QUALITY CONTROL OF THE HERBAL DRUG *JUSTICIA PECTORALIS* JACQ. (ACANTHACEAE) AS AN ADVANCE IN CLINICAL PHYTOTHERAPY

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ABSTRACT

Introduction: The Cerrado presents a rich biodiversity of medicinal flora, and the use of medicinal plants as a popular tradition passed down through generations still persists in society. Among the various plant families in this biome, the Acanthaceae family stands out, comprising about 275 genera and 4,000 species. This family includes several species with great pharmacological potential. Within Acanthaceae, the genus *Justicia* is the largest and is popularly used, characterized mainly by the presence of alkaloids, lignans, flavonoids, and terpenoids, compounds responsible for its pharmacological potential. **Objective:** To perform the quality control of the herbal drug *Justicia pectoralis* Jacq. (Acanthaceae). **Method:** This is an experimental study conducted through the extraction, qualification, and quantification of the chemical constituents of the essential oil and the phytochemical screening of the species. **Results:** The presence of saponins and coumarins was observed, along with traces of flavonoid and cardioactive glycosides. The morpho-anatomical analysis showed similarity with other members of the Acanthaceae family. **Conclusion:** The analysis demonstrated the presence of several compounds that suggest the pharmacological activity of the plant.
Keywords: Phytochemistry; Essential oil; *Justicia*.

INTRODUCTION

Many species of Acanthaceae are used as ornamentals, and some also have forage and ecological importance due to their abundance in humid forests and dominance in semi-arid environments (EZCURRA, 2002). The species of this family have economic importance thanks to their high content of secondary metabolites and essential oils. These volatile oils hold great value in various societies, which use them for their proven therapeutic properties (CÔRTES, 2009; VILAR, 2009). Phytochemical studies on species of Acanthaceae have demonstrated their importance in traditional medicine for the treatment of infections and general pain (OKOLI et al., 2008).

Thus, the identification of compounds from the secondary metabolism of medicinal plants, as well as the determination of ash content (which may indicate the presence of impurities) and moisture content through phytochemical prospecting, are tests of great importance in the analysis of herbal drugs of medicinal interest, constituting essential quality control parameters.

METHODOLOGY

1. Botanical material

The phytochemical screening analyses were carried out at the Chemistry Laboratory of the Universidade Evangélica de Goiás.

The botanical material was prepared by drying the leaves in a FABBE-PRIMA oven with forced ventilation at 40ºC and then ground in a WILLYE TECNAL knife mill, model TE 650. The powder thus obtained was properly identified, stored, and kept until use in the experiments. For the analyses of moisture content, total ash, and acid-insoluble ash, five different specimens of the species under study were collected at the Medicinal Garden of the Universidade Evangélica de Goiás.

1.1 Moisture content determination

The tests were performed in triplicate following the Brazilian Pharmacopoeia V (2010). Two grams of powdered botanical material were weighed on a BIOPRECISA analytical balance, model FAN, and transferred to a crucible previously weighed and dried at 100–105ºC for 30 minutes. The sample was then dried in a FANEM oven, model 002 CB, at 100–105ºC for 2 hours, removed from the desiccator, and weighed. Drying was repeated at 1-hour intervals until two successive weighings did not differ by more than 5 mg. The percentage of water was calculated relative to the air-dried sample using the formula (COSTA, 1982; PREGNOLATTO; PREGNOLATTO, 1985):

$$\% \text{ moisture content} = 100 \times N/p$$

Where:

N – weight loss of the sample (g);

P – amount of sample (g).

1.1 Ash content determination

1.1.1 Determination of total ash

For determination of this quality parameter, tests were performed in triplicate, in accordance with the *Brazilian Pharmacopoeia V* (2010). Three grams of the powdered sample were weighed on a BIOPRECISA analytical balance, model FA2104N, and transferred to a porcelain crucible previously calcined, cooled, and weighed.

The sample was evenly distributed and incinerated in an EDG EQUIPAMENTO muffle furnace, model 3000, with the temperature gradually increased to about 500 °C until white ash was obtained. The crucible was then removed, cooled in a desiccator, and weighed. The percentage of total ash was calculated relative to the air-dried sample (COSTA, 1982; PREGNOLATTO; PREGNOLATTO, 1985), according to the formula below:

% total ash = 100x N/p

Where:
N- weight of total ash (g);

p- weight of the sample (g).

1.1.2 Acid-insoluble ash

For this parameter, the residues obtained in the determination of total ash, in triplicate, were boiled for 5 minutes with 12.5 mL of HCl SR (prepared according to the Brazilian Pharmacopoeia V, 2010) in crucibles covered with watch glasses. The residue was filtered with quantitative filter paper, and both crucibles and watch glasses were washed with hot water. The filter paper containing the residue was washed until the filtrate became neutral.

The filter paper with the residue was transferred back to the original crucible, dried, and carbonized on a Bunsen burner. The crucibles were then placed in a preheated EDG EQUIPAMENTO muffle furnace, model 3000, at 500ºC, and incinerated for about 5 hours or until white ash was obtained. The crucibles were cooled in a desiccator and weighed.

The percentage of acid-insoluble ash was calculated relative to the initial sample (COSTA, 2001).

RESULTS

According to Costa (2001), herbal drugs naturally contain a certain amount of water that remains from the drying process. This value is related to the correct preparation and proper preservation of herbal drugs. The Brazilian Pharmacopoeia V (2010) sets limits of 8–14% moisture for herbal drugs in general, with some exceptions specified in the monographs.

High water content in herbal drugs decreases their pharmacological value and may even nullify it, since excess water enables enzymatic activity, leading to the degradation of active substances, as well as favoring the emergence and growth of microorganisms (FARIAS, 2010).

Phytochemical screening of the leaves of *J. pectoralis* Jacq. revealed, as main secondary metabolites, the presence of anthraquinone glycosides, traces of cardioactive and flavonoid glycosides, as well as evident presence of saponins and coumarins. According to Oliveira et al. (2000) and Palmieri (2011), similar results were found, where infusions of *J. pectoralis* leaves presented coumarins (1,2-benzopyrone and umbelliferone), O-glycosides (quercetin and kaempferol), and stigmasterol, suggesting that the phytotherapeutic properties attributed to the plant may be induced by different active principles, possibly coumarins.

CONCLUSION

The drying method adopted in this study provided a moisture content for *J. pectoralis* leaves close to the limit established by the Brazilian Pharmacopoeia V (2010), suggesting good preservation of the herbal drug.

Although the results for total ash and acid-insoluble ash content varied among the specimens studied, this may be related to environmental and edaphic conditions. Based on the chemical classes identified in the *Justicia* species analyzed here, it was confirmed that they follow the same pattern as the Acanthaceae family.

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