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NMR characterization and sorption behavior of agricultural and forest soil humic substances

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Humic substances are the predominant components of the organic matter in the terrestrial system, which are not only important for the physicochemical properties of soil but are also dominant factors for controlling the environmental behaviors and fates of some organic contaminants, such as hydrophobic compounds. Nonylphenol [4-(1-ethyl-1, 3 dimethylpentyl) phenol] (NP), a ubiquitous hydrophobic pollutant, has recently focused the attention owing to its endocrine disruptors property. Sorption behavior of NP on humic substances, which were isolated from agricultural and forest soils, was investigated by using the dialysis technique at room temperature. 14C-labeled NP was used to quantify the partitioning behavior. Humic substances were characterized by 13C Cross-Polarization/Magic-Angle-Spinning Nuclear Magnetic Resonance (CP/MAS NMR). The results showed that the partition parameters of NP on various humic acids were slightly different. Relationships between partition coefficients and the functional groups of humic substances identified by CP/MAS NMR were analyzed.