Regulatory ecotoxicity testing of nanomaterials – proposed modifications of OECD test guidelines based on laboratory experience with silver and titanium dioxide nanoparticles - DTU Orbit (29/03/2019)

Regulatory ecotoxicity testing of nanomaterials is of societal importance and a large effort is undertaken at the OECD to ensure that OECD test guidelines (TGs) for nanomaterials (NMs) are available. Significant progress to support the adaptation of selected TGs to NMs was achieved in the context of the project MARINA (http://www.marina-fp7.eu/) funded within the 7th European Framework Program. Eight OECD TGs were adapted based on the testing of at least one ion-releasing NM (Ag) and two inert NMs (TiO2). With the materials applied, two main variants of NMs (ion releasing vs. inert NMs) were addressed. As the modifications of the test guidelines refer to general test topics (e.g. test duration or measuring principle), we assume that the described approaches and modifications will be suitable for the testing of further NMs with other chemical compositions. Firm proposals for modification of protocols with scientific justification(s) are presented for the following tests: growth inhibition using the green algae Raphidocelis subcapitata (formerly: Pseudokirchneriella subcapitata; TG 201), acute toxicity with the crustacean Daphnia magna (TG 202), development toxicity with the fish Danio rerio (TG 210), reproduction of the sediment-living worm Lumbriculus variegatus (TG 225), activity of soil microflora (TGs 216, 217), and reproduction of the invertebrates (Enchytraeus crypticus, Eisenia fetida, TGs 220, 222). Additionally, test descriptions for two further test systems (root elongation of plants in hydroponic culture; test on fish cells) are presented. Ecotoxicological data obtained with the modified test guidelines for TiO2 NMs and Ag NM and detailed method descriptions are available.

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