

CONTRIBUTIONS TO CLINICAL PHYTOTHERAPY RESEARCH: MACROSCOPIC CHARACTERIZATION OF THE ROOT AND STEM OF *JUSTICIA PECTORALIS* JACQ. (ACANTHACEAE) – ANADOR

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ABSTRACT

Introduction: The study of medicinal plants involves several areas of science since, although currently included in the List of Medicinal Plants of Interest to the Brazilian Unified Health System (SUS), there is a lack of pharmacobotanical studies that can support their quality control. Morphological analyses were performed on fresh material with the aid of a stereomicroscope. **Objective:** To describe the morphology of the root and stem of *Justicia pectoralis*. **Methodology:** This is a descriptive and qualitative study, and the morphological study followed the methodologies for this description based on organographic characters. **Results:** The root is axial and the stem is stalk-like or scape-like. In cross section, the root of *J. pectoralis* has a single-layered epidermis, well-developed intercellular spaces, and a collateral vascular system with a protostelic organization. The stem has a uniseriate epidermis with simple multicellular trichomes and cystoliths. Adjacent to the epidermis is angular collenchyma. The vascular system is collateral with an ectophloic siphono-stele structure. **Conclusion:** The findings of this study allow us to infer that the presence of solitary globose cystoliths, observed in the stem of *J. pectoralis*, constitutes an anatomical marker of taxonomic relevance that can be used to characterize and distinguish the species under study.

Keywords: Morphoanatomy; RENISUS; *Justicia pectoralis* Jacq.

INTRODUCTION

The Cerrado, as a component of Brazilian biodiversity, is a source of many plant species that play an important role in folk medicine (RODRIGUES; CARVALHO, 2001). Species of the Acanthaceae family stand out in this scenario. According to the Angiosperm Phylogeny Group (APG III) classification, this family belongs to the order Lamiales (clade Eurosida I) and comprises about 240 genera with approximately 3,250 species (MARCHIORETTO; MATIAS; CONSORALO, 2015), distributed throughout the tropical and subtropical regions of the world, reaching some temperate areas, but with little representation (MARTINELLI; MELLO-SILVA, 2015).

In the context of Brazilian biomes, the Acanthaceae flora for the state of Goiás has not been finalized yet. However, surveys based on herbarium material have

identified 48 species distributed across eight genera (VILAR, 2009). Although well represented in the flora of Brazil, the specific identification of representatives of this family in the country is generally quite difficult due to the absence of recent comprehensive taxonomic studies, since the Brazilian species are, for the most part, poorly defined, with outdated nomenclature and typification problems (SARTIN, 2015).

There is an urgent need for research involving the use of medicinal plants that are widely used in traditional medicine (AGRA; FRANÇA; BARBOSA-FILHO, 2007; ALBUQUERQUE; HANAZAKI, 2006), since the rational use of plants for therapeutic purposes can be an important economic factor in the health sector in developing countries (YUNES; PEDROSA; CECHINEL-FILHO; 2001).

However, due to the scarcity of studies dealing with the morphological characterization of the root and stem vegetative organs of *J. pectoralis*, the objective of this study was to provide information for its botanical identification in order to define parameters for quality control, certification, and authenticity of this medicinal species, since the Brazilian Pharmacopoeia's herbal medicine formulary does not have a monograph for the species under study.

METHODOLOGY

To carry out the studies, *Justicia pectoralis* Jacq. seedlings were cultivated between July 2022 and August 2023 under uncontrolled environmental conditions at the Medicinal Garden of the Evangelical University of Goiás in the city of Anápolis, Goiás (16°34'50"S and 48°92'88"W) under the supervision of Prof. Dr. Cláudia Fabana Alvez.

The species was identified by Prof. Josana de Castro Peixoto, and the exsiccatae were deposited in the Herbarium of the State University of Goiás, under the numbers HUEG10764 and HUEG11027.

Morphological studies of the root and stem were performed on fresh material. The specimens were collected in the cultivation area between 10 a.m. and 1 p.m. using suitable pruning shears. The analyses were performed with the naked eye and with the aid of a Q-106S - P1 binocular stereoscopic microscope at the Laboratory of Research in Biodiversity (LaPeBIO) of the Evangelical University of Goiás. The main axes of the median region of roots and stems obtained from 5 cm below the apex of the branches were analyzed.

RESULTS

The species of the genus *Justicia* show morphological similarities, and the description of their botanical characteristics is relevant for the certification and taxonomic characterization of the species. Thus, the results of the morphological and anatomical study of the root and stem of the species under study are presented below.

The root is axial or pivotal, with a main axis 1-2 mm in diameter, brown to light brown in color, moderately attached to the substrate, with slightly marked longitudinal striations.

The stem is ascending, cylindrical to quadrangular, herbaceous, stalk-like or scape-like, 1-2 mm in diameter in the basal region, green in the middle and apical regions, grayish woody base, not striated, sympodial branching, blackened constrictions above the nodes, glabrous and sparsely pubescent, with grayish trichomes arranged in two vertical bands and internodes 3.0 cm long. The description of the macroscopic characteristics of the species *Justicia pectoralis* Jacq. reinforces the assertion that there is similarity between members of the genus *Justicia*.

However, the vegetative morphological characters found were insufficient to distinguish *Justicia pectoralis*, since the patterns presented are common within the genus *Justicia* (KAMEYAMA, 2006). Thus, anatomical patterns gained greater relevance in characterizing the species.

As for microscopic characters, the presence of multicellular trichomes is commonly observed in representatives of the Acanthaceae family and well described in literature. The occurrence of angular collenchyma in the stem was also observed in the petiole and central vein region in the studies by Aoyama and Indriunas (2014) and Monteiro and Aoyama (2012).

Data from the literature on the leaf anatomy of various Acanthaceae species allow us to conclude that the presence of leaf cystoliths is common and characteristic of representatives of the family, especially for the genus *Justicia*, and creates an anatomical indicator of taxonomic importance for species of this genus. However, since the presence of this inclusion has not been commonly observed in the stems of *Justicia* species described in the literature, the findings of this study allow us to infer that the

presence and type of cystoliths in this organ can be used as an anatomical reference for the characterization of *Justicia pectoralis* Jacq.

In addition, the morphology and anatomy of the stems and roots observed in this study for *J. pectoralis* coincide with the observations of Monteiro and Aoyama (2012) for the same species occurring in northeastern Brazil.

CONCLUSION

Based on the results obtained, it was possible to survey the anatomical characteristics of the root and stem of the species *J. pectoralis* occurring in the Cerrado region of Goiás. Given the scarcity of previous pharmacobotanical studies on this species, especially on root and stem anatomy, and even on the *Justicia* genus, this study is relevant in characterizing *J. pectoralis* as an important tool that can aid in its correct identification, especially with regard to its use as a plant drug, given the intense use of this species in folk medicine.

The findings of this study, combined with data obtained from the literature, allow us to infer that the presence of solitary globular cystoliths visualized in the stem of *J. pectoralis* constitutes an anatomical marker of taxonomic relevance that can be used to characterize and distinguish the species under study, since other studies have not verified the occurrence of this inclusion in the same organ in other *Justicia* species found in Brazil.

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