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BOOK OF ABSTRACTS

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A large difference in dissolution in the three media was found in the order: MilliQ water > seawater > sediment. It was also found that ligands (i.e., organic matter and inorganic ligands) have a large influence on ion release of AgNPs. In MilliQ water, the amount of released ions was 1.6 µg collected in a diffusive gradient thin film after 16 days. In sediment, the released ion amount was less than 0.1% of the total amount of AgNPs added. We exposed Capillaeta tetra to sediment-associated Ag(I) and AgNPs. The results showed that AgNPs were bioavailable and were taken up mainly by worms as particles. The influence of ligands on AgNPs dissolution may have an important influence on bioavailability and toxicity, and we suggest that more studies are needed to examine the effects of ligands on AgNP dissolution and the influence of dissolution on bioavailability.

N1.142
Manufactured TiO₂ nanoparticles availability and behavior in soil
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The increase in applications of nanostructured materials and consequently their industrial production lead to an uncontrolled release of nanoparticles into the environment. The knowledge of the impact of nanoparticles, their availability and how they may alter terrestrial and aquatic ecosystems is limited. Nanomaterials containing TiO₂ nanoparticles (TiO₂-NPs) are useful for a wide range of applications and at the end of life-cycle they could become nano-wastes, thus the need of understanding their transport and diffusion in terrestrial ecosystems. Batch experiments were performed using TiO₂-NPs (Sigma-Aldrich, anatase, 25 nm) suspened with three Italian soils. Aliquots of soil suspensions with and without TiO₂-NPs were periodically collected, and monitored for aggregate size distribution (Mastersizer2000 Malvern) and Ti concentration (ICP-OES_Variam). Soils analyses showed huge differences in particle size distribution and organic matter content, where the cationic exchange capacity was higher in soils richer in clay and in organic carbon, and the values of electrical conductivity suggest ionic strength higher in the sandy soil suspension and lower in the clayey one. TiO₂-NPs are particularly influenced by the dissolved organic matter as well as the ionic strength. From day 6 all soils suspensions and their mixture with TiO₂-NPs showed size distribution similar to that of TiO₂-NPs alone however differences in Ti concentration were found. TiO₂-NPs suspended in soil richer in organic carbon showed higher Ti concentrations indicating a stabilization of TiO₂-NPs aggregates, probably due to a sterically stabilized system formed by the dissolved organic matter. In sandy soil suspension, the lowest Ti concentration could be attributed to the higher ionic strength despite of the expected lower adsorption capacity of this soil.

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N1.143
Controlled ion release from copper nanoantimicrobials: A versatile system for tuneable bioactivity
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