

Mixture toxicity data from STAR experiments

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Abstract

One of the main activities in the EC-STAR (SStrategy for Allied Radioecology) project over the last four years has been to explore whether radiation protection criteria need to be considered within a mixed contaminant context (Work Package 4: WP4). Experiments have been carried out at several laboratories on a range of test organisms (*Caenorhabditis elegans*, *Daphnia magna*, *Salmo salar*, *Lemna minor*, *Pseudokirchneriella subcapitata*) representative of aquatic invertebrates, vertebrates, plants and communities. This experimental work has produced a large amount of valuable data.

One set of experiments has investigated how one contaminant may influence the uptake of a second, under a range of environmental conditions and using several different species. The focus has been on U and Cd and these data have been used to populate Biotic Ligand Models (BLM). A second set of experiments were effects studies where stressors were tested alone or in pairs (e.g., gamma irradiation + Cd or U + Cd) on various organisms to identify possible synergistic or antagonistic effects of the combined stressors. In some cases, data were then used for toxicokinetic and toxicodynamic modelling (DEBtox).

The raw data produced is not only interesting for the purposes for which it was collected, but may be of use to others within the fields of radioecology, ecotoxicology and environmental protection. Single stressor effect metrics (e.g., EC₁₀ or EC₅₀ values) can be calculated and used in a risk assessment context. Gamma effects data may be useful to add to the growing amount of data in the Frederica database. The wealth of information on uranium speciation and related uranium toxicity will be useful for the evaluation of the effect of environmental conditions on uranium toxicity and hence for uranium risk assessment. Future meta-analyses may also be able to make use of the data.