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THE USE OF INFRARED SPECTROMETERS TO PREDICT QUALITY PARAMETERS OF CORNMEAL AND DIFFERENTIATE BETWEEN ORGANIC AND CONVENTIONAL VARIETIES

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The demand for organic food products has increased, and this trend is expected to continue as organic products become mainstreamed into major grocery chains. Quality variability of organic cornmeal can affect the final extruded product. In this study, a portable Mid-Infrared (IR), handheld and benchtop Near-IR spectrometers were evaluated as rapid methods for differentiating between organic and conventional cornmeal and to measure the quality parameters of the cornmeal used for production of snack foods. Twenty-seven conventional and eleven organic cornmeal samples were obtained from a local manufacturer of grain-based products. Reference quality parameters measured included moisture content (vacuum-oven), ash content (muffle furnace), final viscosity, peak viscosity, setback values (Rapid Visco-Analyzer, RVA) and particle size (Laser diffraction particle sizing). Data was evaluated using soft independent modeling of class analogy (SIMCA) and partial least squares regression (PLSR). Thirty varieties of cornmeal were used to develop calibration models while 8 varieties were used as an independent validation set. For all three spectrometers used, the SIMCA analysis accurately classified between organic and conventional cornmeal samples (interclass distance>3.7). Additionally, excellent linear correlations between infrared predicted and reference values were obtained for independent sample set. Residual predictive deviation (RPD) values for PLSR-models developed ranged between 2.3 and 9.6 which indicate that the models could be used for quality control applications. Overall, our data supports the capability of infrared systems to classify between organic and conventional cornmeal, and to predict important quality attributes of cornmeal for the snack food industry, reducing time and the cost.

Keywords: Cornmeal**,** organic, handheld and portable spectrometers, multivariate analysis, RVA

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