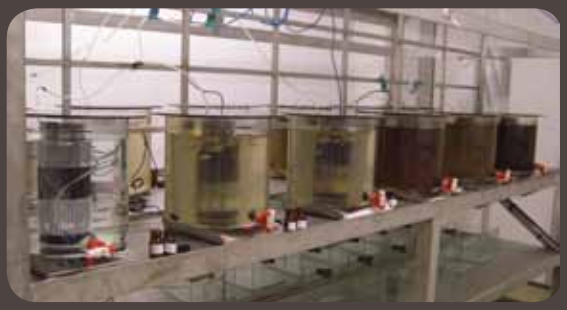
Tool for the impact assessment of chemicals on aquatic organisms

The ecotoxicology test bench developed at *Cedre* is designed to assess the toxicity of chemicals, whether pure substances or mixtures, on aquatic organisms.

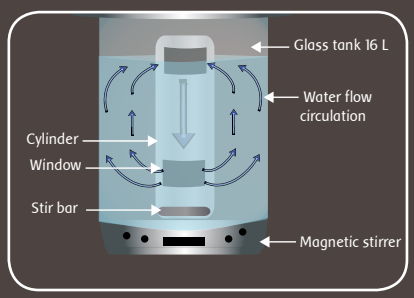


This action is part of a wider effort by *Cedre* in terms of the assessment of dispersant toxicity according to French standard AFNOR NF T 90-349 (determination of the acute toxicity of a substance on marine shrimp *Palaemonetes varians*). It meets the latest evolutions in national and international regulations in terms of the characterisation of chemicals placed on the market, and in particular, the entry into force of the REACH regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. This European directive makes industry responsible for assessing the risks posed by the chemicals they manufacture and sell. *Cedre* therefore decided to redesign its experimental system in order to provide a wider range of tests required by new regulations, to offer new services in terms of research into the ecotoxicity of a given substance on a given species, as well as to create new experimental possibilities for its Research and Development team and those of its partners.

Description of the experimental system

The ecotoxicology test bench is an original system developed in 2011 especially for *Cedre*. It is made up of two units comprising:

- **12 glass 16-litre exposure tanks** placed on magnetic stirrers to ensure an even distribution of the product to be tested throughout the volume of water. The tests can be conducted statically or in dilution (i.e. with or without added water).



- **12 recovery tanks** in which the water is continuously renewed.

Methodology applied

The toxicity assessment of a given substance is based on the determination of its lethal concentration. The indicator generally used is the lethal concentration 50 (LC_{50}), which is equal to a 50% mortality rate among individuals tested.

Lethal concentrations are obtained for 6 to 96 hours exposure periods, followed by a decontamination period or not.

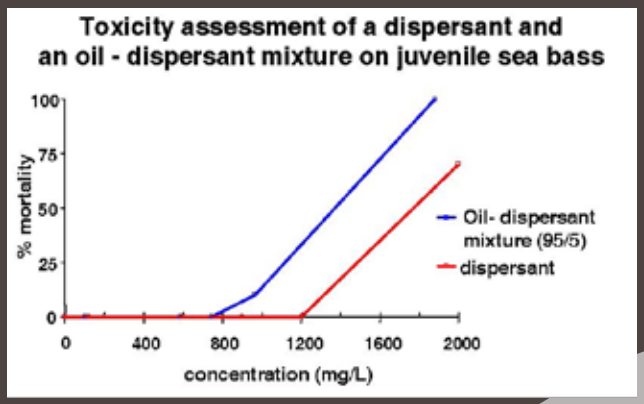
The product tested may be a liquid or a gas. The study can be conducted either in a saline, brackish or freshwater environment at temperature ranging from 1 to 30 °C (thermostatically-controlled room).

Cedre performs studies on different animal species of distinct trophic levels such as teleostian fish (sea bass, turbot, mullet, trout…) and invertebrates (shrimp, oyster, mussel…).

The concentrations of the substance in the water and in flesh are monitored in *Cedre*'s laboratory after extraction by Stir Bar Sorptive Extraction (SBSE) for water and Accelerated Solvent Extraction (ASE) for flesh, followed by quantification by gas phase chromatography coupled with mass spectrometry (GC-MS and GC-MS/MS).

Examples of use

- Toxicity characterisation of dispersants listed by *Cedre* and, more widely, of response products (gelling agents, washing agents…).
- Toxicity characterisation of chemicals in response to regulations in force (REACH…).
- Development of research programmes focusing, for instance, on the toxicity assessment of oil/dispersant mixtures (Discobiol project).
- The ecotoxicology test bench complements *Cedre*'s other experimental systems (flume tank, IFP test, floating cells), allowing the toxicity of a substance to be determined while taking into consideration its physical and chemical evolution in the environment.



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