Influence of edaphic factors on chemical and phenolic compositions of jabuticaba (*Myrciaria cauliflora*)

Luciane D. Pereira[1] (PG), João Marcos G. Barbosa[2] (IC), Pedro H. Ferri[2] (PQ), Suzana C. Santos[2]* (PQ)
***suzana.quimica.ufg@hotmail.com**

[1]*Instituto Federal de Goiás, Anápolis, GO.*[2]*Instituto de Química, Universidade Federal de Goiás, Goiânia, GO*

Palavras Chave: *Jabuticaba, tannins, flavonoids, anthocyanins, centesimal composition, multivariate analysis*

Abstract

Multivariate chemometric analysis grouped five jabuticaba populations in four clusters related to soil types and fruit nutrients.

Introdução

Jabuticaba (*Myrciaria cauliflora* (Mart.) O. Berg.) is a Brazilian tree that bears an edible purplish-black sweet fruit. It is rich in phenolic compounds, such as tannins, anthocyanins, flavonoids, and depsides, which are responsible for antioxidant, cytotoxicity and anti-inflammatory activities[1]. Jabuticaba's high sugar content makes it suitable for jam, juice, liqueur and wine production. Chemical composition can be modified by genetic or environmental factors, such as soil texture and nutrients. This study aimed to correlate the influence of soil on the chemical profile of seeds and skins of jabuticaba.

Resultados e Discussão

Jabuticaba fruits were collected from populations growing on five soils of Jaboticabal Winery, located in central Brazilian Cerrado. Seeds and skins were analyzed for centesimal and mineral compositions, phenolic compounds (total phenols, anthocyanins, flavonoids, tannins) and color parameters. Data collected was submitted to canonical redundancy (RDA) and hierarchical cluster (HCA) analyses in order to study soil influence on chemical variability.

Figure 1 shows RDA ordination results of species data set, whose soil parameters and fruit minerals were treated as environmental variables [30 samples in 5 sites × 13 species variables × 23 environmental variables]. Species-environmental correlations were higher for the first two canonical axes (0,999 and 0,623), explaining 98.5% of the cumulative variance in the species-environmental relation. A statistical test with an unrestricted Monte Carlo permutation (9999 permutations) found significant Fischer's *F*-ratio for the eigenvalues of RDA axe 1 (*F*-value = 1072.6; $p < 0.001$). Trace statistics were highly significant, giving signs that patterns did not arise by chance. These results suggest strong significant association between chemical contents and the measured soil/fruit nutritional parameters (environmental factors) shown in the data set.

Positive loadings in RDA1 axis revealed a clear correlation between Cu^{2+} (fruit) with high contents of tannins, flavonoids and moisture present in seeds, whereas Mn^{2+} (fruit) is associated to larger levels of anthocyanins, total phenols, carbohydrate, color parameters, protein, ash and fiber of skins. On the other hand, an increase in the value of RDA's axis 2 is associated with an increase in Mn^{2+} (soil) of S3 sample origin, which also showed high contents of moisture for seeds and hue for skins. Thus, whereas RDA2 axis shows changes in soil fertility, axis 1 describes a differential nutrient accumulation in sampled fruit parts from different sites.

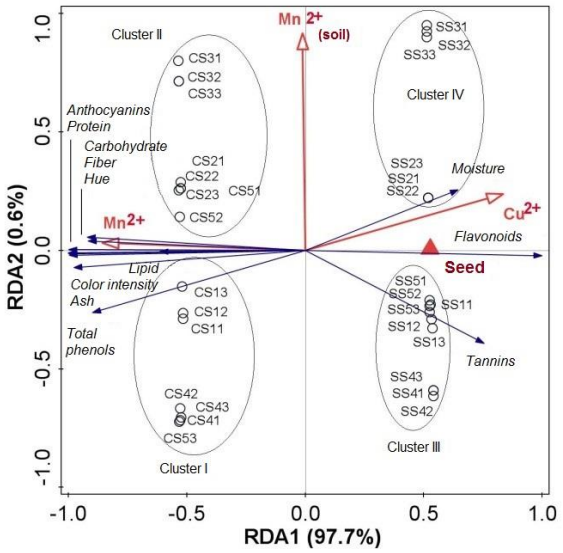

Figura 1. RDA ordination of the first two axes showing the distribution of jabuticaba's seed (S) and skin (C) sampling sites (S1, S2, S3, S4 and S5).

Cluster analysis grouped samples from the five soils in four classes. Skins from cluster I and II were characterized by high levels of total phenols and fiber, respectively, whereas tannins and flavonoids were the main compounds for seeds from cluster III and moisture was higher in seeds of cluster IV.

Conclusões

Chemical variability in *M. cauliflora* fruits determined by multivariate chemometric techniques showed a strong influence of edaphic factors on phenolics, centesimal composition and color parameters.

Agradecimentos

Jabuticabal Winery and CNPq.

[1]Wu, S-B.; Long, C.; Kennelly,E. *J. Food Res. Int.***2013**, *54*, 148.