

# Characterization of Soil Organic Matter using Fourier Transform Infrared Spectrometer

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Combustion method is usually used to measure total carbon (TC). However, the total amount of carbon does not tell the contents such as fresh biomass or old humin. Therefore, detailed organic matter analysis was attempted using Fourier transform infrared spectrometer (FTIR), which could obtain unique spectrum of absorption or emission of soils. First, calibration curve was obtained using a mixture of cellulose and KCl. KCl was newly introduced as a diluent to avoid saturation of the emission peak. Furthermore, in order to extract individual organic matter, heavy liquids were used to select them by specific weight. Then, a total of 12 field soil samples were analyzed to figure out the organic matter differences affected by land management. As a result, the amount of cellulose was successfully measured. In field soils, cellulose was the most abundant organic matter in the surface layer, and the amount was more at the cultivated field than at the no-tillage field. When comparing this result with the result of the total carbon analysis, we estimated that there are much readily decomposable organic matter on the tillage field and much hardly decomposable organic matter on the no-tillage field. This is consistent with the previous reports. However, we should note, in the experiment using heavy liquids for specific gravity fractionation selection, sufficient accuracy was not obtained. So far, quantitative analysis was challenging to examine the organic matter of field soil, but we obtained the possibility that it can be done by specific gravity fractionation. Currently, accurate quantification has not been achieved, but comparison was possible.

Keywords: soil organic matter, specific gravity fractionation, fourier transform infrared spectrometer