

DETECTION OF SOY, PEA AND WHEAT PROTEINS IN MILK POWDER BY NIRS

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This work aimed to prove the feasibility of NIR spectroscopy to detect vegetable protein isolates (soy, pea and wheat) in milk powder. Two hundred and thirty-nine samples of genuine and adulterated milk powder (NIZO, Ede, NL) were analysed by NIRS using an InfraAlyzer 500 (Bran+Luebbe). NIR spectra were collected at room temperature, and data were processed by using Sesame Software (Bran+Luebbe). Separated calibrations for each non-milk protein added, in the range of 0-5%, were calculated. NIR data were processed by using Sesame Software (Bran+Luebbe). Prediction and validation were made by using a set of samples not included into the calibration set. The best calibrations were obtained by the PLSR.

The type of data pre-treatment (normalisation, 1st derivative, etc..) was chosen to optimise the calibration parameters.

NIRS technique was able to predict with good accuracy the percentage of each vegetable protein added to milk powder (soy: R^2 0.994, SEE 0.193, SEcv 0.301, RMSEPall 0.148; pea: R^2 0.997, SEE 0.1498, SEcv 0.207, RMSEPall 0.148, wheat: R^2 0.997, SEE 0.1418, SEcv 0.335, RMSEPall 0.149).

Prediction results were compared to those obtained using other two techniques: capillary electrophoresis and competitive ELISA.

On the basis of the known true values of non-vegetable protein contents, the NIRS was able to determine more accurately than the other two techniques the percentage of adulteration in the analysed samples.