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Total phenolic content and antioxidant potential of *Pavonia glazioviana* Gürke

Camila Macaúbas da Silva[1,*], MaysaDayane Félix[1], Ana Karoline Aquino[1],Micaelly da Silva Oliveira[2], Yanna Carolina F.Teles[3]and Maria de FátimaVanderlei de Souza[2,4]

[1] GraduaçãoemQuímica, Universidade Federal Da Paraíba, Campus II,58397-000, Areia, PB, Brazil; E-Mail: *camilamacaubas@hotmail.com (C.M.S); maysa.j.v@gmail.com (M.D.G.F.); karolaquino@gmail.com (A.K.S.A.)

[2] Post graduation in Development and Technological Innovation in Medicines; Health Sciences Center;Universidade Federal da Paraíba, 58051-900, João Pessoa, PB, Brazil;mica_ellysilva@hotmail.com (M.S.O.)

[3] Department of Chemistry and Physics, Agrarian Sciences Center; Universidade Federal da Paraíba,58397-000, Areia, PB, Brazil; yanna@cca.ufpb.br (Y.C.F.T)

[4] Post graduation in Bioactive Natural and Synthetic Products,Health Sciences Center; Universidade Federal da Paraíba, 58051-900, João Pessoa, PB, Brazil; mfvanderlei@ltf.ufpb.br (M.F.V.S.)

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Abstract: Phenolic compounds have been related to several beneficial effects on health. Most of them are due the antioxidant activity played by these natural occurring substances. The phenolic compounds are able to inhibit the formation of free radicals, which can induce oxidative damage to cell biomolecules, being related to the etiology of several diseases. Many compounds from secondary metabolism of plants can play relevant role in human health preventing cell oxidative damage. The present study was carried out with the vegetal specie *Pavoniaglazioviana*Gürke (Malvaceae), known as "malva-da-chapada" and "tampa-cabaça". Chemotaxonomic studies on the family indicated that its species are great producers of phenolic substances, such as phenolic acids, flavonoids, tannins and coumarins. From the species *P. glazioviana* the isolation of flavonoids has already been reported. The present aimed to quantify the total phenolic content in the ethanolic extract of *P. glazioviana* as well as to evaluate the antioxidant potential of the studied species. For this purpose, the dried aerial parts of the plant were extracted with ethanol, followed by evaporation of the solvent in a rotary evaporator. In order to quantify the total phenolic content in the obtained extract, the Folin-Ciocalteau spectrophotometric method was carried out. The DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenger method was used to evaluate its antioxidant activity. After analysis, the obtained result was 48.4 mg of EAG/g of ethanolic extract of the species. In the evaluation of the antioxidant activity, the EC50 found was 6.36 mg/mL ± 0.02921. The obtained results indicated that the specie *P. glazioviana* produces

high content of phenolic substances and presents interesting antioxidant activity, being higher than other species of Malvaceaepreviously analyzed.

Keywords:*Pavoniaglazioviana,antioxidants*, Malvaceae.

1. Introduction

Phenoliccompoundsproducedbyplantshavebeenrelatedtobeneficaleffectsofvegetablesandfruitsonhumanhealth. Thesesubstancescompose some classes of vegetal secondarymetabolites, such as flavonoids, coumarinsandtannins(ABE, 2007). Theirchemicalstructures, with a hidroxylattachedtoanaromaticring, are responsible for theirantioxidantactivity, thatispartofthe non enzimatic system thatactstopreventoxidative stress.

The antioxidant activity has aroused intense scientific interest in the health area, because antioxidant substances reduce cellular events of biomolecules oxidation, resulting in protective effects to human health (VIEIRA et al.,2011). It hasbeendemonstratedthat the consumption of antioxidants reduces the formation of free radicals, which induce oxidation of biomolecules and contribute to the onset of diseases such as: Alzheimer's, chronic inflammation and cancer(TELES et al, 2015).

The research was carried out focusing on the species *Pavoniaglazioviana*Gürke, known as "malva-da-chapada" is an endemic species from the Northeast region of Brazil(ESTEVES, 1998; MAZZOTTI et al., 2010). The speciebelongstoMalvaceaefamily, knowntopossessseveralgreaterproducersofphenoliccompounds (OLIVEIRA et al., 2012).

Considering the relevance of Malvaceae species, the objective of this work was to quantify the total phenolics content of *P. glazioviana* extract and to evaluate the antioxidant potential of this species.

