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Comparison of total phenols content and DPPH radical-scavenging activity of four *Psidium* species

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Abstract:
A comparative study of the ethanol extract of the leaves of four species of *Psidium* (*P. cattleianum, P. claraense, P. guajava and P. sartorianum*) was carried out. The investigation included phytochemical screening, Folin-Ciocalteu method to determine total phenolic content, and determination of antioxidant activity by assaying the free radical sequestering activity of 2,2-diphenyl-1-picryl-hydrazyl (DPPH). The phytochemical screening showed a similar composition in the four evaluated species. The phenolic content of the ethanolic extracts of the four species was high, especially in the extract of *Psidium sartorianum* (17.59 mgEAG / gES) but lower than that obtained for *Psidium guajava* (19.782 mgEAG / gES) considered a reference species. The ethanolic extracts of the four species of *Psidium* showed values of DPPH free radical scavenger activity higher than the synthetic antioxidant Butyl hydroxytoluene (BHT) (175.98 µg / mL), highlighting the *Psidium sartorianum* (17.82 µg / mL). The use of medicinal plants containing phenols is broad, due to its antitumor, antiviral, antihemorrhagic, hormonal, anti-inflammatory, antimicrobial and antioxidant properties, which opens up a spectrum of potentialities for the species under study.

Keywords: *Psidium;* radical scavenger activity*;* phenolic content*;* phytochemical screening.

1. Introduction

The genus *Psidium* is endemic to America and includes more than 100 species, approximately 25 of them have been reported in the Cuban flora, with a high degree of endemism [1]. The most studied species of the genus is *Psidium guajava* L, whose extracts have metabolites that justify their pharmacological actions [2, 3], so it was used as a reference species and compared with *Psidium sartorianum* (O. Berg) Nied, *Psidium claraense* Urb. and *Psidium cattleianum* Sabine. The objective of the study was to evaluate *in vitro* the antioxidant activity of four *Psidium* species that grow in the central region of Cuba.

2. Results and Discussion

The presence of phenols and tannins, flavonoids and coumarins, were identified. These metabolites take part of the responsibility for the antioxidant properties of medicinal plants is attributed. Triterpenes, steroids, reducing carbohydrates, quinines and anthocyanidins were also identified. In general, these results are in agreement with studies carried out on leaves of *P. guajava*, the most studied species of the genus [5]. The total content of phenolic compounds was calculated using the calibration curve of gallic acid as standard, the results were expressed as milligrams equivalents of gallic acid per grams of dry extract.

The results for the extract obtained from *P. guajava* showed the highest level of phenolic compounds (19,782 mgEAG/gES) when compared with the remains of the samples evaluated. In previous investigations of the same species, values of (1,004 mgEAG/gES) [6] were referred to, markedly lower than those referred to in the present study. In studies carried out on other species of *Psidium*, endemic to Ecuador, values of 9,419 mgEAG/gES for *Psidium guayaquilense* and 5,913 mgEAG/gES for *Psidium rostratum* were reported [7], lower than those obtained for the four *Psidium* species studied.

The ethanolic extracts of the four species of *Psidium* presented a value of IC50 lower than the synthetic antioxidant BHT (175,98 µg/mL), which is widely used in the food industry 94. However, higher than that obtained for the standards Rutina and Quercetina with 10,29 µg/mL and 4.58 µg/mL, respectively, which shows a lower antioxidant power than these standards. The extract with the greatest antioxidant potential is obtained from *P. sartorianum* with 17,82 µg/mL. There are no references of other studies where the antioxidant power of the leaves of the species is evaluated, so this result provides valuable criteria for the medicinal use of this plant.

Table 1. Phenolic content of *Psidium* extracts.

Psidium species	Total phenolic content (mgEAG/gES)
P. guajava	19,78 ± 0,22
P. cattleianum	13,09 ± 0,43
P. claraense	10,19 ± 0,36
P. sartorianum	17,59 ± 0,84

Table 2. Scavenging activity of the DPPH• radical of the standards and extracts.

Sample	*IC50*
P. guajava	*54.93*
P. cattleianum	*31.16*
P. clarense	*36.82*
P. sartorianum	*17.82*
BHT	*175.98*
Rutin	*10.29*
Quercetin	*4.58*

3. Materials and Methods

The preliminary phytochemical analysis was performed following the standard procedures described in the literature [4].
The total phenolic content (TPC) was measured according to the reported method of Nurmi (1996) using a UV-Visible spectrophotometer, Folin-Ciocalteau reagent and gallic acid as the reference phenolic compound.
The antioxidant activity was investigated by the assay of the scavenging activity of the free radical 2, 2-diphenyl-1-picryl-hydracil (DPPH).

4. Conclusions

In the four species evaluated, the presence of phenols, tannins, flavonoids, coumarins, triterpenes, steroids, reducing carbohydrates, quinones and anthocyanidins was identified. The extracts obtained from *Psidium guajava* and *Psidium sartorianum* showed the highest level of phenolic compounds. The ethanolic extracts of the four *Psidium* species showed a DPPH radical sequester effect, with the *Psidium sartorianum* extract having the best results (IC50= 17.82 μg).

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Conflicts of Interest

The authors declare no conflict of interest.

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