Anti-glycation and antioxidant properties of Brazilian Atlantic Forest plants

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Abstract

The anti-glycation and antioxidant properties were evaluated for different species from Brazilian Atlantic Forest biome: *Solanum granuloso*, *Rubus brasiliensis*, *Cordia eucalyculata*, *Baccharis genistelloides*, *Eugenia handroana*, *Eugenia puryformis* and *Ocotea paranapiacabensis*. The highest antioxidant activities were observed for E. *puryformis* and *R. brasiliensis* extracts. The extract of *O. paranapiacabensis* presented high anti-glycation property.

Introduction

Natural products from plants play an important role in the drug/cosmetic discovery process and the Brazilian biodiversity is a source of great variety of medicinal plants, offering a particular potential for biologically active compounds.[1]

The protein glycation is a reaction between carbonyl groups of reducing sugars and amino groups of protein and it has been demonstrated to be a major pathogenic factor in diabetes, advanced aging, Alzheimer's disease and renal failure.[2]

In this work, the anti-glycation property of different species from Brazilian Atlantic Forest were evaluated by the glycation of bovine serum albumin (BSA) method,[2] antioxidant property evaluated by DPPH[3] and peroxyl radical scavenging[4] methods, in addition to metabolomics studies by HPLC-UV/DAD.

Results and Discussion

The hydroalcoholic extracts presented antioxidant capacity, highlighting the species *E. puryformis* and *R. brasiliensis* which presented high antioxidant activities in both methods (DPPH and peroxyl radical scavenged). The EC_{50} values obtained for the *R. brasiliensis* extract are higher if compared to values from gallic acid and rutin, ie, the extract was more potent antioxidant than the standards tested (Table 1).

The anti-glycation property of *O. paranapiacabensis* were obtained by the relative amount of florescence of the reaction between BSA and methylglyoxal (phosphate buffer, pH 7,4). The percentage of inhibition obtained were 57% at 150 μg mL^{-1}.

Table 1. Antioxidant activity for the species studied.

Species	EC_{50} (μg mL^{-1}) DPPH· assay	EC_{50} (μg mL^{-1}) ROO· assay
Eugenia puryformis	16.74 ± 0.07	7.72 ± 0.05
Cordia eucalyculata	38.22 ± 0.09	17.60 ± 0.08
Eugenia handroana	33.75 ± 0.10	10.72 ± 0.05
Ocotea paranapiacabensis	30.40 ± 0.10	15.72 ± 0.08
Baccharis genistelloides	27.45 ± 0.08	9.16 ± 0.05
Rubus brasiliensis	13.03 ± 0.04	4.65 ± 0.06
Solanum granuloso	39.70 ± 0.12	16.60 ± 0.09
Gallic Acid	15.08 ± 0.12	7.10 ± 0.04
Rutin	10.93 ± 0.03	6.93 ± 0.03

The chromatographic analysis (metabolomic tools) of the *E. puryformis* and *R. brasiliensis* extracts obtained by HPLC-UV/DAD analysis showed the presence of high amount of flavonoids, which might be responsible for the antioxidant activity.

Conclusion

In conclusion, our study showed that the *E. puryformis* and *R. brasiliensis* extracts presented the highest antioxidant activity by DPPH and peroxyl radical scavenging. Thus, the use of different methods for evaluation of the antioxidant action is important and should be based on the identification of different mechanisms under variable conditions, reflecting the multifunctional properties of antioxidant compounds present in different species.

The results obtained for the anti-glycation activity has shown that the *O. paranapiacabensis* extract has potent inhibitory effects. Additionally, anti-glycation assays are being conducted for all the species in this study.

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