SCREENING FITOQUÍMICO DAS FOLHAS DE *Justicia goianensis* L. (ACANTHACEAE) DE OCORRÊNCIA NO CERRADO

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ABSTRACT

The study investigated the phytochemical composition of the leaves of *Justicia goianensis* L., a species of the Acanthaceae family, widely found in the Cerrado biome of Goiás. The family is known for its medicinal properties, and the species shows pharmacological potential due to the presence of bioactive compounds. The objective was to identify and analyze the presence of secondary metabolites in the leaves of *J. goianensis*, which may have therapeutic applications. The leaves were collected, dried at room temperature, and pulverized. Subsequently, determinations of moisture content, total ash, and acid-insoluble ash were carried out according to the *Brazilian Pharmacopoeia V*. For phytochemical prospecting, adapted qualitative tests were used to detect the presence of anthraquinones, cardiac glycosides, flavonoids, saponins, tannins, and alkaloids in the samples. The analyses revealed the presence of anthraquinones, cardiac glycosides, flavonoids, saponins, and tannins in the leaves of *Justicia goianensis*. The total ash content was 3%, and the acid-insoluble ash content was 0.07%, demonstrating the purity of the samples. The compounds identified are known for their anti-inflammatory, antimicrobial, and anticancer properties. The presence of various bioactive secondary metabolites in the leaves of *Justicia goianensis* suggests great therapeutic potential, with possible applications in pharmacology. However, additional biological studies are necessary to further explore its properties and validate its medicinal use.

Keywords: Cerrado; *Justicia* sp.; Essential oils; Medicinal.

Introduction

Essential oils are volatile aromatic liquids extracted from plants, composed mainly of monoterpenes (C10), sesquiterpenes (C15), and, in smaller amounts, diterpenes (C20). These compounds are biosynthetically derived from isoprene, formed from mevalonic acid, and their production is limited to certain plant families and species (SIMÕES et al., 2010). The oils are stored in different parts of the plant, such as flowers, leaves, and fruits, and can be found in specialized structures, such as glandular hairs and lysigenous cavities (ARAÚJO et al., 2014). Monoterpenes account for about 90% of the

compounds present in essential oils, with more than 150 monoterpenes and 1000 sesquiterpenes identified in these oils (SIMÕES et al., 2010). Studies highlight the role of these compounds in attracting pollinators or repelling predators, as well as their growing importance in the food, cosmetics, and pharmaceutical industries (GOTTLIEB; SALATINO, 1987).

The pharmaceutical industry benefits from the diverse pharmacological activities of essential oils, such as anti-inflammatory, antimicrobial, and antispasmodic effects (COSTA, 1982; SIMÕES et al., 2010). Examples include eugenol in clove oil, with anesthetic and antiseptic action, and citral present in oils with antiseptic properties (SILVA SANTOS et al., 2006). The Acanthaceae family is an important source of essential oils, with several genera recognized for their therapeutic properties, economically valued by different cultures (CÔRTES, 2009; VILLAR, 2009). The aim of this study was to identify the chemical composition of the essential oil of the leaves of *J. goianensis*, found in the Cerrado of Goiás.

Materials and methods

Drying and Pulverization

The leaves of *Justicia goianensis* L. were dried for 20 days at room temperature in the LAPEBIO Laboratory of *UniEvangélica*, pulverized in a knife mill, resulting in 393.40 g of material, which was stored at room temperature for use in the experiments.

Determination of Moisture Content

Following the *Brazilian Pharmacopoeia V* (BRASIL, 2019), 2 g of the pulverized material were dried in an oven at 100–105 ºC. The process was repeated until the difference between consecutive weighings was less than 0.5 mg, with the moisture content calculated based on the formula: % moisture = 100 × N/p, where N is the weight loss and p the sample in grams (COSTA, 1982; PREGNOLATTO; PREGNOLATTO, 1985).

