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Long-term Effects of Carbon Nanomaterials on Aquatic Crustaceans and Relevant Environmental Factors

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Increasing rates of nanomaterial research and production show that environmentally relevant long-term toxicity studies are needed. Factors such as salinity, pH, exposure to light and others have previously shown to be relevant for nanoparticle stability in aquatic solutions. The influence of these factors on non-modified multi-walled carbon nanotube and carbon black toxicity was investigated in this study. Two different acute toxicity standard tests, the *Daphnia magna* immobilization test (EN ISO 6341:1996, freshwater) and the *Artemia salina* test (ArtoxKit M standard method, saltwater), were applied to assess impact of environmental factors on toxicity of carbon nanomaterials. A chronic *D. magna* reproductive toxicity test was used to assess the long-term effects. Nanomaterials were sonicated in test medium for 5 minutes and the particle size was measured using TEM. Preliminary results show that water suspensions of both materials are toxic at low concentrations. Observed toxic effects were not dose-dependant for *A. salina*. *D. magna* was more sensitive to carbon nanomaterials at EC₅₀ below 2.5 mg/L, and it is suggested that nanomaterial aggregates could cause physical effects via ingestion or adherence to the organism's surface.