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Pharmacognostic evaluation of root of *Celastrus paniculatus* Willd

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Abstract
Objective: To evaluate the pharmacognostic characters of an important medicinal plant, *Celastrus paniculatus* Willd. **Methods:** The pharmacognostic studies were carried out in terms of organoleptic, microscopic, macroscopic and fluorescence analysis. **Results:** The characteristic features of root observed were multicellular uniseriate trichomes, Outermost narrow zone of cork and Secondary cortex with polygonal cells containing starch and oil globules. The characteristic microscopic powder study of root powder showed presence of fibers, fiber tracheids, uniseriate and multiseriate trichomes. Starch and oil globules were also observed. Macroscopy of root showed primary and secondary roots with yellow brown, rough inner surface. **Conclusion:** Various pharmacognostic characters observed in this study help in identification and standardization of C. paniculatus Willd.

Keywords: *Celastrus paniculatus*, Microscopy, Organoleptic, Fluorescence analysis, Identification, Standardization, Pharmacognostic character.

1. Introduction
Over the last decade there has been a growing interest in drugs of plant origin in contrast to the synthetics that are regarded as unsafe to human and environment [1]. *Celastrus paniculatus* is a scandent shrub of family Celastraceae and commonly known as Black oil plant or Malkangani. In traditional system of medicine, seeds, bark and leaves are used as bitter, acrid, thermogenic, diaphoretic, diuretic, anti-inflammatory, digestive, laxative, emetic, anthelmintic, depurative, and in rheumatism, for chronic liver and skin ailments (including skin cancer), rheumatism, leucorrhoea, dysentery. All the species are memory enhancers and have been used as natural insecticides for a long time. Local healers use the different species to treat different ailments. The authentic identification of these parts is a problem for them because other species of *Celastrus* are also being used as herbal medicines and there is little morphological difference in members of these species. As pharmacognosy is 1st step in proving medicinal status as crude drug of plant parts used in health care system, the pharmacognostic studies of root of *C. paniculatus* were carried out. This adulteration can be prevented by means of various evaluation parameters like microscopic study. Establishment of the pharmacognostic, morphological and microscopical characters of leaves and bark of the plant will assist in standardization, which can guarantee quality, purity and identification of samples [2].

Fig 1: *Celastrus paniculatus*

2. Materials and methods

2.1 Chemicals

All the chemicals used were of analytical grade and were obtained from E. Merck Limited India and Hi-Media Laboratories, Mumbai, India.

2.2 Procurement of plant materials

Fresh root and root bark of *C. paniculatus* were collected from forest areas of Kokan. Identification of the plant was done by

Organoleptic evaluation- Various sensory parameters of the plant material (such as colour, odour, size, shape, and taste) were studied by organoleptic evaluation.

2.3 Macroscopic evaluation

Various macroscopic characters of roots of *C. paniculatus* were recorded such as duration, type of roots, presence or absence of primary and secondary roots and special characters if any exists. The root bark is morphologically studied for its size, shape, surface, fracture and configuration.

2.4 Microscopic evaluation

In microscopic evaluation, studies were conducted on both grounds qualitatively and quantitatively.

2.5 Qualitative microscopy

In this study, transverse sections root bark was studied under photomicrograph. Staining reagents (such as phloroglucinol-HCl and methyl orange) were used as per standard procedures [3, 4, 5]. The various identifying characters were studied with or without staining and recorded.

2.6 Powder microscopy

The dried root bark was powdered and studied under microscope. Different staining reagents (such as iodine for detection of starch grains and phloroglucinol for detection of lignified components) were used. A little quantity of root bark powder was taken onto a microscopic slide, 1-2 drops of 0.1% w/v phloroglucinol solution and a drop of concentrated hydrochloric acid were added and covered with a cover slip. The slide preparation was mounted in glycerol and examined under microscope. The characteristic structures and cell components were observed and their photographs taken using photomicrography [6, 7].

2.7 Fluorescence analysis

Fluorescence analysis of powder of root bark was done by standard procedure [8, 9, 10, 11]. In this analysis the root bark and its powder were treated with various acidic and basic solvents and were then observed in UV/ visible chamber under visible, short wave and long wave regions simultaneously [12, 13]. Fluorescence is an important phenomenon exhibited by various chemical constituents show fluorescence in the visible range in day light. The UV light produces fluorescence in many natural products (e.g. alkaloids like berberine) which do not visibly fluorescence in day light. If the substances themselves are not fluorescent, they may often be converted into fluorescent derivatives by applying different reagents hence some crude drugs are often assessed qualitatively in this way and it is an important parameter of pharmacognostical evaluation [14, 16]. The changes in appearance and colour were observed and recorded.

