Title:

Banana plantain functional properties evaluation during water cooking processes: a NIRS original assay and perspectives

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Starch is the major component of edible banana at green stage of maturity, and is well-known to highly contribute to its functional properties. Among others, methods based on near-infrared spectroscopy (NIRS) have already been successfully applied to evaluate various native starch functional properties.

In our study, an assay was carried out to try to differentiate the cooking behavior of 6 banana genotypes. Pulp cylinder accessions were cooked in boiling water, and also packed and vacuum sealed in heat-resistant pouches prior to similar cooking. At various time intervals, samples were removed from the water bath and dried at 40°C prior to milling to get stabilized flour samples. The physicochemical properties of the flours were then evaluated by reference methods (DSC, RVA, gravimetry, instrumental firmness).

Based on physicochemical properties, a PCA showed that the first 3 components accounted for 84% of the variation. PC1 was positively related to RVA slope (Slope), firmness (F), hot paste viscosity (HPV), and pasting temperature (Ptemp), and negatively correlated to cooking ability (CA). A discussion will be proposed in regards to the wavelengths correlated to the different PCs on the potential structural justification of the phenomenon probably related to starch crystallinity. The factorial map (PCs 1 x 2) highlighted some crossed-effects of the cooking mode and varietal contribution, making possible to distinguish both processes and genotypes.

Results of PLS modeling indicated that NIRS was accurate in predicting Ptemp, HPV, CA, slope, and F with good coefficients of determination (RSQ = 0.70-0.93). Surprisingly, near infrared spectra were able to predict properties measured on the freshly cooked material, although the NIR measurements were carried out on flours. Rapid predictive methods such as NIRS, applied on native or even cooked flour samples can contribute to routinely predict the cooking behavior of the banana starchy resources in breeding programs.