

# Near infrared spectroscopy, a suitable tool for fast phenotyping – The case of cashew genetic improvement

Nancy Taéra Ibraimo Samamad, Livia Paulia Dias Ribeiro, Mônica Mariade Almeida Lopes,  
Rolf Puschmann and Ebenezerde Oliveira Silva

Scientia Horticulturae 238: 363-368. (2018)

---

## Abstract

Cashew apple (*Anacardium occidentale* L.) quality traits such as firmness, pH, total soluble sugar (SSC), soluble solid (SS), titratable acidity (TA), SS/AT ratio (flavor), vitamin C (VC), total carotenoids (TC), total flavonoids (TF), total polyphenols (TP) and total antioxidant activity (TAA) are critical factors for fruit quality assessment. We are reporting here a set of results obtained with a near infrared spectrometer using the 830–2,500 nm range, showing good prediction of the quality traits cited above in the ripe early dwarf cashew clones by partial least squares (PLS) algorithm. The intact cashew apples spectra resulted in good predictions of firmness ( $R^2 = 0.92$ ; RMSEP = 0.71), pH ( $R^2 = 0.84$ ; RMSEP = 0.17), SSC ( $R^2 = 0.86$ ; RMSEP = 0.99), SS ( $R^2 = 0.90$ ; RMSEP = 0.70), TA ( $R^2 = 0.96$ ; RMSEP = 0.055), flavor ( $R^2 = 0.87$ ; RMSEP = 7.5), VC ( $R^2 = 0.92$ ; RMSEP = 38), TC ( $R^2 = 0.97$ ; RMSEP = 0.089), TF ( $R^2 = 0.95$ ; RMSEP = 0.86), TP ( $R^2 = 0.94$ ; RMSEP = 27) and TAA ( $R^2 = 0.93$ ; RMSEP = 34). Near Infrared Spectroscopy (NIR) is a valid approach to study the physiology of early dwarf cashew clones, and the presented NIR methodology is expected to be an alternative for cashew germoplasm banks as a tool to support the database of images spectra for a rapid and robust phenotyping.