

Quantification of Glucosinolates in Turnip Greens and Turnip Tops by Near-Infrared Spectroscopy

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Abstract : The potential of near-infrared spectroscopy (NIRS) for screening the total glucosinolate (t-GSL) content, and also, the aliphatic glucosinolates gluconapin (GNA), progoitrin (PRO) and glucobrassicinapin (GBN) in turnip greens and turnip tops was assessed. This crop is grown for edible leaves and stems for human consumption. The reference values for glucosinolates, as they were obtained by high performance liquid chromatography on the vegetable samples, were regressed against different spectral transformations by modified partial least-squares (MPLS) regression (calibration set of samples n= 350). The resulting models were satisfactory, with calibration coefficient values from 0.72 (GBN) to 0.98 (tGSL). The predictive ability of the equations obtained was tested using a set of samples (n=70) independent of the calibration set. The determination coefficients and prediction errors (SEP) obtained in the external validation were: GNA=0.94 (SEP=3.49); PRO=0.41 (SEP=1.08); GBN=0.55 (SEP=0.60); tGSL=0.96 (SEP=3.28). These results show that the equations developed for total glucosinolates, as well as for gluconapin can be used for screening these compounds in the leaves and stems of this species. In addition, the progoitrin and glucobrassicinapin equations obtained can be used to identify those samples with high, medium and low contents. The calibration equations obtained were accurate enough for a fast, non-destructive and reliable analysis of the content in GNA and tGSL directly from NIR spectra. The equations for PRO and GBN can be employed to identify samples with high, medium and low contents.

Keywords : brassica rapa, glucosinolates, gluconapin, NIRS, turnip greens

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