



Relationships between DOM's quality and its interaction with copper

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Dissolved organic matter (DOM) in soils is known to play various ecological roles. One of them is the interaction with soil pollutants such as heavy metals. DOM can make them leach more readily out of soil and therefore less bio-available. On the other hand increased leaching can have a negative impact on the hydrosphere. In this study, the relationships between DOM quality and the interaction between DOM and copper were investigated. DOM was extracted from 48 different soils, which were obtained in various places in Europe. The extracted DOM was characterized optically (UV and fluorescence), and the interaction between DOM and copper was evaluated with fluorescence quenching. The maximum binding capacity (B_{max}) and the concentration of Cu required to reach half- B_{max} (K_d), which implies the efficiency of the interaction, were calculated with the "one-site binding" equation. The fluorescence emission peak of all DOM samples was quenched as the Cu concentration increases. The quenching was mainly observed in the emission region of higher wavelengths, implying more condensed DOM molecules (such as humic substances) are involved in the binding. B_{max} has a linear relationship with the total anionic charge of DOM, which can be measured with the change of fluorescence when acid is added to DOM solutions. It suggests that the DOM, which has more charge, can interact better with Cu. B_{max} has also a linear relationship with the humification index (HIX). These results suggest the DOM, which has more condensed molecules and at the same time more functional groups (charge), can interact better with Cu. Furthermore, K_d decreases as the fluorescence efficiency (FE) increases. HIX implies the intra-molecular condensation, while FE shows the three-dimensional inter-molecular structure.