Abstract

Nondestructive determination of total anthocyanin in Brazilian palm fruits (Açaí, *Euterpe oleracea* Mart., and Juçara, *Euterpe edulis* Mart.) by means of near infrared spectroscopy

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Introduction

Tropical fruit consumption is increasing worldwide due to growing recognition of its nutritional and therapeutic value. Today fruit consumption is no longer merely a result of taste and personal preference, but has become a concern of health due to the vital fruit nutrients content such as anthocyanin. There is intense interest in the anthocyanin content of foods because of possible health benefits related to reduction of coronary heart disease, antioxidant and anticancer activities. The determination of anthocyanin in fruit is time consuming and tedious, and does not fit on modern on-line grading lines. As NIR systems have been implemented to measure various quality attributes of fruits, the objective of this study was to evaluate the feasibility of NIR diffuse reflectance spectroscopy to quantify the total anthocyanin content of two Brazilian palm fruits, açaí (*Euterpe oleracea* Mart.) and juçara (*Euterpe edulis* Mart.).

Materials and Methods

Seven plants of açaí and seven plants of juçara were selected in two different municipalities in São Paulo State, Brazil. From each genotype ~400g of fruits were harvest at commercial maturity stage. After temperature stabilization (~25°C), ten fruits of each genotype were randomly taken and spectra were collected in the diffuse reflectance mode (4,000-10,000 cm^{-1}) on the epidermal surface of tree different positions of each fruit (64 scans, spectral resolution of 8 cm^{-1}). Total anthocyanin content of individual fruit was determined using A.O.A.C. (1983, 2005-02) reference method. Spectra normalization was carried out using multiplicative scatter correction (MSC) followed by the first derivation. PLS regression models were constructed to predict the content of the anthocyanin in the fruits.

Results and Discussion

The global model including açaí and juçara fruits showed clear segregation of samples from each genotype. However, the RMSEP (0.84% w/w) obtained by this model was not adequate to determine total anthocyanin content in açaí fruits as their amount is approximately five times lower than in juçara fruits. Thus, individual models were developed for each genotype and an optimum PLS model required four latent variables for açaí (R^2 = 0.80, RMSEP = 0.29% w/w) and five latent variables for juçara (R^2 = 0.71, RMSEP = 0.92% w/w). The external validation was not performed as recommended by ASTM due to the short fruit season. Internal cross-validation showed good performance based on RMSEPs values, though.

Conclusion

The NIR spectroscopy can be successfully used to determine anthocyanin in açaí and juçara as a nondestructive method with promising use in on-line grading lines. Individual models were more accurate, but external validation, planned for the next season, is still necessary to validate both models.

Reference paper as:
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