**Colloidally Stable Gold Nanoparticles as Model Systems in Environmental Science**

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Nanotoxicity is an emerging field in environmental science. Unfortunately, this also means that the number of ambiguous study results increases.This is especially the case when trying to connect the physico-chemical properties of nanoparticles with their fate or their toxicity in complex environments.

This seems to be mainly due to the colloidal variability of engineered nanoparticles, especially with regard to theirsize, their surface chemistry and their colloidal stability in the testing media. The variability is caused by the undefined adsorption of organic matter (humic acids and proteins), high ionic strength or unsuitable pHs (Podila 2012).

These three problems can be circumvented by using protein coated gold nanoparticles, as they are stable at high ionic strength and over a large pH region. Gold nanoparticles are well suited to do so as they exhibit surface plasmon resonance so that the particles’ colloidal stability can be detected with the naked eye (Chanana 2011, Chanana2013). Another advantage is the absence of gold in biological systems and their non-toxicity, which allows to exclude the toxicity generated by the core material.

In this contribution, we present the investigation of the protein coated nanoparticles’ stability in environmentally relevant aquatic matrices, as well as the results of testing BSA coated gold nanoparticles on zebrafish and barley. The preliminary results show that our particles do not influence the development of these organisms and thus confirm the hypothesis of protein coated gold nanoparticles not being toxic – not even in very high nanoparticle concentrations such as 1 mM.

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