



Predicting contamination by the fuel additive Cerium Oxide engineered nanoparticles within the United Kingdom and the associated risk

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Abstract

As a fuel additive, cerium oxide nanoparticles may become widely dispersed throughout the environment. Commercial information from the United Kingdom (UK) on the use of cerium oxide nanoparticles was used to perform a modelling and risk assessment exercise. Discharge from exhausts took into account the likely removal by filters fitted to these vehicles. For predicting current soil exposure, scenarios were examined, ranging from dispersion occurring across the entire UK landmass to only within the urban area to only 20m on either side of road networks. For soils, the highest predicted contamination level was 0.016 mg/kg within 20m of a road following seven years of continuous deposition. This value would represent 0.027% of reported natural background cerium. If usage were to double for five more years, levels would not be expected to exceed 0.04 mg/kg. River water contamination considered direct aerial deposition and indirect contamination via runoff in the water and entrained soil sediment, with the highest level of 0.02 ng/L predicted. The highest predicted water concentration of 300 ng/L was associated with water draining from a road surface, assuming a restricted deposition spread. These predictions are well below most toxicological levels of concern.

Reference

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