

EDUCATIONS ARRANGED MORPHOLOGY, STRUCTURE AND PHYTOCHEMISTRY OF AZADIRACHTA INDICA A. JUSS. BAY

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ABSTRACT:

The bark of Azadirachta indica A.Juss.

KEYWORDS: Azadirachta indica, Bark, Standardization.

INTRODUCTION:

The bark of Azadirachta indica A.Juss. (Meliaceae) commonly known as Neem. Bark is useful in skin diseases, leucoderma, intermittent and malarial fevers, wounds, ulcers, tumour, vomiting, intestinal worms, inflammation, cough and bronchitis. It is given in piles, jaundice. It is used in snakebite, and scorpion-sting.

It is useful in vitiated conditions of pitta, hyperdipsia, leprosy, skin diseases, eczema, burning sensation, tumour tubercular glands, anorexia, hypoparathy, cough, diabetes, amenorrhoea; haemorrhoides, syphilis and fatigue (Varier, 1996, Misra and Kumar 2001 A), Pyorrhoea (Patel 2004), antiseptic (Shrivastava and Jain 2005), stomachic (Gupta and Kumar 2002), hair and scalp care (Sharma and Kumar 2002), healing of gastric ulcer (Dorababu 2004).

Insecticide (Siddiqui et al 2004), very effective in healing gums, periodontal diseases and extract is considered an important ingredient of the toothpaste and other product of oral hygiene (Das 2004). The twig with bark is used as tooth brush (Das and Das 2002), worm diseases and improve intelligence (Martin, Innocent and Ratnam 2004). The bark is bitter, tonic and stimulant. It arrests secretion and bleeding besides counteracting and spasmodic disorders.

Bark is cherished in local healing tradition (Nadkarni 1997). The neem bark is a cool, bitter, acrid, astringent and refrigerant. It is useful in tiredness, cough, fever, loss of appetite, worm infection, vomiting, skin diseases, excessive thirst and diabetes (Bhattacharjee 2000).

MATERIALS AND METHODS: During present investigation the bark samples of Azadirachta indica were collected from Sambhaji Hills, Dr. Babasaheb Ambedkar Marathwada University campus, Aurangabad and their morphological, anatomical and maceration characters were studied.

For anatomical studies free hand sections of the bark were taken, double-stained and mounted permanently by following standard methods (Esau, 1965) and observed under compound microscope.

The bark powder was kept in different solvents for 48 hours in air tight containers, filtered, the filtrate was evaporated to dryness, dry weight was recorded and the percent extractive value was calculated (Sadashivam and Manickam, 1992).

RESULT AND DISCUSSION:

Morphology: Thickness of fresh bark 15 to 20 mm and dried bark 10 to 17 mm, according to age, hard, external surface very rough fissured longitudinally and transversely, rusty gray, laminated, inner surface

greyish and foliaceous, striated; fracture hard, irregular fibrous; odour characteristic; taste bitter, shape of dried bark quilling.

Anatomy: T.S. of stem bark shows outer exfoliating pieces of rhytidomes which are hard, woody, and considerably thicker in older bark, followed by entirely dead element of secondary phloem alternating with discontinuous tangential bands and compressed cork tissue. The dead elements of secondary phloem also having several layers of stone cells occurring in regularly groups together with collapsed phloem elements filled with brown contents in exfoliating portion, a number of layers of cork cambium are there which are brick shaped.

Below this very wide zone of secondary phloem commonly composed of well-developed fiber bundles composed of 3-5 layers of lignified fibers which are polygonal and 15-25 μ in diameter alternating with 2-4 seriate phloem rays and transversely separated by bands of phloem parenchyma.

Secretary cavities of 30-50 μ in diameter occur in cortex and the phloem regions. Most of phloem parenchyma contains starch grains and prismatic crystals of calcium oxalate. In the inner phloem ray parenchyma becomes radially elongated. Some rays parenchymatous cells also impregnated with starch grains.

Maceration: Maceration of mature bark reveals parenchymatous cells thin walled squarish or rectangular with very little irregular cytoplasm measuring 15-30 x 40-75 μ (Fig). There is heap of rectangular cells, thin walled blunt at the corners are another type of parenchymatous cells, measuring 10-15 x 35-45 μ (Fig).

