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Researchers use MARA to show importance of sediment particle size on the availability of metallic nano-particles in the aquatic environment.

Evidence that sediment grain size can influence the toxicity of metallic nano-particles in the aquatic systems by controlling their availability has demonstrated by a group of researchers in Canada using the MARA system.

Santos from the Ecotoxicology Laboratory of Professor R. Monteiro (Centre for Nuclear Energy and Agriculture, Piracicaba Campus of the U. of Sao Paulo, Brazil) together with her colleagues at Environment Canada (Montréal (Quebec, Canada) and University of Metz (France) have shown that metallic nanoparticle-spiked sediments with high levels of fine particles (clay type sediments) demonstrated lower toxicity effects than sediments with lower levels of fine particles (sandy type sediments) when performing a microbial bioassay (MARA) on sample elutriates (aqueous extracts).

The MARA system uses a suite of genetically diverse microorganisms to produce a fingerprint response of the effect of sample extracts on their growth over an 18 hour period. In their study Santos and colleagues compared both artificial and natural river sediments from the St Lawrence River and by comparing the microbial fingerprints between a number of sediment types with varying levels of fine particles amended with four commonly utilised metallic nano-particles (copper zinc iron oxide, samarium (III) oxide, erbium (III) oxide and holmium (III) oxide) were able to demonstrate a correlation between toxicity and sediment composition for three of the four nano-particles tested.

The results demonstrate the importance of sediment particle size in controlling any adverse effects of metallic nano-particles on aquatic systems and the usefulness of the MARA system for routine monitoring in aquatic environments.

Reference:

Santos, M.A., Monteiro, R. T. R, Blaise, C., Gagné, F., Bull, K. and Féard, J.F. 2009. Influence of sediment grain size on elutriate toxicity of inorganic nano-materials. *Water Qual. Res. J. Canada*, Vol. 44, No. 3 (in press).

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