NMR studies of organo-mineral complexes and soil surfaces. (S09-simpson124527-Poster)

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Abstract:

Using Multidimensional High Resolution Magic Angle Spinning NMR spectroscopy we are able to show the categories of structures in model mixtures and in real soil extracts that have high affinity for clay surfaces, and even provide insights into the conformations of the species when sorbed in both synthetic and natural systems. The following conclusions can be drawn.: 1) The aliphatic components have a very high affinity for the clay surface. They tend to be buried at the surface and only the hydrophilic heads exposed at the soil-aqueous interface, 2) Similarly, aromatic species show some affinity for the clay surface. When bound to a clay they are not generally well exposed at the solid-aqueous interface, 3) Amino acids, peptides and sugars or carbohydrates have less affinity for the clay. However, these species appear to coat the clay-bound aromatic and aliphatic components. The above observations help explain the conformation of organic matter in whole soils and is consistent with the hydrophobicity of the various species in soil organic matter. With the most hydrophilic peptide and carbohydrate structures arranging themselves at the soil-water interface, while the aromatic and aliphatic species tend to be partially or completely buried.

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