2. Results and Discussion

The calibration curve of the Gallic acid standard showed a linearity coefficient of R^2 = 0.99628, and the equation of the line obtained was: y = 0.000993696x - 0.00218. From the above equation it was possible to determine in the ethanolic extract of *P. glazioviana,* 48.4 ± 1.79mg of EAG/g of ethanolic extract (EAG = equivalents of gallic acid). When compared to other crude extracts ofmalvaceas, the CEE of *P. glazioviana* showed to possess greater content of phenolics. For example, extracts of *Sidastrummicranthum* and *Sidarhombifolia*were previously evaluated using the same method resulting in38.22 ± 0.43 and 39.37 ± 2.54 mg EAG/g, respectively, showing lower phenol content than *P. glazioviana*extract. Researchers in pharmaceutical field are very interested in phenolic compounds because of their biological properties, which include antioxidant and anti-inflammatory activities(OLIVEIRA et al., 2012).

The calibration curve of the DPPH, obtained the value of the linearity coefficient R^2 = 0.99984; the equation of the line I obtained was: y = 0.00842x – 0.02017. In order to calculate the Abs corresponding to the 50%

reduction (Abs50) at the DPPH concentration the absorbance value was divided at the highest concentration (0.487) by 2, resulting 0.2435.

The calibration curve for antioxidant activity of the ethanolic extract of *P. glazioviana* obtained a linear coefficient of R2 = 0.98503 and the equation of the line II generated was: y = -0.03863x + 0.488925. The value 0.2435 was substituted in the equation of the line II to calculate the concentration of extract that reduces in 50% the contraction of DPPH (EC50).

For the ethanolic extract of *P. glazioviana* the EC50 found was 6.36 mg/mL ± 0.02921.The results from antioxidant activity of *P. glazioviana* CEE showed a greater antioxidant potential than those previously reported for other Malvaceae species (OLIVEIRA et al., 2012), for example: *Sidastrummicranthum* (EC_{50} = 125.733 mg/mL ± 0.291), *Wissadulaperiplocifolia* (EC_{50} = 125.733 mg/mL ± 0.291), *Sidarhombifolia* (EC_{50} = 125.733 mg/mL ± 0.291) and *Herissantiacrispa* (EC_{50} = 120.06 mg/mL ± 3.10). However, other the species of *Pavonia* genus, such as*Pavoniaxanthogloea*and *Pavoniaspeinoides*showed greater antioxidant activity than *P. glazioviana*(GASCA, et al., 2013; MOSTARDEIRO, et al., 2014).

3. Materials and Methods

The botanical material wascollected in Serra Branca, Jeremoabo-BA. The identificationofthespecieswascarried out byProfª. Drª. Adilva de Souza Conceição, beingan exsicata deposited in the HUNEB Herbarium, Paulo Afonso Collection, undercode 28709.

The material wasdried in ovenandground in mechanical mil. The resultingpowderwasmaceratedwithethanol (EtOH) for 72 hours. The obtainedsolutionwasconcentratedunderreducedpressure.

The quantification of total phenolicsin the ethanolic extract was determined using the methodologydescribed by Gulcin et al (2004), based on spectrophotometric method of Folin-Ciocalteau. The CEE was solubilized in methanol to a final concentration of 1000 µg/mL. The test solution was prepared adding 100 µl of the CEE solution, 50 µl of the Folin-Ciocalteureagent, 6 ml of distilled water and 2 ml of sodium carbonate methanol solution (15%). The experiment was performed in triplicate. The concentration of the phenolic compounds was determined as equivalent milligram of gallic acid per gram of CEE (mg GAE /g of CEE), from the calibration curve constructed with gallic acid solutions (7.5625 to 125 µg/mL), considering the average standard error (SEM).After 2 h ofreactionthesolutionswasreadatspectrophotometer FEMTO (UV-Vis) at 760 nm.

The antioxidant activityof *P. glazioviana* CEE was evaluated by the DPPH˙ (2,2-diphenyl-1-picrylhydrazyl) radical scavenging method described by Maciel et al. (2016). DPPH˙ solutions were prepared in ethanol at 60, 50; 30; 15 and 7.5 µM. After 30 minutes the absorbance of each solution was measured at 517 nm to

construct a calibration curve. The values of absorbance versus DPPH concentration were plotted and the graphic was used to calculate the absorbance corresponding to reduction of 50% in DPPH˙ concentration (EC_{50}). In dark room, 0.1 ml of *P. glazioviana* CEE solution (8, 4 and 2 mg\mL) wasadded to 3.9 ml of the DPPH˙ solution (60 μM). The experiment was performed in triplicate. After 30 min the absorbance was read in spectrophotometer (Cirrus 80MB) at 517 nm against a blank sample without extract.

4. Conclusions

The evaluation of total phenolic content andantioxidant potential showed that *P. glazioviana*is a great producer of phenolics, with interesting antioxidant potential, indicating that its extract can be useful to prevent the effects caused by oxidative stress.

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Author Contributions
Authors 2, 3, 4 and 5, contributed to the accomplishment of the quantitative experiments, Author 6, contributed with the sample preparation and Author 7 guided the research

Conflicts of Interest
The are no conflicts of interest.

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