How important is drinking water exposure for the risks of engineered nanoparticles to consumers?

This study explored the potential for engineered nanoparticles (ENPs) to contaminate the UK drinking water supplies and established the significance of the drinking water exposure route compared to other routes of human exposure. A review of the occurrence and quantities of ENPs in different product types on the UK market as well as release scenarios, their possible fate and behaviour in raw water and during drinking water treatment was performed. Based on the available data, all the ENPs which are likely to reach water sources were identified and categorized. Worst case concentrations of ENPs in raw water and treated drinking water, using a simple exposure model, were estimated and then qualitatively compared to available estimates for human exposure through other routes. A range of metal, metal oxide and organic-based ENPs were identified that have the potential to contaminate drinking waters. Worst case predicted concentrations in drinking waters were in the low- to sub-µg/l range and more realistic estimates were tens of ng/l or less. For the majority of product types, human exposure via drinking water was predicted to be less important than exposure via other routes. The exceptions were some clothing materials, paints and coatings and cleaning products containing Ag, Al, TiO2, Fe2O3 ENPs and carbon-based materials.

General information
Publication status: Published
Organisations: Department of Environmental Engineering, Environmental Chemistry, Arizona State University, Institute of Occupational Medicine, Fera Science Ltd., University of York
Pages: 102-110
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Nanotoxicology
Volume: 10
Issue number: 1
ISSN (Print): 1743-5390
Ratings:
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.8
Web of Science (2016): Impact factor 6.428
Web of Science (2016): Indexed yes
Original language: English
Keywords: Concentration, Estimation, Human health, Market penetration, Nanomaterials, Release, Surface water, Waste water
DOIs: 10.3109/17435390.2015.10228
Source: PublicationPreSubmission
Source-ID: 110170086
Research output: Contribution to journal › Journal article – Annual report year: 2015 › Research › peer-review