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# Pharmacognostic standards of Katphala (*Myrica nagi* Hook.f.non-Thumb); A potent bark drug used in Indian systems of medicine

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## Abstract

**Background:** *Katphala* bark of *Myrica nagi* Hook.f.non-Thumb. is a potent drug used in Indian system of medicine at many therapeutic conditions. As the tree is grown only at northern parts of India, market sample found adulterated with many other bark samples. Hence standard authentication features are found necessary for proper identification of the raw drug. **Materials and methods:** Bark sample collected from Shimla, cleaned properly and authenticated. Macro-microscopic study, physico-chemical standards and preliminary phytochemical study of test drug carried out as per standard methodology. **Results:** Longitudinally and transversely fissured, rough bark piece were the naked eye observations made from the raw drug. Multi layered cork with a wide zone of secondary cortex are found as two distinct characteristics in TS bark. Polygonal parenchymatous cells filled with tannin, and stone cells in secondary cortex region and phloem in the inner bark region are other diagnostic microscopic features. Physico-chemical standards measured in this test can be used as measure of purity of this drug. Alcoholic extract of bark sample has shown the presence of alkaloids, protein, phenol and tannin as secondary moieties.

**Keywords:** *Katphala*, *Myrica escuelntaa*, Macro-microscopic, physico-chemical, standardisation.

## INTRODUCTION

*Katphal,* an Ayurvedic medicament used in Indian systems of medicine consists of dried bark of *Myrica nagi* Hook.f.non-Thumb. syn. *M. esculenta* Buch.-Ham ex Don, an evergreen dioecious tree[1]. It is found distributed in sub-tropical Himalayas from the Ravi eastwards to Assam and in Khasi, Jaintia, Naga and Lushai hills at altitudes of 900-2100m[2]. In Ayurveda bark is widely used as *Kaphaghna, Shirovirechana, Shothagahna, Vedanasthapana, Garbhashaya samkochaka, Krimighna and Kandughna*[3]. *Devadarvaadi kwaatha choorna, Brihat phala ghrita, Ashwagandhadi choorna, Pushyanuga choorna, Katphalaadi choorna, Khadiraadi gutika* are some important formulations prepared out of this drug [4]. Materia medica explicate this drug to be astringent, antimicrobial useful in fever, asthma, urinary discharge, throat complaints, a good snuff in headache, collyrium for opthalmia and other eye diseases[5]. Apart from these traditional uses, the bark is reported to be used in Khasi hills as a fish poison. Drug chewed to relieve toothache and a lotion prepared from it finds application for washing putrid sores[7]. Chemically it is said to have myricanol, a proannthocyanidin[8]. Wide therapeutic demand and limited availability made this drug with spurious market adulterants. *Careya arborea* Roxb. has been found to be used in place of *Katphala* in some parts of India[9] .

Hence a study designed to illustrate macro-microscopic features along with their physico-chemical standards in this paper.

## MATERIALS AND METHODS

### Collection of plant sample

The bark of *Myrica nagi* was collected from Shimla and was authenticated through botanist. Voucher specimen was deposited in Pharmacognosy department of the institute for further documentation (Voucher no. 784/16061804). As per the general practice of raw material processing in commercial scale, in India, collected bark material was cleaned by running water and reduced in size. Bark sample

dried in shade and preserved for further study. For microscopic study few cut samples were preserved in a fixative solution. The fixative used was FAA (Formalin-5ml + Acetic acid-5ml + 70% Ethyl alcohol-90ml). The materials were left in FAA for more than 48 hours. Other samples were dried under the shade and then were powdered to mark their quality control parameters.

**Macroscopy:** Naked eye observation of bark sample done and photographs taken using Canon IXUS digital camera. Documentation of macroscopic features recorded, according to standard references[10].

**Microscopy:** The preserved specimens were cut into thin transverse section using a sharp blade and the sections were stained with saffranine as per standard methodology. Transverse sections were photographed using Zeiss AXIO trinocular microscope attached with Zeiss Axio Cam camera under bright field light. Micro-measurements were taken using the pre-calibrated scale available in the software[11].

**Physicochemical studies:**

The percentage of foreign matter, loss on drying, total ash and acid insoluble ash were determined according to the method described in Indian Pharmacopea and the WHO guidelines on quality control methods for medicinal plants materials.[12,13]

**Preliminary phytochemical screening:**

Preliminary phytochemical screening of the bark powder was performed using alcoholic extract to detect the presence of secondary metabolites.[14]

**RESULTS**

**Macroscopy**

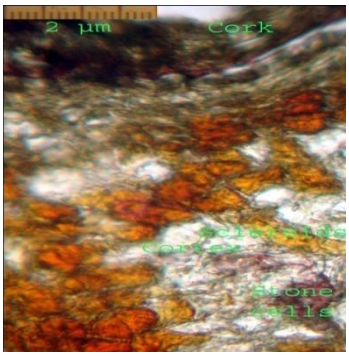
Drug occurs in pieces of variable length, 1-2.5cm thick, fissured longitudinally and transversely, outer surface rough, greyish white, inner surface dark brown, red, smooth, fracture hard, taste bitter (Figure 1).


**Figure 1:** Macroscopic view of bark Myrica nagi Hook.f.non-Thumb

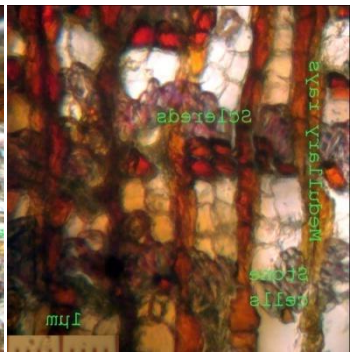
**Microscopy**

Outline of TS matured stem bark shows a multilayered cork, composed of rectangaular, tangentially elongated, thin walled cells.

