

IMPROVING THE SCREENING OF NATIVE ANDEAN POTATO BREEDING LINES FOR SPECIFIC NUTRITIONAL TRAITS

H. Ayvaz^{1*}, A. Bozdogan², M. M. Giusti¹, L. Rodriguez-Saona¹

¹⁾ Dept of Food Science and Technology,

The Ohio State University, Columbus, OH, USA

²⁾ Food Engineering Dept, Korkut Ata University, Osmaniye, Turkey

Andean potatoes are gaining popularity not only for their appealing colors and culinary uses but also for its potential higher content of polyphenolic compounds. Our objective was to develop simple protocols to determine phenolics, anthocyanins, and sugars in Andean potatoes using portable infrared spectroscopy combined with pattern recognition techniques. Lyophilized Andean potato samples (76) from 8 different *Solanum* species, including cream, yellow, pink, red and purple colors, were evaluated for monomeric and polymeric anthocyanins (pH differential method), total phenolics (Folin-Ciocalteu method), and characterized by HPLC for anthocyanin, phenolic and sugars profiles. Potato extracts were directly placed on a five-bounce ATR accessory of portable infrared system, vacuum dried, spectrum (4000-800 cm⁻¹) collected and analyzed by Partial Least Squares Regression (PLSR) based on reference values. Excellent linear correlations ($r_{Val} > 0.91$) were obtained for all PLSR models. Models for monomeric anthocyanin (4-177 mg cy-3-glu equivalents/100g DW) and total phenolics (28-507 mgGAE/100gDW) gave standard error of cross validation (SECV) of 8 mg/100gDW and 22 mgGAE/100gDW, respectively. Based on HPLC data, models were developed for estimating chlorogenic acid (15-402 mg/100gDW, ~82% of the phenolic content) had SECV of 26 mg/100gDW and while sugar models (0.4-3.8g sucrose, 0.01-1.81g glucose and 0.02-0.88g fructose/100gDW) gave SECV of 0.2, 0.05 and 0.04 g/100gDW for sucrose, glucose and fructose, respectively. Overall, portable infrared technology allowed for rapid, cost-effective, easy and simultaneous measurements of anthocyanin, phenolics and sugars in potatoes based on unique spectral information, showing a great opportunity to benefit potato breeding and certain aspects of crop management, production and research.

Keywords: Infrared, portable spectrophotometers, Andean potatoes, phenolics

* Corresponding author: ayvaz.2@osu.edu