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Anatomy and Microscopy of Piper caldense, a Folk Medicinal Plant from Brazil

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Piper caldense (Piperaceae) is used as a sedative in folk medicine of Brazil. It also has antifungal, antimicrobial and acaricidal properties. The taxonomy of the genus *Piper* is problematic because different species have similar morphologies, making their morphological identification difficult. The present study investigates the anatomical characteristics of the leaves and stems of *P. caldense* by light and scanning electron microscopy in order to provide supporting data for correct identification of the species. The anatomical markers are hypostomatic leaves with a two-layered hypodermis; unicellular pearl glands on the leaf surfaces; flat-convex midrib with about 10 vascular bundles arranged in U-shape; concave-convex petiole with about 12 vascular bundles; circular stem with a continuous ring of sclerenchymatous sheath in the pith; and calcium oxalate sand crystals on the adaxial leaf surface, and raphides in the leaf midrib, petiole and stem.

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Foliar Anatomy and Microscopy of Six Species of Baccharis (Asteraceae)

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In Brazil, different species of *Baccharis* are called by the same vernacular name (*vassouras*) and used indiscriminately for the same therapeutic purposes, such as gastroprotective, anti-inflammatory and diuretic. Considering the confusion in the identification of different species of *Baccharis* due to their morphological similarities, the comparative leaf anatomy and micro-morphology of six species namely *B. illinita*, *B. microdonta*, *B. pauciflosculosa*, *B. punctulata*, *B. reticularioides*, and *B. sphenophylla* were investigated by light and scanning electron microscopy. The main distinguishing features as observed during the study are the morphology of the cuticle; type and occurrence of the stomata; presence or absence of glandular trichomes; shape of the flagelliform trichomes; and arrangement of the mesophyll tissues. The findings of the study can be used for species identification as well as quality control of herbal products.
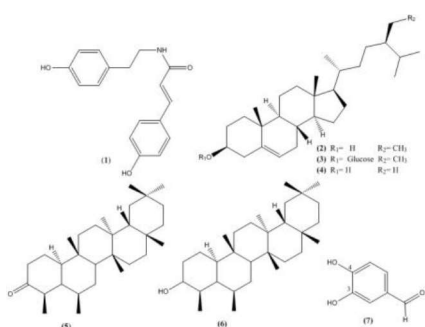
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Chemical and Biological Studies of Cannabis sativa Roots

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The roots of the cannabis plant have a long history of medical use stretching back millennia. However, the therapeutic potential of cannabis roots has been largely ignored in modern times. Interestingly, cannabis roots are not a significant source of cannabinoids. Therefore, chemical and biological screening of the root extracts were investigated. Chemical study of *Cannabis sativa* roots led to the isolation and identification of seven compounds (**1-7**). Their chemical structures were unambiguously established on the basis of 1D and 2D NMR spectroscopy and mass spectrometry as N-(*p*-hydroxy-*b*-phenylethyl)-*p*-hydroxy-*trans*-cinnamamide (**1**), *β*-sitosterol (**2**), *β*-sitosterol-*β*-D-glucoside (**3**), ergost-5-ene-3-ol (**4**), friedelan-3-one (**5**), epifriedelanol (**6**), 3,4 dihydroxybenzaldehyde (**7**), along with other fatty acids and triglycerides. Compound **1** and **4** showed potent antimicrobial activity. Compound **1** was active against *E. Coli* with IC_{50} value of 0.8 µg/ml, while compound **4** was active against *C. neoformans* with IC_{50} value of 13.7 µg/ml. An HPLC method was developed and validated for the detection and quantification of N-(*p*-hydroxy-β-phenylethyl)-*p*-hydroxy-*trans*-cinnamamide (**1**) in extracts of different varieties of *C. sativa* roots.