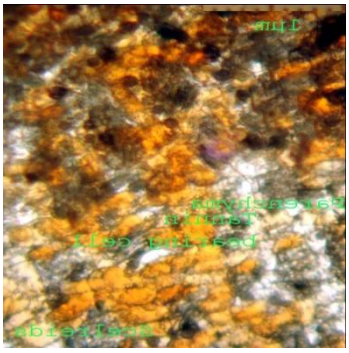
Inner to this a secondary cortex a wide zone, composed of polygonal parenchymatous cells filled with red colouring matter. Most of these cells filled with tannin, as cell content. A number of circular, oval, polygonal stone cells found scattered throughout this region. Lower portion of bark show secondary phloem, medullary rays interrupted transversely with a line of hard sclerides found microscopically. Stone cells found frequently in this layer. Lenticel on outer cork layer connected internally with a zone of medullary rays is observed (Figure 2).



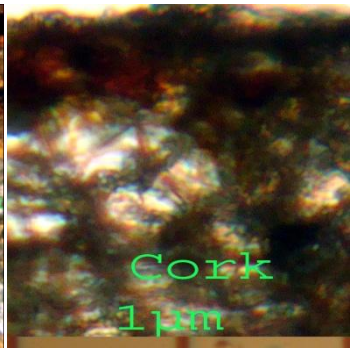

Outline of TS of stem



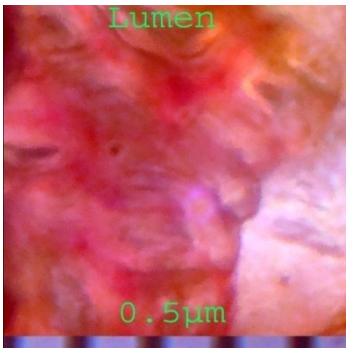
Lower portion of bark



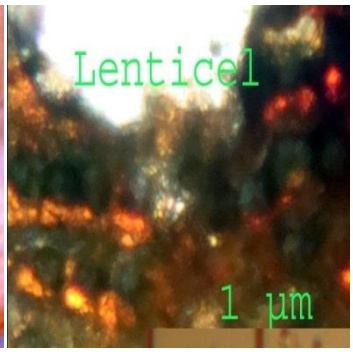
Upper cortex filled with tannin bearing cells and sclerides




Cork cells




Stone cells




Lenticel

**Figure 2:** Transverse section of bark of *Myrica nagi* Hook. f. non-Thumb

**Physico-chemical study**

Results of physico-chemical standards of study material are shown in Table 1. Ethanolic extract of bark sample has shown the presence of alkaloids, protein, phenol and tannin as secondary moieties. Whereas flavanoids, carbohydrates, triterpenoids and saponins were found absent from test sample (Table 2).

**Table 1:** Physico-chemical standards of *Myrica nagi* Hook.f.non-Thumb

| Tests | Result n = 3 (% w/w) |
|---|---|
| LOD | 5 |
| Total ash | 3.5 |
| Acid insoluble ash | 1.8 |
| Water soluble extractive | 6.2 |
| Alcohol soluble extractive | 8.2 |

**Table 2:** Phytochemical constituents alcohoilc extract of *Myrica nagi* Hook.f.non-Thumb

| | |
|---|---|
| Alkaloid | + |
| Protien | + |
| Flavanoid | - |
| Carbohydrate / glycoside | - |
| Phenol | + |
| Tannins | + |
| Triterpenoid | - |
| Saponins | - |

## DISCUSSION

Ayurveda advocate using different parts of natural products as therapeutic agents[15]. Each of these plant parts are a complex mixture of different chemical constituents. Though standardization of these plants or plant part is of difficult task, but still it is need of an hour to avoid their admixture with harmful and other adulterants[16]. Standardization is an essential measurement for ensuring the quality control of herbal drugs[17]. WHO has set certain guidelines for standardization of herbal drug. Authenticity, quality and purity are the primary three main measures to ensure the quality of natural products[18].

Bark of *M. nagi* is a widely used drug in Indian systems of medicine since centuries. Major area of distribution of this tree is at Himalayas from the Ravi eastwards to Assam at altitudes of 900-2100m. Because of wide therapeutic demand and non-availability of this tree at southern parts of India, adulteration is very common with this bark. Scientifically published quality standards on such drugs will definitely improve science of Ayurveda and researches related to it.

Authenticity of *M. nagi* carried out laying down its macro-microscopic features of standard bark sample collected from its natural habitat. Longitudinally and transversely fissured, rough bark piece with grayish white on outer surface and dark brown inner surface are characteristic macroscopic observation. Multi layered cork and a wide zone of secondary cortex are two major sections recorded out of microscopic observation on TS bark. Polygonal parenchymatous cells filled with tannin, and stone cells are found at secondary cortex region. Inner bark has sown the presence of secondary phloem, medullary rays interrupted transversely with a line of hard sclerides.

Purity is a measure of its contamination with surrounding materials. Bark piece of *M. nagi* collected from its natural habitat from a matured tree and results obtained on following parameters such as loss on drying, ash value, acid- insoluble ash, water soluble extractive and alcohol soluble extractive are of its standard values. Thus in total study resulted in a standard quality monograph on bark of *Myrica nagi* Hook.f.non-Thumb.

## CONCLUSION

Global demand on natural products necessitated their quality control parameters. Authentication, purity and qualitative data of *Myrica nagi* Hook.f.non-Thumb conducted and published scientifically in this paper prove as quality monograph for further reference.

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