

**TU107 Chronic metal mixture toxicity to *Ceriodaphnia dubia*: a meta-analysis and implementation in ecological risk assessment**

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Although metals in the aquatic environment mostly occur as mixtures, ecological risk assessment procedures are currently still based on a metal-by-metal approach. However, before metal mixture toxicity can be integrated into risk assessment frameworks, better knowledge on mixture toxicity effects during chronic exposure is needed. In several experiments conducted over the past years, we investigated chronic toxicity of Ni, Zn, Pb, Cu and Cd mixtures to *Ceriodaphnia dubia* in 6 different binary, ternary and quaternary combinations comprising in total 210 mixture treatments. In the present study, we combined all our mixture toxicity data in a meta-analysis to evaluate the following three risk assessment related questions: I) are mixture effects important?; II) is the concentration addition (CA) model a conservative model for mixture toxicity?; III) which of the two commonly applied model mixture reference models (CA or independent action (IA)) describes metal mixture toxicity most accurately? Overall, the mixture effect was significantly different from the effect of the most toxic metal. This indicates that mixture effects are important, and that the current risks evaluation approaches based on a metal-by-metal approach might not be protective for communities exposed to metal mixtures. In general, the CA model was the most conservative model. Additionally, very few (less than 1%) significant synergistic interactions relative to the CA model were observed. The latter confirms that the CA reference model can be used as a conservative first tier in a tiered metal mixture risk evaluation scheme. Overall, the IA model described metal mixture toxicity to *C. dubia* more accurately than the CA model. Finally, a possible tiered approach is presented.