Annals of the University of Craiova
The Chemistry Series
Volume XLVIII, No. 2 (2022) 43-48
homepage: chimie.ucv.ro/anale/

Phytochemical screening of the methanolic extract of *Passiflora incarnata* L.

Research article

Mihaela Gabriela Dumitru[1]*, *Anca Gănescu*[1]

[1]University of Craiova, Faculty of Sciences, Department of Chemistry, Calea București 107i, Craiova, Romania
*E-mail: dummgs@yahoo.coom

Received: 15.10.2022 / Accepted: 18.11.2022 / Published: 20.12.2022

Abstract
The aim of this work is to carry out a phytochemical screening of extracts of *Passiflora incarnata* L. to know the composition of secondary metabolites and to better understand the pharmacodynamic properties of its extracts. Phytochemical screening of the methanolic extract of *Passiflora incarnata* indicates the presence of the following phytochemicals: Tannins, Alkaloids, Flavonoids, Carbohydrates, Terpenoids, Steroids, Polyphenols and Phytosterols. Saponins, Resin, Fixed oils and fats and Quinones weren't detected.

Keywords: Phytochemical screening, *Passiflora incarnata* L.

1. INTRODUCTION

Medicinal plants are a rich source of biologically active metabolites belonging to different molecular families which have various biological activities in humans [1]. Modern pharmacopoeia contains at least 25% drugs that are derived from plants, which are

synthetic, and built on compounds isolated from plants. Modern medicine has evolved from folk and traditional medicines through chemical and pharmaceutical screening [2]. The genus *Passiflora* consists of 500 species which are mostly found in warm and tropical regions. "*Passiflora*" comes from latin word "Passio" and was described as a symbol for "Passion of Christ" [3; 4]. This plant was used widely in traditional medicine in West India, Mexico, Netherland, South America, Italia and Argentina [5; 6].

The plants of genus *Passiflora* are shrubs and herbs, mostly climbers with auxiliary tendrils. Stem is herbaceous or woody, generally climbing, very rarely arborescent. Leaves alternate, sometimes simple, entire, lobed or palmate, sometimes compound, imparipinnate; stipules germinate at the base of petioles, rarely absent; tendril axillary, arising from sterile pedicels. Flowers are bisexual or unisexual, regular [7]. Out of all the reported species, *Passiflora incarnata* L. and *Passiflora edulis Sims* stand out as being the most extensively investigated for their chemical composition and biological activities [8]. *Passiflora alata*, *Passiflora edulis* and *Passiflora incarnata* are known for their sedative properties and have relevant interest for the food and pharmaceutical industry [9; 10]. Characterization and evaluation of plants and their phytoconstituents can explore the evidences to support therapeutic claims of those plants against various ailments [11]. The phytochemical screening is very important to evaluate the possible medicinal utilities of a plant and also to determine the active principles responsible for the known biological activities exhibited by the plants. Further, it provides the base for targeted isolation of compounds and for performing more precise investigations. The present paper focuses on the phytochemical screening of *Passiflora incarnata* and on the common methods used for qualitative determination of the biologically active constituents.

2. MATERIALS AND METHODS

2.1. Preparation of alcoholic extracts for screening

About 10 g of the powdered sample (dried leaves of *Passiflora incarnata*) were extracted for analysis with 100 mL of 80% aqueous

methanol for 24 h in a water bath at 50 °C. The obtained extracts were filtered through Whatman No. 1 filter paper and then centrifuged at 4000 rpm for 5 minutes. The extracts were kept at 4 °C and used for analyses [12].

2.2. Phytochemical screening

Phytochemical screening was implemented by using the standard procedures.

2.2.1. Test for tannins

Two gram of methanolic extract were placed in a test tube. Then, 5% of ferric chloride drops were added. A bluish black or greenish coloration was observed. It was an indication of the presence of pyrogallol tannins or catechol, respectively [12].

2.2.2. Test for alkaloids

One grams of methanolic extract was mixed with 2 mL of dil. HCl (1%) in a test tube, then it was gently heated, followed by the addition of 2-3 drops of Mayer's reagent. The formation of a cream or white precipitate was an indication for the presence of alkaloids [12].

2.2.3. Test for flavonoids (Shinoda test)

Two grams of methanolic extract were placed in a tube. A few fragments of magnesium were added, followed by the addition of 0.5 mL of hydrochloric acid. The reddish color was an indication of flavonoids presence [12].

2.2.4. Test for carbohydrates (Molisch's test)

Two milliliters of the methanolic extract solution were mixed with 0.2 mL of an alcoholic solution of α-naphthol (10%) in a test tube, followed by the addition of 2 mL of conc. sulfuric acid on one side of the test tube, without mixing. At the interphase of the two layers, a bluish violet zone is formed that indicates the presence of carbohydrates or/and glycosides [12].

