Towards the establishment of a prioritization strategy: A combination of exposure and toxicity data

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The extensive production and use of chemicals augments their occurrence in the aquatic environment and is detrimental to its ecological heath. Hence, the large number of detected chemicals urges the need for appropriate prioritization strategies prior to further testing and potential inclusion into monitoring programs. Here, a prioritization strategy is proposed, for chemicals detected in the North Sea over the last decade, through the establishment of an Hazard Index. Exposure data was obtained from peer-review publications while the ToxCast database was consulted for toxicity data. Data availability and density in ToxCast were determined for these chemicals. A total of 158 chemicals were ranked, based on the more than 9000 tested assay endpoints, and the most sensitive tested assay endpoints identified. Moreover, a second level of analysis was implemented for the prioritization of both classes of chemicals and biological processes targeted by the retrieved assay endpoints. The calculated Hazard Indexes range in several orders of magnitude, with the biggest difference being detected for the tested assay endpoints, in which 11 orders of magnitude separate the most and least sensitive endpoint. The obtained results further emphasize the need for such prioritization strategies.

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