Partition and sorption of heavy metals to soils

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The fate of toxic metallic cations in the soil environment depends largely on the interactions of these metals with inorganic and organic surfaces. The extent to which a metallic cation interacts with these surfaces determines the concentration of metal in solution and, consequently, the potential for movement into groundwater or uptake by plants. A considerable amount of work has been done to evaluate the adsorption of various heavy metals by soils and soil constituents, such as clays and organic matter fractions.
The objectives of this work were to determine the sorption capacity of four soil categories, in absence and presence of different quantities of the yeast Saccharomyces cerevisiae, during the sorption ability of copper ion. Also, the semi-batch experiments were set in order to find how much time the sorbent is active during copper sorption process. The mobility of heavy metals in soil was described by the distribution coefficient, Kd, defined as the ratio of metal concentration in the solid phase to that in the liquid phase at equilibrium, determined from the slope of the linear part of the adsorption isotherms.
The results show that there are differences between sorption capacities of various soils, and the sorption process kinetics and dynamics are influenced by the presence of S. cerevisiae, which can act both as biosorbent and as organic matter in soil. The sorption process kinetics can be described by a pseudo-second order model, indicating that the rate limiting step is a chemical sorption process between copper and soil.