2.8 Observation table

Table 1.1: Fluorescence analysis of root bark powder using different extracts

Sr. No	Extracts	Root Powder		
		Day light	254 nm	365 nm
1)	Chloroform	Dark Brown	Dark Brown	Dark Brown
2)	Acetone	Light Brown	Light Brown	Light Brown
3)	Methanol	Brown Yellow	Brown	Brown
4)	Ethanol	Yellow Brown	Yellow Brown	Yellow Brown
5)	Pet ether	Light Yellow	Light Yellow	Light Yellow
6)	Water	Brown	Brown	Brown

Table 1.2: Fluorescence analysis of root bark powder using different chemicals

Sr. No.	Treatment	Root Powder		
		Day light	254nm	365nm
1)	NaOH (aq)	Green	Green	Green
2)	NaOH (al)	Green	Light Green	Light Green
3)	1N HCl	Dark Green	Green	Green
4)	NH_3	Green	Yellow Green	Green
5)	Iodine	Light Green	Yellow	Green
6)	$FeCl_3$	Green	Light Yellow	Light Green
7)	Acetic acid	Green	Green	Green
8)	HNO_3	Brown	Green Brown	Green
9)	Methanolic NaOH	Green	Light Green	Green
10)	NC in amyl acetate	Green	Light Green	Green

3. Results

The root bark and its powder were yellowish brown in colour, bitter taste

3.1 Macroscopic evaluation

The morphological features of root bark were observed as,

rough and firm externally. Root system is tap root system. The root is brown coloured with number of primary and secondary roots. The inner surface of bark showed yellowish brown colour when fresh and dark brown when dried.

3.2 Microscopic evaluation

The transverse section of root bark of *C. paniculatus* showed the arrangement of different types of cells in the presented in Figure. Transverse section of mature root is circular in outline and is with multicellular uniseriate trichomes. Outermost is a narrow zone of cork, which is dark coloured. Secondary cortex is very prominent with polygonal cells in 12-16 layers and they contain starch and oil globules. A large zone of secondary vascular tissue is present with prominent medullary rays containing starch grains. Pith is nearly obligated in the secondary structure.

3.3 Powder microscopy

Powdered root bark of *C. paniculatus* under microscopic investigation showed fibers, fiber tracheids. Brown coloured powder showed presence of uniseriate and multiseriate trichomes. Fibers and fiber tracheids also showed presence in the powder. Starch and oil globules were observed.

4. Discussion

Standardization is an important tool for herbal drugs in order to establish their identity, purity, safety and quality. In order to standardize a drug, various macroscopic, microscopic, fluorescence analyses are done. Microscopic method is one of the cheapest and simplest methods to start with establishing the correct identification of the source material [15]. Morphological and microscopical studies of the root will enable to identify the crude drug. The quantitative determination of some pharmacognostical parameters is useful for setting standards for crude drugs. Morphological and microscopic studies of root bark act as a reliable aid for detecting adulteration. These simple but reliable standards will be useful to a lay person in using the drug as a home remedy. These studies can also help the manufacturers for identification and selection of the raw material for drug production. In conclusion, the parameters which are reported here can be considered as distinctive enough to identify and decide the authenticity of this drug in herbal industry/trade and this can be included as microscopic standards in Indian Herbal pharmacopoeia.

5. References

1. Joy PP, Thomas J, Mathew S, Skaria BP. Medicinal plants. Calcutta: Naya Prokash 2001, 449-632.
2. Evans WC. Trease and Evans pharmacognosy. Edn 16, Edingburgh: Saunders Elsevier, 2009, 541-570.
3. Pandya DJ, Desai TR, Nadpara NP, Mehta HA, Modi AM. Pharmacognostic study and establishment of quality parameters of leaves of *Bombax insigne* Linn. Int J Pharmacogn Phytochem Res 2010; 2(3):1-5.
4. Kokate CK. Practical pharmacognosy. New Delhi: Vallabh Prakashan 2005, 107, 108, 115-120, 122-123.
5. Ali M. Text book of pharmacognosy. New Delhi: CBS Publishers & Distributers 2008, 181-211.
6. Gokhale SB, Kokate CK. Practical pharmacognosy. Edn 12, Pune: Nirali Prakashan 2008, 24.
7. Khandelwal KR. Practical pharmacognosy. 18th ed. Pune: Nirali publication 2007, 10-14.
8. Gupta AK, Tandon N, Sharma M. Quality standards of Indian medicinal plants. New Delhi: Indian Council of Medical Research 2008, 246-255.
9. Thitikornpong W, Phadungcharoen T, Sukrong S. Pharmacognostic evaluations of *Lagerstroemia speciosa* leaves. J Med Plant Res 2011; 5(8):1330-1337.
10. Srinivasa B, Kumar A, Prabhakarn V, Lakshman K, Nandeesh R, Subramanyam P *et al.* Pharmacognostical studies of *Portulaca oleracea* Linn. Braz J Pharmacogn 2008; 18(4):527-531.
11. Edwin S, Joshi SB, Jain DC. Comparative pharmacognostic studies on root powder of *Plumbago zeylanica* and *Plumbago rosea*. Indian J Nat Prod 2008; 24(2):27-29.
12. Najafi S, Deokule SS. Pharmacognostic study of *Tylophora dalzellii* Hook. f. J Med Plant Res 2010; 4(5):403-406.
13. Chase CR, Pratt RJ. Fluorescence of powdered vegetables drugs. Indian J Exp Biol 1949; 33(6):428-432.
14. Ansari SH. Essential of pharmacognosy. Edn 1, New Delhi: Birla publications Pvt. Ltd. 2006.
15. Singh S, Manchawal L, Chauhan MG. Pharmacognostic study of male leaves of *Trichosanthes dioica* Roxb. with special emphasis on microscopic technique. J Pharmacogn Phytother 2010; 2(5):71-75.
16. Wallis TE. Text book of pharmacognosy. 5th ed. New Delhi: CBS Publishers & Distributers 1985, 68-101.