POZVÁNKA NA SEMINÁŘ

CAN WASTEWATER-BORNE ENGINEERED NANOMATERIALS POSE A THREAT TO THE MICROORGANISMS INVOLVED IN WASTEWATER TREATMENT?

IMPACT OF CARBON NANOTUBES ON BACTERIAL COMMUNITIES ASSOCIATED WITH THE DIATOM NITZSCHIA LINEARIS

Kdy: 17. října 2017 od 10.00 – 13.00

Kde: TUL, budova L, seminární místnost (4.003), 4. Patro

Lektoři: *Claire Courtis - Norwegian Institute of Bioeconomy Research*

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Abstracts:

The major fraction of engineered nanomaterials (ENMs) released in the environment are transiting through wastewater treatment plants (WWTPs). How do the microorganisms responsible for the removal of nitrogen in WWTPs react when exposed to wastewater-borne ENMs? We investigated the potential for Ag and TiO2 nanoparticles (and their transformation products) to cause a decrease in the operational efficiency of WWTPs, more specifically on nitrogen removal by denitrification. To gain a mechanistic understanding of the potential effects of Ag and TiO2 NPs on denitrifying bacteria, we exposed pure cultures of bacteria isolated from activated sludge to various concentrations of NPs, and monitored gas kinetics during the transition from oxic to anoxic respiration. We also conducted similar exposure experiments on indigenous bacterial communities present in actively operating WWTPs. Results obtained with suspended and biofilm associated microorganisms will be presented, in order to complement eco-physiological studies on single organisms.

In aquatic ecosystems, Diatoms-Bacteria interactions condition the carbon and nutrient cycling. Here, we studied the impact of Carbon nanotubes (CNTs) on a Nitzschia linearis with associated bacteria. Diatoms was exposed to CNTs at 0, 0.1, 1 and 10 mg/L. A negative effect of CNTs on the abundance of bacteria was observed at 50mg/L. CNTs exposure modified the structure of bacterial communities in planktonic fraction at 1 mg/L. Bacteroidetes phylum were dominant in planktonic community of control, while they were strongly lower at 1 and 10 mg/L. On the contrary, the Proteobacteria phylum increased. These results demonstrate that CNTs affect the bacterial communities at relatively low concentration, with potential disruption of their functions in aquatic ecosystems.

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PRO BEZPEČNOST A RIZIKA NANOMATERIÁLŮ V ŽIVOTNÍM PROSTŘEDÍ

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