2.5.5. Test for saponins

Approximately 1 g of the methanolic extract was boiled with 2 mL deionized water and it was allowed to stand for 2 min. The content was shaken vigorously. The persistent froth appearance that lasted for 15 min was an indication of saponins presence [12].

2.2.6. Test for terpenoids (Salkowski test)

Approximately 2 mL of chloroform was mixed with 0.5 g of the extract. Then, 3 mL of conc. H_2SO_4 were added carefully to form a layer. The red color appearance is an indication of terpenoids presence [12].

2.2.7. Test for steroids (Liebermann-Burchard test)

In a test tube, 1 mL of acetic acid anhydride was added to 1 mL of methanolic extract. The solution was cooled well in ice followed by the careful addition of conc. sulfuric acid.Appearance of color development from violet to blue or bluish-green was an indication for the presence of steroids [12].

2.2.8. Test for resin

1mL of extract was taken and to this, few milliliters of acetic anhydride and 1 mL of conc. H_2SO_4 were added. The appearance of orange to yellow color indicates the presence of resins [13].

2.2.9. Test for fixed oils and fats

Spot test: small quantity of the extract was taken and pressed between 2 filter papers. The appearance of spots indicates presence of oils [13].

2.2.10. Test for quinones

To 1 ml of extract, alcoholic KOH is added. The presence of red to blue color indicates the presence of quinines [13; 14].

2.2.11. Test for polyphenols

To 1 mL of extract, few drops of 5% solution of lead acetate was added.

The appearance of yellow precipitate indicates the positive results for polyphenols [13].

2.2.12. Test for phytosterols

The extract is dissolved in 2mL of acetic anhydrite, to which 1 or 2 drops of concentrated H_2SO_4 are added. Along the sides, an array of color change indicates the presence of phytosterols [13; 14].

3. RESULTS

Phytochemical analysis of *Passiflora incarnata* extract is presented in Table 1.

Table 1. Qualitative phytochemical analysis of dried powder of *Passiflora incarnata*

Phytochemical constituent	Methanolic extract	Phytochemical constituent	Methanolic extract
Tannins	+	Steroids	+
Alkaloids	+	Resin	-
Flavonoids	+	Fixed oils and fats	-
Carbohydrates	+	Quinones	-
Saponins	-	Polyphenols	+
Terpenoids	+	Phytosterols	+

"+" indicates positive and "-" indicates negative

4. CONCLUSION

The phytochemical analysis is very important to evaluate the possible medicinal utilities of a plant and also to determine the active principles responsible for the known biological activities exhibited by the plants. The methanolic extract of *Passiflora incarnata* showed an abundant production of phytochemicals as secondary metabolites, that may be used in the pharmaceutical industries. It also contains some biologically active constituents worthy of further investigations.

REFERENCES

[1] U. Schippmann, D.J. Leaman and A.B. Cunninghan, *Agric.J, Rome*, 5 **(2002),** 33.
[2] N. Morsy, *Main Group Chem.,* 13 **(2014)**, 7.
[3] G.R. Kinghorn, *Sex Transm Inf*., 77, **(2001**), 370.
[4] K. Dhawan, S. Dhawan and A. Sharma, *J.Ethnopharmacol*., 94**,(2004),** 29.
[5] G.R. Kinghorn, *Sex Transm Inf*. 77, **(2001**), 27.
[6] K. Dhawan, S. Dhawan, *J. Ethnopharmacol*., 94, **(2004**), 23.
[7] S. S. Patel, N. K. Verma, K. Gauthaman, S. S. Patel, N. K. Verma, K. Gauthaman, *Pharmacogn.Rev.,* 3(5), **(2009**),175.
[8] A. Ehab, A. Abourashed, R. John, R. Vanderplank, A. Ikhlas, A. Khan, *Pharm. Biol.,* 40(2), **(2002),** 81.
[9] K. Dhawan, S. Dhawan, A. Sharma, *J. Ethnopharmacol.,* 90, **(2004),** 102.
[10] L. Zeraik, C. A. M. Pereira, V. G. Zuin, J. H. Yariwake, *Rev. Bras. Farmacogn*., 20, (2010), 459
[11] P. Tiwari, B. Kumar, M. Kaur, G. Kaur, H. Kaur *Int. Pharm. Sc*i., 1(1), **(2011),** 98.
[12] M. G. Dumitru, *GSC Biol. Pharm. Sci*., 10(2), **(2019),** 001.
[13] V. Balamurugan, M. A. Serin Fatima, A. Sreenithi Velurajan, *Int. J. Adv. Res. Innov., -5(1)*, **(2019)**, 236.
[14] S. Velavan, *World Journal of Science and Research,* 1(2), **(2015),** 80.