Environmental risk assessment of chemicals and nanomaterials — The best foundation for regulatory decision-making? - DTU Orbit (22/12/2018)

Environmental risk assessment (ERA) is often considered as the most transparent, objective and reliable decision-making tool for informing the risk management of chemicals and nanomaterials. ERAs are based on the assumption that it is possible to provide accurate estimates of hazard and exposure and, subsequently, to quantify risk. In this paper we argue that since the quantification of risk is dominated by uncertainties, ERAs do not provide a transparent or an objective foundation for decision-making and they should therefore not be considered as a “holy grail” for informing risk management. We build this thesis on the analysis of two case studies (of nonylphenol and nanomaterials) as well as a historical analysis in which we address the scientific Foundation for ERAs. The analyses show that ERAs do not properly address all aspects of actual risk, such as the mixture effect and the environmentally realistic risk from nanomaterials. Uncertainties have been recognised for decades, and assessment factors are used to compensate for the lack of realism in ERAs. The assessment factors’ values were pragmatically determined, thus lowering the scientific accuracy of the ERAs. Furthermore, the default choice of standard assay for assessing a hazard might not always be the most biologically relevant, so we therefore argue that an ERA should be viewed as a pragmatic decision-making tool among several, and it should not have a special status for informing risk management. In relation to other relevant decision-making tools we discuss the use of chemical alternative assessments (CAAs) and the precautionary principle.

General information
State: Published
Organisations: Department of Environmental Engineering, Environmental Chemistry, Roskilde University
Contributors: Syberg, K., Hansen, S. F.
Number of pages: 11
Pages: 784-794
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Science of the Total Environment
Volume: 541
ISSN (Print): 0048-9697
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.98 SJR 1.546 SNIP 1.65
Web of Science (2017): Impact factor 4.61
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.09 SJR 1.652 SNIP 1.856
Web of Science (2016): Impact factor 4.9
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.33 SJR 1.653 SNIP 1.648
Web of Science (2015): Impact factor 3.976
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.2 SJR 1.635 SNIP 1.843
Web of Science (2014): Impact factor 4.099
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.73 SJR 1.527 SNIP 1.745
Web of Science (2013): Impact factor 3.163
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.7 SJR 1.749 SNIP 1.82
Web of Science (2012): Impact factor 3.258
ISI indexed (2012): ISI indexed yes