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Pharmacognostical studies of *Neolamarckia cadamba* (roxb.) Bosser leaf

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The leaves of *Neolamarckia cadamba* (Roxb.) Bosser (Rubiaceae) are reported to have good medicinal values in traditional system of medicines. The present study deals with pharmacognostical examination of morphological and microscopical characters of *Neolamarckia cadamba* leaves including determination of leaf constants, ash values, foaming index and extractive values.

Key words: *Neolamarckia cadamba*, kadam, leaf microscopy

INTRODUCTION

The plant *Neolamarckia cadamba* (Roxb.) Bosser (Rubiaceae) (Naithani and Sahni, 1997; Yoganarsimhan, 2000) is commonly known as Kadam. The bark and leaves of the plant is reported to possess various medicinal uses such as astringent anti-hepatotoxic (Kapil *et al.*, 1995), antidiuretic, wound healing, antiseptic (Anonymous, The Wealth of India, 1992) and anthelmintic (Gunasekharan *et al.*, 2006). The pharmacognostical studies of leaf of this plant have not been reported. Therefore, the present investigation was planned to study the pharmacognostical aspects of *Neolamarckia cadamba* (Roxb.) Bosser.

MATERIALS AND METHODS

Plant Material

The leaves of *Neolamarckia cadamba* (Roxb.) Bosser were collected from Tirupati (Andhra Pradesh) and positively identified and authenticated by Prof. P. Jayaraman, Plant Anatomy Research Centre, Chennai.

Pharmacognostical Studies

Morphological studies, such as shape, size, apex, surface, base, margin, venation, taste and odour of leaves, were carried out. Microscopical studies were also carried out using Nikon Labphot-2 instrument (Japan). The transverse sections were taken with the help of rotary microtome. The average thickness of the sections was 10-12 µm. Dewaxing of the sections was done by customary procedure. The sections were stained with toluidine blue. Some phytochemical reactions were also carried out. It rendered pink colour to the cellulose walls, blue to the lignified

cells, dark green to suberin, violet to the mucilage, blue to the protein bodies, etc., some of the leaf sections were also stained with safranin and iodine solution for the detection of starch (Khandelwal, 2004; Kokate, 2005).

As a part of quantitative microscopy, stomatal number, stomatal index, vein islet number and vein termination number were determined by using fresh leaves of the plant. The total ash, water-soluble ash, acid-insoluble ash, sulphated ash, alcohol- and water-soluble extractive value and foaming index were determined. The dried powdered material of leaves was also subjected to identification tests for the detection of various phytoconstituents (Anonymous, Indian Pharmacopoeia, 1996).

RESULTS AND DISCUSSION

The shape of *Neolamarckia cadamba* leaves is broadly ovate, elliptic-oblong with entire margin, pulvinus base, bitter in taste, mucronate apex, glabrous surface, pinnate venation, length varying from 7.5 to 18 cm and breadth is 4.5 to 16 cm. In the microscopic studies, leaf is dorsiventral with thick prominent midrib and uniformly thin lamina. The midrib is broadly conical adaxial side and broadly hemispherical abaxial side. Ground tissue of the midrib consists of a broad outer zone of collenchyma and inner and middle zone of parenchyma. Vascular bundle consists of a horseshoe shape inverted vascular strands and two small top-shaped strands placed at the ends of the 'U'-shaped strands. The epidermis of the midrib is distinct with squarish thick-walled cells and prominent cuticle. The short thick-walled unicellular trichomes are also seen on the epidermis layer and lamina consists of thicker adaxial epidermis and thinner abaxial epidermis (Fig. 1).

Microscopic study of *Neolamarckia cadamba* leaf powder

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Figure 1: TS of *Neolamarckia cadamba* (roxb.) Bosser leaf. La: lamina; Pa: parenchyma; MVB: main vascular bundle; Co: collenchymas; AbS: abaxial side; AS: accessory strand; AdS: adaxial side.

showed the presence of unicellular, lignified trichomes, paracytic stomata, simple starch grains and sandy balls of calcium oxalate crystals. The stomatal values, vein islet number, vein termination number, total ash, water-soluble ash, acid-insoluble ash, sulphated ash, water- and alcohol-soluble extractive values and foaming index of leaves powder are given in Table 1.

The qualitative chemical tests revealed the presence of saponins, steroids, alkaloids and carbohydrates in the leaves powder of *Neolamarckia cadamba*.

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Table 1: Analytical parameters of *Neolamarckia cadamba* (roxb.) Bosser leaf

Parameter	Result
Stomatal number	Upper epidermis: 41-47 Lower epidermis: 42-45
Stomatal index	Upper epidermis: 27.2% Lower epidermis: 26.9%
Vein islet number	11
Vein termination number	21
Total ash	8.26% w/w
Water-soluble ash	2.36% w/w
Acid-insoluble ash	0.66% w/w
Sulphated ash	4.12% w/w
Water-soluble extractive value	4.8% w/w
Alcohol-soluble extractive value	5.6% w/w
Foaming index	200

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