



Student Research

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Mixture risk assessment for water quality: applicability of alternative regulatory frameworks

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An increasing number of chemicals from anthropogenic sources is reflected in the complex mixtures found in environmental water bodies, which complicates the characterisation and interpretation of water quality information. In a regulatory context, possible human health risks resulting from exposures to mixtures are generally not assessed. Nevertheless, there is a broad understanding of a need to move beyond single-chemical assessment by developing more ambitious frameworks to assess mixture toxicity.

This study investigated how current human health risk approaches from different (inter)national legislative frameworks could potentially improve mixture risk assessment in a drinking water context. A comparative analysis between regulatory frameworks was conducted to identify differences and similarities in legislative requirements and risk assessment approaches. Two frameworks were selected as potentially applicable in a drinking water context, one published by the World Health Organization and the other by the European Food Safety Authority. To evaluate their potential impact on water quality limits, a case study was conducted to estimate hazard indices of mixtures using national and regional average concentrations of pesticides detected during monitoring rounds between 2015 and 2019 in Dutch groundwater.

Follow-up research should focus on improving mixture toxicity risk assessment methods to account for exposure to multiple pollutants and regulatory feasibility of a generic drinking water target level for mixtures. Also, further studies could assess the regulatory fit and explore suitable adjustments to current frameworks (which are currently not applicable in a drinking water context). By targeted adjustments, these frameworks can be refined for applicability in the water domain.

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