
Confounding factors in nanomaterial ecological risk assessment in agrosystems

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Résumé

For the last 15 years, the nano-ecotoxicology has emerged as a new field of research with new paradigms and the development of new tools to evaluate the fate and impact of these contaminants in the environment. In particular, modeling suggests agrosystems as a major sink for these nanomaterials in the environment through the spreading of sewage sludge or the use of nanobased pesticides. Even If a lot of progress has been made so far, there are still many discrepancies in the scientific literature on that topic with no general consensus: some studies suggest the massive use of nanomaterials to sustain food production in an ever-growing world population while others concluded to a high toxicity of these contaminants and higher than their ionic or bulk counterparts. Based on the research we have been carrying out in the lab for these last 15 years, we have been able to identify some confounding factors that could mitigate the conclusions of such nano-ecotoxicity studies or even completely modify them. In ecological risk assessment, indicative values are given to these factors overlooking their biological implications. Here, going through few examples based on the impact of different types of nanomaterials (TiO₂, CNT, Ag) on crop plants, we can highlight the role of the exposure medium, the particle physico-chemical characteristics, the plant species considered, or tools used for assessment. All these parameters can drastically modify the toxicity and transfer of contaminants in agrosystems and need to be included for a more relevant risk assessment.

Mots-Clés: agrosystem, nanoparticle, risk assessment, ecotoxicity

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