Title	Prediction of total anthocyanin concentration in two brazilian palm fruits (Açaí, *Euterpeoleracea* Mart., and Juçara, *Euterpeedulis* Mart.) using near-infrared spectroscopy (NIR)
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Abstract

Both açaí (*Euterpeoleracea* Mart.) and juçara (*Euperteedulis* Mart.) species bear fruits with a dark-purple skin colour due to the presence of anthocyanins which have excellent functional properties, high antioxidant capacity. The standard assay methods to quantify anthocyanin are destructive, time consuming, generate chemical residues and sometimes require specialized procedures. Therefore non-invasive and/or nondestructive techniques have been used to determine quality parameter of fruits and vegetables e.g. the near infrared spectroscopy (NIRS). Although the apparent simplicity of using NIRS and its possible application as a nondestructive technique for sorting and classification of whole fruits it can just be implemented based on robust mathematical models. This study describes the feasibility of NIR diffuse reflectance spectroscopy to predict anthocyanin content in two Brazilian palm fruits (açaí, *E. oleracea* Mart. and juçara, *E. edulis* Mart.).The models we have developed were obtained from samples of açaí and juçara fruits collected during 2010-2011 at 3 harvest periods and at 4 growing regions. The spectra were pre-treated using standard normal variate (SNV), de-trend transformation and first derivative (Savitzky-Golay). Calibrations were developed using partial least squares (PLS) regression. The largest differences in the spectra were found around the water absorption peaks (4.550 to 5.350 cm^{-1} and 6.150 to 7.500 cm^{-1}). Using external validation dataset the global model including açaí and juçara fruits predicted well the anthocyanin content (4 latent variables, $R^2 = 0.74$). However, the large prediction error (RMSEP 1.07%) was not adequate to predict anthocyanin content in açaí fruits as the amount of anthocyanin in açaí (1.14±0.76%) is approximately three times lower than in juçara fruits (3.09±2.02%). Therefore, individual PLS models were developed for each species and external validations using independent dataset showed better anthocyanin prediction. The RMSEP for predictions of anthocyanin ranged from 0.28% to 0.91 % to açaí and juçara fruits, respectively. The NIR spectroscopy can be successfully used to predict anthocyanin in açaí and juçara fruits as a nondestructive method with promising use in on-line grading lines.