Ecotoxicology and Risk Assessment
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The section for Ecotoxicology and Risk Assessment encompasses all aspects of environmental hazard and risk assessment, including computational predictions, Bayesian network modelling, fate assessments (i.e., persistence or biodegradability) effects assessments and biological monitoring. In an integrated approach, the section applies in silico techniques, in vitro assays (ranging from subcellular molecular tools to multiple cytotoxicity assays) and in vivo assays, covering the full spectrum of acute and chronic ecotoxicology test methods in both freshwater and marine organisms according to international test guidelines (e.g. OECD and ISO).

The Ecotoxicology and Risk Assessment section works closely with the Environmental Chemistry section who can supply full analytical support including LC-MS, GC-MS, GC-TOF-S and ICP-MS.
Fate Assessment

The section routinely carries out fate assessments to determine the fate of chemicals in both freshwater and marine environments according to regulatory guidelines such as OECD 301, 306 etc. We have access to deep water marine environments (60 m) from our marine research station, which ensures a more constant microbial community than water taken at surface levels. The determination of the possible persistence of a chemical is the first step in our hazard and risk assessment approach. To understand the fate of chemicals within biological organisms, we also perform fish bioaccumulation tests according to regulatory guidelines (e.g. OECD 305) or more bespoke studies looking at uptake of chemicals into bivalves such as mussels.
Effects Assessment

The laboratory is approved for Good Laboratory Practice for the following product groups: pharmaceuticals, veterinary medicine products, pesticides, biocides, food additives, industrial chemicals.

The approved areas of expertise include physical/chemical testing, bioaccumulation, biodegradation and ecotoxicity tests. Our dedicated research scientists are also able to design and perform bespoke complex ecotoxicity tests according to individual customer requirements. These range from small scale systems with algae and invertebrates to large scale fish studies. In cooperation with the NIVA algal culture collection, we have access to one of the largest collection of different species of algae in Europe. We provide tests according to regulatory test guidelines (e.g. OECD, ISO, ASTM etc.) covering all aspects of freshwater and marine ecotoxicity.
Biological Effects Assessment

Biological effects monitoring, using an integrative suite of biomarker responses, are important tools within the ecotoxicology section. They are used to provide environmental hazard assessments for a diverse range of industrial discharges including mining, aquaculture, sewage treatment and coastal and offshore oil and gas activities. Our staff are trained in many biological effects techniques that are measured in tissues, cellular fluids and whole organisms and show an exposure and/or effect to one or more chemical contaminant(s).

Integrating chemical body burden data, together with biological responses from different levels of biological organisation, provides a holistic approach to environmental monitoring. The selected biomarkers measure both general health and fitness responses as well as specific genotoxic, neurotoxic and/or endocrine responses in exposed organisms.
Systems toxicology

The team conducts research on the effects and underlying mechanisms of single and combined environmental stressors in a wide range of organisms, such as algae, aquatic plants, crustaceans and fish. By implementing the Adverse Outcome Pathway (AOP) concept and utilizing advanced analytical techniques such as high-throughput (HT) in vitro screening and high-content (HC) toxicogenomic tools (transcriptomics, proteomics, metabolomics and epigenomics), the SysTox team aims to mechanistically understand the effects of stressors occurring at different levels of biological organization, characterize the modes of action (MoAs) of stressors, develop in vitro and in vivo alternative testing strategies and in silico prediction tools for reducing laboratory animal tests.
Risk Assessment

The section performs standardized risk assessments for various international regulatory/legislative requirements (e.g. pharmaceuticals, veterinary medicine products, biocides, plant protection products, industrial chemicals etc.) using both the assessment factor approach and the species sensitivity approach. This provides environmental authorities (e.g. the Norwegian Environment Agency, Norwegian Medicines Agency) with information on how to make decisions on managing chemicals in the environment. Over the years, the section for Ecotoxicology and Risk Assessment has conducted environmental risk assessments for a wide range of chemicals and chemical mixtures for both regulatory authorities and external customers.
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