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# Improving interpretation of infrared spectra for OM characterization by subtraction of spectra from incinerated samples

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Non-destructive methods such as diffuse reflectance infrared Fourier transform spectroscopy (DRIFT) have been applied to characterize organic matter (OM) at intact structural surfaces among others. However, it is often difficult to distinguish effects of organic components on DRIFT signal intensities from those of mineral components. The objective of this study was to re-evaluate DRIFT spectra from intact earthworm burrow walls and coated cracks to improve the interpretation of C-H and C=O bands. We compared DRIFT and transmission Fourier transform infrared (FTIR) spectra of entire samples that were from the same pedogenetic soil horizon, but different in mineral composition and texture (i.e. glacial till versus loess). Spectra of incinerated samples were subtracted from the original spectra. Transmission FTIR and DRIFT spectra were almost identical for entire soil samples. However, the DRIFT spectra were affected by the bulk mode bands (i.e. wavenumbers 2000 to 1700 cm-1) that affected spectral resolution and reproducibility. The ratios between C-H and C=O band intensities as indicator for OM quality obtained with DRIFT were smaller than those obtained from transmission FTIR. A spectral subtraction procedure was found to reduce effects of mineral absorption bands on DRIFT spectra allowing an improved interpretation.
DRIFT spectroscopy as a non-destructive method for analyzing OM composition at intact surfaces in structured soils could be calibrated with information obtained with the more detailed transmission FTIR and complementary methods.