

SPECTROSCOPY AS A RAPID METHOD TO DETECT PAPRIKA POWDER ADULTERATION WITH CORN FLOUR

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Paprika is a spice of important culinary and nutritional benefits, especially in its semi-processed or powdered form. Paprika powder has become famous for its ease of use, access and storage but has also equally become a target for adulteration for financial gains and greed. Although diverse types of conventional methods exist to track various forms of food adulteration, they are relatively slow and sometimes require a high technical expertise or sample destruction for successful analysis. Emerging methods such as near infrared spectroscopy (NIRS) operates on the non-destructive principle of light interaction with the sample and has shown promising tendencies as a rapid alternative for the conventional methods in detecting adulteration. This study aimed to apply two NIRS instruments (bench: metri NIR and Handheld: DLP NIRSCAN NANO) to detect artificial adulteration of red paprika powder with corn flour at adulterant concentrations of 5%, 10%, 15%, 20%, 25%, 30% and 40%. Discriminant analysis (LDA) was used for classification of samples of different adulteration levels. Partial least square regression (PLSR) was used to build models to predict the adulteration. LDA showed a recognition ability of 100% and 90% for metri NIR and NIRSCAN NANO respectively. Prediction accuracy in LDA was 97.8% and 88.9% for metri NIR and NIRSCAN NANO respectively. Both instruments showed high prediction accuracies in PLSR with coefficients of determination (R^2_{CV}) greater than 0.9 and Root Mean Squared Error Calibration (RMSEC) less than 2g/100g of paprika powder. The NIRS instruments exhibited discriminatory and predictive abilities capable of tracking paprika adulteration with corn flour and could be applied in further studies to test lower adulterant concentrations.

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