

# Develop molecular spectroscopic techniques to screen mycotoxin concentrations in feeds

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The application of traditional methods to detect feed mycotoxin is time consuming and requires a high level of experience and expertise. The objective of this study is to test possibility of using rapid molecular spectroscopic techniques to screen mycotoxin concentrations in feeds. Cereal grain, wheat and barley, are top-ranked among the most important crops in western Canada. However, they have been suffering from mycotoxins contamination for a long time. In this study, a total of 80 wheat and 42 barley samples were collected and detected for 6 major ergot alkaloids as well as other 12 common mycotoxins concentration by liquid chromatography-tandem mass spectrometry method. The near-infrared spectra (NIR; 680-2500 nm) and mid-infrared spectra (MIR; 4000-700  $\text{cm}^{-1}$ ) of all samples were all collected with the NIR and FT/IR spectrometers. All spectra were averaged from three repeated NIR or FT/IR measurements, each recorded from a new sub-sample. The final spectra data were imported into the Unscrambler X, v10.3 (CAMO, Oslo, Norway). Preliminary descriptive analyses were performed by both graphic tools and numerical results. To remove the spectral baseline shift, noise, and light scatter effects, nine preprocessing methods were applied, including baseline offset, standard normal variate (SNV), detrending, SNV + detrending, multiplicative scatter correction, first derivative, second derivative, first derivative + SNV, and second derivative + SNV. The possibility of whether we can develop a fast screening method for wheat and barley mycotoxins detecting by NIR and MIR are revealed in this study.