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Short Communication

Evaluation of the medicinal profiles of fresh and powdered leaf of *Mitracarpus vilosus* (S.W) D.C

I.A. Jegede*, O.F. Kunle, J.A. Ibrahim, G. Ugbabe and J.I. Okogun

Department of Medicinal Plant Research and Traditional Medicine (MPR&TM), National Institute for Pharmaceutical Research and Development (NIPRD), P.M.B. 21, Garki, Abuja, Nigeria.

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Pharmacognostic investigation on fresh, powdered and anatomical sections of leaf of *Mitracarpus vilosus* (S.W) D.C was carried out to determine its macromorphological, micromorphological and chemomicromorphological profiles. Qualitative and quantitative studies indicated presence of amphicribal vascular bundle arrangement, characteristic asperites, cone-shaped clothing trichomes, simple leaf arrangement lanceolate shape, entire margin, cuneate base, parallel venation and opposite/decussate arrangement. Other features include presence of calcium oxalate crystals, lignin and oil globules with palisade ratio of 4 – 7 and stomatal number of 13.5. The relative similarities between the members of the Spermacoceae tribe, to which the plant belongs, coupled with lack of information towards monograph preparation on the plant necessitated this investigation. These findings will be useful towards establishing pharmacognostic standards on identification, purity, quality and classification of the plant which is gaining relevance in plant drug research.

Key words: *Mitracarpus vilosus*, pharmacognostic standardization, leaf morphology, monograph.

INTRODUCTION

The plant *Mitracarpus vilosus* (S.W) D.C (Rubiaceae family) was formerly referred to as *Mitracarpus scaber Zac.* It is in a single species genus, largely growing as an annual herb up to 2 feet high. It grows as a weed on old and abandoned farmlands. It has been found in tropical countries like Senegal, Gambia, Mali, Nigeria (Southern and Northern Parts) and Liberia. It is often confused with *Borreria ocymoides,* with which it was formerly grouped. In Nigeria, it is known as 'Irawo Ile' by Yorubas (Gbile, 1984), 'Obuobwa' by Ibos and 'Gududal' by Sokoto Fulanis (Hutchinson, 1937). Traditionally, in various parts of tropical Africa, it is put to various uses. In Senegal, it is employed in the treatment of sore throat and leprosy, while in Nigeria; the extracted juice from aerial parts is topically applied against skin diseases and on wounds. Internally it is used as an antidote to arrow poison, antidiarrhea, and anti dysentery (Dalziel, 1937). Hexane extract of the leaves was found to have a dose-dependent anti-inflammatory activity; the methanol extract is active against a wide range of test microorganisms, most remarkable being against *Pseudomonas aeruginosa.* Phytochemical analysis of the leaves indicated presence of stigmasterol, ursolic acid, (Sofowora, 1986) and coumarins (Ekpendu, 1995).

MATERIALS AND METHODS

Leaves of *M. vilosus* were collected from the Botanical Garden of National Institute for Pharmaceutical Research and Development (NIPRD), Abuja, in September 1999. Identification and confirmation

*Corresponding authors E-mail: adeolajegede@yahoo.com Tel: +234 804 413 3649.

were done by Mr. O.A. Ohaeri (now late) of the Institute's Herbarium. The specimen number is NIPRD 3273.

Qualitative investigation

The macroscopical description of matured fresh leaves was done according to terms outlined by Wallis (1995). The epidermal strips, anatomical sections and powdered samples of the leaves were used for microscopic investigation as outlined in African Pharmacopoeia (1986) . The chemomicroscopy was conducted on anatomical sections and powdered samples of the leaves.

Qualitative Investigation

Quantitative leaf microscopy was carried out on epidermal strips and anatomical sections of fresh leaves of the plant to determine palisade ratio, stomatal number, stomatal index, vein islet number and vein termination number (WHO publication, 1998).

Table 1. Quantitative leaf microscopy of *M. vilosus*.

Parameter	Range	Mean
Palisade ratio	4 – 7	5.5
Stomatal number	12 – 13	13.5
Stomatal index	14.6 – 17.6	15.1
Vein islet number	2 – 4	3
Vein termination number	14 – 21	17.5

RESULTS AND DISCUSSION

Chemomicroscopic investigations on powdered and fresh samples of *M. vilosus* indicates the presence of lignin, oil, calcium oxalate and starch. Tannins and aleurone grains were not detected. Results of quantitative leaf microscopy is presented in Table 1. The leaf is simple in composition, opposite/deccusate in arrangement; lanceolate in shape, entire in margin with a cuneate base and an acute apex. Venation is parallel, without petiole i.e. sessile and with an internode length of 5.2 – 7.2 cm. Veins are more prominent on lower surface with nearly glabrous upper and lower surfaces with hairs on mid-rib region. The matured leaf size is 3.5 cm (length) and 0.8-1.3 cm (breath). Fresh leaves are green in colour, with characteristically mild odour, bitter taste and a peppery after-taste.

The micromorphological features of the epidermal strips, anatomical sections and powdered sample were also investigated. The upper epidermis consist of nearly straight (5 – 6 sided) polygonal cells; abundant paracytic stomata, short conical clothing trichomes possessing a striated lumen and a conspicnos rounded base. The lower surface consists of markedly wavy cells with paracytic stomata, more abundant than upper surface. The lower surface also possesses short conical clothing trichomes in equal distribution with the upper surface.

Veins are made up of lignified spiral vessels (2 – 5 micron wide and 800 cm long) alongside phloem fibres. Arising from the veins are unicellular long, uniseriate, fairly thick-walled clothing trichomes with a wide lumen and up to 70 micron length and 30 micron in breath. Occurring towards the edge of the leaf lamina is a peculiar distribution of idioblasts containing bundles of a circular calcium oxalate crystals. Characteristic conical asperites having an extended base and a wide lumen, about 30 micron length arise from the leaf margin.

Transverse section of the leaf across the mid-rib indicated presence of abundant oil globules (10 micron indiameter) in the mesophyll region with more occurring asperites having an extended base and a wide lumen, towards upper surface, a dorsivental leaf arrangement (1 layer of palisade mesophyll below upper epidermis), proto- and metaxylem vessels surrounded by phloem tissue giving rise to an amphicribal vascular bundle arrangement and characteristic sub-epidermal layers of collenchyma. Short thin walled trichomes arising from epidermal surfaces, multicellular (3.5 cell) collapsed clothing trichome, arising from the mid rib region are also present.

M. vilosus sample employed in this investigation is a plant that has been earlier confused with *Borreria ocymoides* over time due to their relative similarities. The result of this investigation could therefore serve as an important tool towards proper identification, collection and investigation of the plant. Macro morphological features of the leaf including its composition, arrangement, venation, shape and margin are pointers to its placement in the Spermacoceae tribe and also in distinguishing it from other genera of the tribes. The detection of the presence of inherent diagnostic micromorphological features including peculiar asperites, bundles of oil globules, calcium oxalolate crystals, amongst other features are required towards judgment of identity, purity and often general quality of the plant. The result of chemomicroscopy and quantitative leaf microscopy are parameters required in the standardization of the plant. The presence of oil globules could also serve an indication of best time for collection and a justification for its ethnobotanical utilization against parasitic infections. These results being reported for the first time could be used in the pharmacognostic standardization of the plant towards monograph preparation.

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