

Evaluation of bioactive compounds in two natural populations of *Butia catarinensis* Noblick & Lorenzi

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Summary:

Butia is a genus of palms from South America, with an extensive history of use. *Butia* fruits are enjoyed for consumption in natura and incorporated into recipes. Large-scale natural populations of *Butia* species (palm groves), once common in southern Brazil, are now in decline due to land use changes and the low regenerative taxas. Among the 22 species of *Butia*, *Butia catarinensis* have its occurrence limited to the coastal areas of Santa Catarina and Rio Grande do Sul (Brazil), and is classified as an endangered species by official lists in these states. The aim of this work was to investigate wheter there are differences in the amount of carotenoids, total phenolic compounds, and antioxidant activity of two natural populations of *B. catarinensis*. Natural populations of *B. catarinensis* were addressed in march/2022 at Areais da Ribanceira, in Imbituba (SC/Brazil), and on a private property in Torres (RS/Brazil). Five bunches from different palms were collected in each population. The analyses were performed at the laboratory of Food Science and Technology from Embrapa Clima Temperado (Pelotas-RS), in triplicate. Total phenolic compounds was determined by Folin-Ciocolteu adapted method, by reading the absorbance at spectrophotometer in wavelenght of 725 nm. Antioxidant activity was determined by DPPH assay, with absorbance reading at 515 nm. The methodology for quantifying carotenoid content was adapted from Talcot and Howard (1999), with wavelenght of 470 nm. Data was analyzed through Student's

T-Test (for independent samples) to compare the mean of the populations, Spearman correlation to distinguish the relations between the parameters, and Cluster Kmeans method to verify the genotypes distribution. All statistical analysis were performed at R software. There was statistical difference among the populations for total phenolic content and antioxidant activity. The carotenoid content showed no difference between populations. The total phenolic content was expressed as a chlorogenic acid equivalents (CAE g/100g fresh weight), and the average in Imbituba's population was 588.82 CAE g in 100g of fresh weight, statistically superior to Torres, whose average was 233.88. The antioxidant activity, expressed in μg trolox equivalent/g tissue, was also higher in Imbituba's population, with an average of 1591.16 μg trolox equivalent/g tissue, while the average for Torres population was 373.41 μg trolox equivalent/g tissue. Average carotenoid content was 123.50 mg β -carotene equivalents/100g tissue in the population of Imbituba, and 136.16 in Torres. A strong positive correlation was found between total phenolic compounds and antioxidant activity ($r = 0.878$; $p \leq 0.001$), a result in consonance with the literature. No correlation was reported between carotenoid content and antioxidant activity, or total phenolic compounds. The clustering method showed the similarity of genotypes based on the place of origin by forming two groups, distinguishing the populations of Imbituba and Torres. It was possible discriminate the natural populations of *B. catarinensis* based on total phenolic content and antioxidant activity. Considering the role of environment conditions in bioactive expression, the quantification of these secondary metabolites in natural populations could provide relevant inferences about evolutionary responses and adaptative strategies in the different distribution areas of *Butia*.

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