape quelling.

Anatomy: Mature stem bark in T.S. shows cork composed of 25-40 layers of moderately thick walled compactly arranged squarish or rectangular, irregular cells. The cork is interrupted at many places because of lenticels. Some cork cells are dark brown and some cells are dark black coloured. Their average size 30 x 30 μ . Cork is followed by cork cambium, which are 5-7 layered tangentially elongated rectangular cells. Usually brown in colour measuring 10-15 x 20-30 μ . Cork cambium is followed by cortex which is 20-25 layered. These cells are circular or oval thick walled loosely arranged 30-60 μ in diameter, brown in colour. Tanniferous cells are distributed throughout region, some of the parenchymatous cells radially elongated, rectangular, 20-25 x 40-70 μ . Starch grains impregnated in cortical cells which are simple and circular. After this zone lignified fibers in patches of 10-30, alternating with secondary phloem, diameter of lignified fiber 15-30 μ . Secondary phloem consists of sieve tube, phloem parenchyma, companion cells, fibers and ray parenchyma. Phloem parenchyma is composed of

tangentially elongated rectangular cells of size 15-25 x 50-100 μ . Cells are impregnated with starch grains. Inner phloem shows circular patches of stone cells. Each patch composed of 10-12 stone cells, stone cells polygonal having 30-60 μ in diameter with little or no lumen. Phloem rays are tangentially elongated in outer phloem and radially elongated in inner phloem, rays are uniseriate. Inner phloem, outer phloem and cortex show rhomboidal or squarish, prismatic crystals of calcium oxalate.

01. Phytochemistry of bark

Chemical composition	% of DM
Dry Matter (DM)	63.0
Bulk Density mg/cm ³	439
Total Ash	10.30
Nitrogen (N)	1.16
Water soluble Nitrogen (WSN)	0.19
Carbohydrates	79.44
Total Sugar	3.39
Reducing Sugar	3.03
Non Reducing Sugar	0.36
Crude Fibre (CF)	24.50
Crude Fat (C Fat)	3.0
Cellulose	29.50
Hemicellulose	22.2
Lignin	9.9
Tannins	10.93
Gross Energy Kcal/gm	3.64
Calcium (Ca)	4.38
Phosphorus (P)	0.040
Potassium (K)	0.351

III. Conclusion:

Anatomical features including cork, cortex and secondary phloem, macerated cells like fibres, sieve elements, stone cells, elongated cells with yellow inclusions, cork cells and parenchymatous cells form the criteria for the standardization of *Diospyros melanoxylon* bark. Another important parameters like 63.0% dry matter, 439 mg/cm³ bulk density, 10.30% ash, 10.00% acid soluble ash, 0.30% acid insoluble ash, 4.05% water soluble ash, 6.6% water insoluble ash, 1.16% nitrogen, 0.19% water soluble nitrogen, 7.25% crude proteins,

Phytochemistry:

The chemicals present in bark drugs were analyzed qualitatively as well as quantitatively following (Dhabe, 2003; Mungikar, 1999; Sadasivam and Manickam, 1992). Occurrence or absence of specific chemicals may give the criteria to evaluate standardize the drug. The chemistry of bark is given in table 01, 02, and 03.

02. Extractive values

Solvents	Percentage
Water	6.24
Methanol	7.2
Alcohol	5.2
Benzene	1.0
Petro. Ether	0.44
Chloroform	0.88
Acetone	3.36

03. Distribution of Phenolic Acid

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

79.44% carbohydrates, 3.03% reducing sugar, 0.36% non reducing sugar, 3.39% total sugar, 24.50% crude fibres, 3.0% crude fats, 29.50% cellulose, 22.2% hemicellulose, 9.9% lignins, 10.93% tannins can also be used as a criteria of standardization of *Diospyros melanoxylon* bark. The extractive values of *Diospyros melanoxylon* bark are 6.24% in water, 7.2% in methanol, 5.2% in alcohol, 1.0% in benzene, 0.44% in petroleum ether, 0.88% in chloroform and 3.36% in acetone are considered as strict parameters. Presence of ferulic acid also used as criteria. The above all

parameters in combinations determine genuinity or authenticity of the *Diospyros melanoxylon* bark.