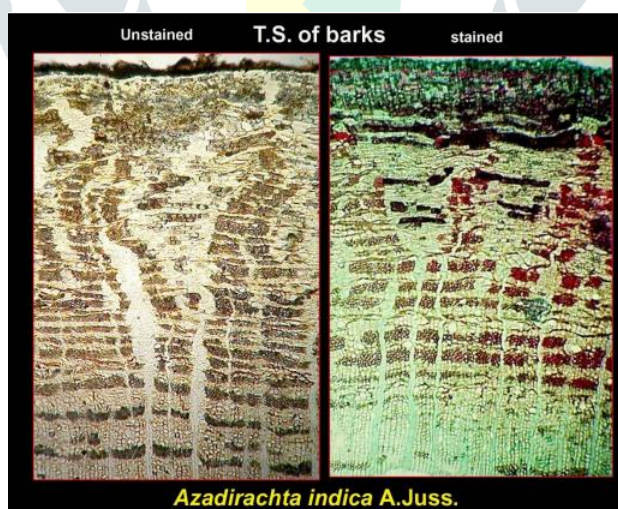
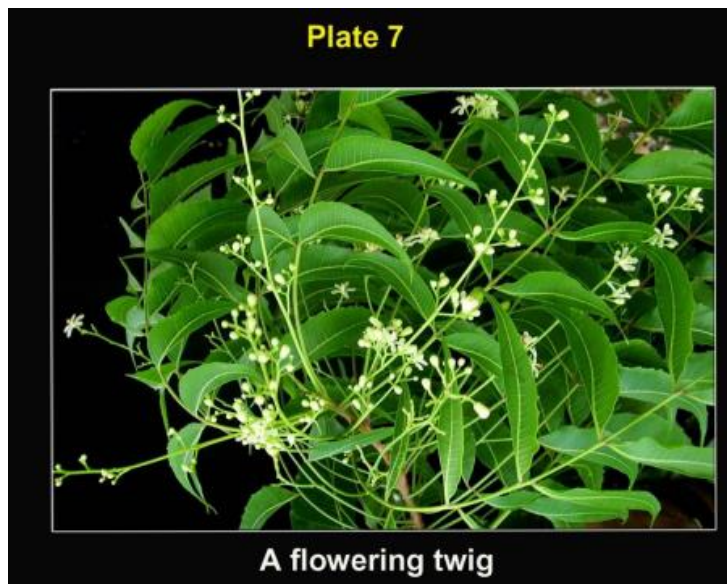
Sclerenchymatous cells that are rectangular thick walled, cell wall interrupted at places 18-30 x 95-120 μ (Fig). Stone cells are squarish to rectangular blunt at corner with large lumen. 30-40 x 45-75 μ . The walls are irregularly thickened (Fig). Fibres are very long 1400-1800 μ long, very tapering at ends. Thick walled with large lumen. Thickness varies from 15-30 μ .

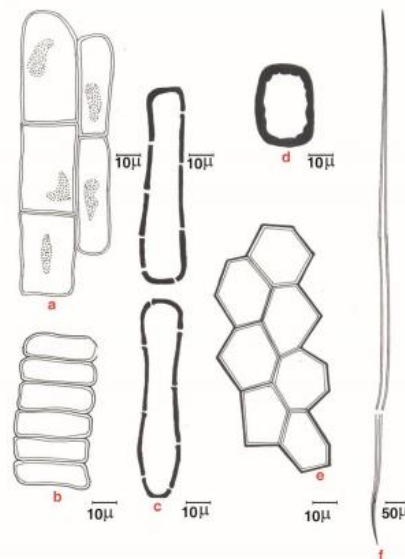
Phytochemistry:

The chemicals present in bark drugs were analyzed qualitatively as well as quantitatively following (Dhabe, 2003; Mungikar, 1999; Sadasivam and Manickam, 1992). The chemistry of bark.

Chemical composition % of DM Dry Matter (DM) 56.50 Bulk Density mg/cm³ 428 Total Ash 4.05 Nitrogen (N) 0.83 Water soluble Nitrogen (WSN) 0.17 Carbohydrates 85.27 Total Sugar 2.36 Reducing Sugar 2.52 Non Reducing Sugar 1.47 Crude Fibre (CF) 23.60 Crude Fat (C Fat) 5.5 Cellulose 29 Hemicellulose 3.5 Lignin 12.1 Tannins 12.81 Gross Energy Kcal/gm 3.50 Calcium (Ca) 1.77 Phosphorus (P) 0.096 Potassium (K) 0.370

Solvents Percentage Water 10.38 Methanol 12.8 Alcohol 10.0 Benzene 2.4 Petro. Ether 1.98 Chloroform 2.82 Acetone 3.66



Macerated cells of *Azadirachta indica*

Conclusion: Anatomical features including cork, cortex and secondary phloem, macerated cells like fibres, sclerenchymatous cells, cork cells, stone cells, and parenchymatous cells form the criteria for the standardization of *Azadirachata indica* bark. Another important parameters like 56.5% dry matter, 428 mg/cm³ bulk density, 4.05% ash, 3.80% acid soluble ash, 0.25% acid insoluble ash, 2.55% water soluble ash, 1.75% water insoluble ash, 0.83% nitrogen, 0.17% water soluble nitrogen.

5.18% crude proteins, 85.27% carbohydrates, 1.47% reducing sugar, 0.89% non reducing sugar, 2.36% total sugar, 23.60% crude fibres, 5.5% crude fats, 29.00% cellulose, 3.5% hemicellulose, 12.1% lignins, 12.81% tannins can The extractive value of *Azadirachata indica* bark are 10.38% in water, 12.8% in methanol, 10.0% in alcohol, 2.4% in benzene, 1.98% in petroleum ether, 2.82% in chloroform and 3.66% in acetone are considered as strict parameters. The above all parameters in combinations determine genuinity or authenticity of the *Azadirachata indica* bark.

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