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Polar and Non-Polar Compounds in Produced Water

Analysis and toxicity study of organic and inorganic trace compounds in co-produced water from North Sea oil fields

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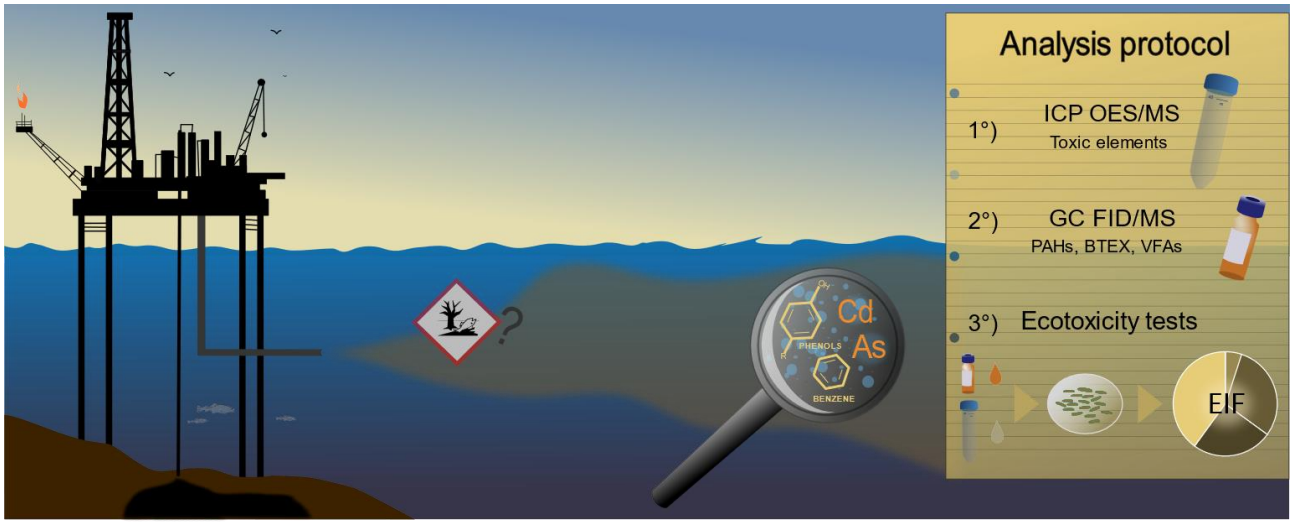
When crude oil is produced, large amounts of water are made along with the raw material. This co-produced water (PW) is highly saline and contaminated by crude oil from the geological formation and production additives. Thus, it is heterogeneous and chemically complex. Since this water is being discharged into the sea at most current offshore production sites, reaching “zero harmful discharge” requires stringent PW management and improved monitoring and toxicology evaluation.

Trace elements are often challenging to measure in formation water brine and thus are hard to quantify reliably in many cases. In this study, the target elements have been: Ba, Sr, Fe, Co, Ni, Cu, V, Mn, Cr, Cd, Pb, As, Sb, and Se. Furthermore, PW has a high content of organics like BTEX (benzene, ethylbenzene, toluene, xylene) and other non-volatile concerning compounds. For detailed analysis, samples of PW are purged in a charcoal trap for volatile analysis and fractionated for the isolation of phenols, naphthenic acids, and other organics, then analyzed with GC-MS and LC-ESI-MS. The individual extracts are tested on bacteria *Aliivibrio Fischeri* and algae *Skeletonema sp* for ecotoxicity evaluation.



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