

## Effects of microorganisms and minerals on size distribution of organic matter adsorbed to soil

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Sorption of organic matter to soil is a key mechanism for carbon sequestration in terrestrial ecosystems. However, little is understood on how adsorptive organic matter is formed during decomposition process. In this presentation, we show changes in size distribution of adsorptive organic matter in soil during decomposition, and influences of microorganisms and minerals on the changes. We conducted an incubation experiment, in which leaves of three species were separately incubated in low-carbon-content soil, and size distribution of extractable organic matter from the soil was analyzed using HPLC attaching a size-exclusion column (HPSEC). Molecular weight of extractable organic matter distributed mainly in two ranges, about 100kDa-200kDa and about 0.5kDa-20kDa (based on proteins molecular weight) for all plant species. The width of these ranges changed to narrower with decomposition process. This change in molecular weight distribution (MWD) was observed when cycloheximide was added to soil, but not observed when chloramphenicol was added, suggesting bacterial influence on the MWD change during decomposition. In order to clarify influence of minerals on the typical two ranges, metal concentration was measured using ICP/MS for fractionated, eluted solution from HPSEC. The MWD of iron was closely related to that of organic carbon. These results suggest an importance of bacteria and iron for size distribution of adsorptive organic matter in decaying litter.

Keywords: Soil microorganisms, Soil minerals, Soil carbon, Organic matter adsorption, Molecular weight distribution