



Solid state NMR spectroscopy in the evaluation of the conformational changes of humic substances as affected by thermal variations

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Soil organic matter (SOM) is an ubiquitous, complex material which is produced by the degradation of plant tissues and animal bodies. It is the major indicator of soil quality since it is directly involved in the maintenance of soil fertility, prevention of erosion and desert encroachment and provision of suitable environment for biological activity. Organic matter is an important driving force in environmental global change as it acts as both a source and sink of atmospheric carbon. However, SOM is subjected to rapid changes due to environmental transformations such as massive deforestations, fires, intensive land uses, temperature increases and so on.

In the present work, a characterization of humic substances was done in order to obtain information about the transformation occurring to SOM as affected by temperature increases. For the first time variable temperature cross polarization magic angle spinning (CPMAS) ^{13}C NMR spectroscopy was applied in combination with thermal analyses (TG and DSC) on environmentally relevant soil organic matter. The results show that the conformational changes occurring in humic substances as temperature is raised can be associated to melting of alkyl components connected with sublimation of some organic compounds. The simultaneous application of solid phase micro extraction GC-MS also allowed the identification of the components which were released by sublimation processes.