Determination of Total Ash Content

Also following the *Brazilian Pharmacopoeia V*, 3 g of the sample were incinerated in a muffle furnace at 500 ºC until white ash was obtained, with the ash content calculated

relative to the air-dried material (COSTA, 1982; PREGNOLATTO; PREGNOLATTO, 1985).

Determination of Hydrochloric Acid (HCl)-Insoluble Ash Content

The residues from the total ash were boiled in hydrochloric acid for 5 minutes, filtered, dried, and incinerated at 500 ºC until white ash was formed. The acid-insoluble ash content was calculated relative to the initial sample (COSTA, 2001).

Phytochemical Prospecting

The qualitative analysis of secondary metabolites in the pulverized leaves followed methodologies adapted from Matos (1988, 1989), Costa (2001), Paula and Bara (2007), Simões et al. (2010), and Zuanazzi and Montanha (2010).

RESULTS

In the total ash tests, the mean of the samples was 3%, indicating a low presence of contaminants such as sand, which attests to their quality. In the hydrochloric acid–insoluble ash test, the mean was 0.07%, also reflecting the uniformity of the samples collected in the same location and confirming their purity. Phytochemical prospecting is essential for pharmaceutical research, phylogenetics, and the conservation of plant resources (SOARES et al., 2016). Based on the analyses carried out, the presence and absence of the following secondary metabolites were observed in the leaf samples of *Justicia goianensis* (Table 1).

Table 1. Phytochemical prospecting of the leaves of *Justicia goianensis*

Reação de Caracterização de Heterosídeos Antraquinônicos	
1- Reação de Borntrager Indireta	+
Reação de Caracterização de Heterosídeos Cardioativos	
1- Reação de Liebermann-Burchard	+
2- Reação de Keller-Kiliani	+
3- Reação de Pesez	+
4- Reação de Kedde	+
Pesquisa de Caracterização de Heterosídeos Flavonóides	
1- Reação de Shinoda	+
2- Reação Oxalo-Bórica	+
3- Reação com Ácido Sulfúrico Concentrado	-
4- Reação com Hidróxidos Alcalinos	-
5- Reação com Cloreto de Alumínio	+

6- Reação com Cloreto Férrico	+
Pesquisa de Caracterização de Heterosídeos Saponínicos (Saponinas)	
+	
Pesquisa de Caracterização de Taninos	
1- Reação com Gelatina	+
2- Reação com Sais de Alcalóides	+
3- Reação com Sais Metálicos	+
4- Reação com Hidróxidos Alcalinos	-
Pesquisa de Caracterização de Alcalóides	
1- Reativo de Mayer	-
2- Reativo de Dragendorff	-
3- Reativo de Bouchardat	-
4- Reativo de Bertrand	-
5- Reativo de Hager	-
6- Ácido Tânico	-
Pesquisa de Caracterização de Cumarinas	
-	

Subtitle: (+) positive (-) negative

The analyses of the leaves of *Justicia goianensis* revealed the presence of anthraquinones, cardiac glycosides, flavonoids, saponins, and tannins. Anthraquinones, aromatic compounds, are widely used in industry and pharmacology, with applications as antimicrobials, laxatives, and anti-inflammatory agents, in addition to being indicated for the treatment of cancer, multiple sclerosis, and arthritis (ANDREI; BRAZ FILHO, 1989; HUSSAIN et al., 2015; MALIK; MÜLLER, 2016). These compounds possess anticancer properties, promoting DNA damage, interrupting the cell cycle, and inducing apoptosis and autophagy (TIAN et al., 2020).

Conclusion

The leaves showed the presence of anthraquinone compounds, cardiac glycosides, flavonoids, saponins, and tannins, which may present, through their bioactive properties, anti-inflammatory, antinociceptive, antimicrobial, and anticancer potential. Thus, it is identified that applied studies need to be conducted in order to further understand the therapeutic properties, bioactive molecules, and the entire chain of

interactions that may make this species a matrix for the development of bioproduct formulations.

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