

Organic matter composition of soil macropore surfaces under different agricultural management practices

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Understanding the heterogeneous nature of soil, i.e. properties and processes occurring specifically at local scales is essential for best managing our soil resources for agricultural production. Examination of intact soil structures in order to obtain an increased understanding of how soil systems operate from small to large scale represents a large gap within soil science research.

Dissolved chemicals, nutrients and particles are transported through the disturbed plow layer of agricultural soil, where after flow through the lower soil layers occur by preferential flow via macropores. Rapid movement of water through macropores limit the contact between the preferentially moving water and the surrounding soil matrix, therefore contact and exchange of solutes in the water is largely restricted to the surface area of the macropores. Organomineral complex coated surfaces control sorption and exchange properties of solutes, as well as availability of essential nutrients to plant roots and to the preferentially flowing water. DRIFT (Diffuse Reflectance infrared Fourier Transform) Mapping has been developed to examine composition of organic matter coated macropores.

In this study macropore surfaces structures will be determined for organic matter composition using DRIFT from a long-term field experiment on waste application to agricultural soil (CRUCIAL, close to Copenhagen, Denmark). Parcels with 5 treatments; accelerated household waste, accelerated sewage sludge, accelerated cattle manure, NPK and unfertilized, will be examined in order to study whether agricultural management have an impact on the organic matter composition of intact structures.