Environmental influence on nanoecotoxicity of carbon nanomaterials and nanoparticles

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Nanotechnology compounds may pose a risk to the environment due to their specific properties and to the potential widespread use. Despite a considerable amount of studies, knowledge gaps between nanotoxicological research and nanomaterial (NM) safety remain large. Of particular interest is the aquatic environment which tend to be the ultimate sink for contaminants. Once in the aquatic environment, NM are highly affected by theirsurroundings like the presence of natural organic material (NOM) and the influence of UV irradiation, among others.Given the possibility of long-term exposure of NM, the specific methodology for nanotoxicology analysis need development.Thus, it becomes important to apply a battery of bioassays in the evaluation of their potential hazard taking into account these factors. More than that, NM realistic environmental concentration may be affectedunder environmental influence on its fate and transport. For example, NOM significantly improved the stability of graphene oxide (GO) in water.Also, nano-TiO_2 photocatalytic properties can result in enhanced toxicity effects.In the same way,GO photoreacts under simulated sunlight.Recently, our study showed thatthe presence of NOM changed GO toxic effects on aquatic organisms.In order to define the environmental risks and identify new tests directions, it is important to understand these issues. Thereafter, bioassays may be performed in different organisms exposed in different experimental conditions. For that, various biological endpoints may be investigated as survival rates, malformation, hatching and biochemical biomarkers. Accordingly, the improved understanding of matrix interactions will help stakeholders in performing nanomaterials relevant risk management.