Acknowledgement:

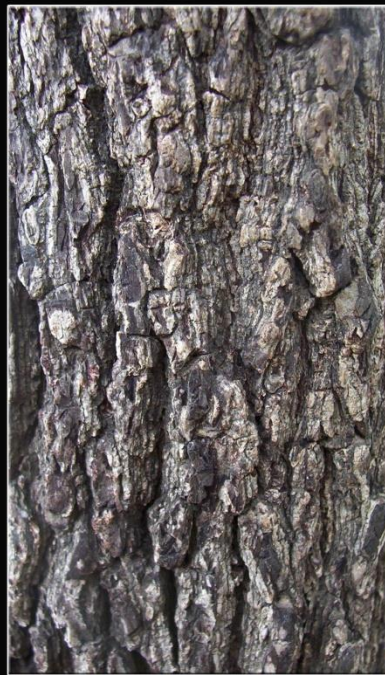
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A flowering twig



Outer surface of bark

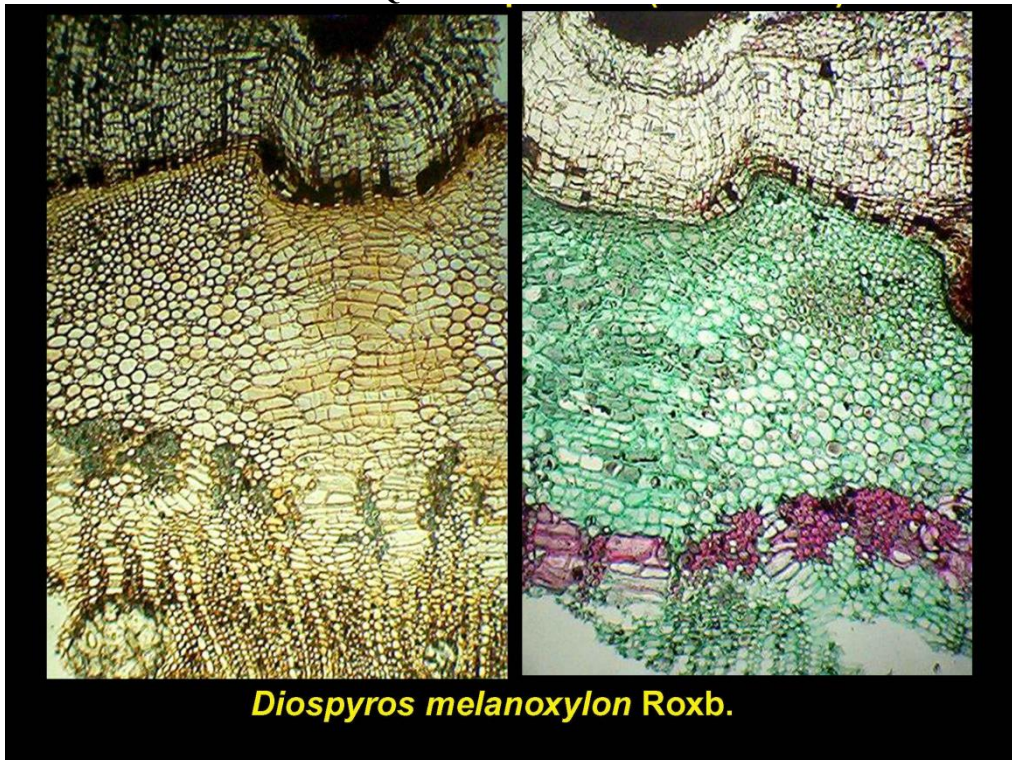


Inner surface of bark

***Diospyros melanoxylon* Roxb.**



QUILLING OF BARK



T. S. OF BARK