

## BIOMARKER RESPONSES IN MYTILUS EDULIS FOLLOWING IN SITU EXPOSURE IN BELGIAN COASTAL HARBOURS

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The presence of micropollutants, such as organotins, pharmaceuticals, phenols, pesticides, etc. is determined in Belgian coastal harbours (Janssen *et al.*, in press). These findings require the assessment of the potential impacts of these chemicals on marine organisms living in the harbours and the coastal zone.

During long-term *in situ* cage experiments, executed in 2007-2008, pollutant induced stress in mussels (*Mytilus edulis*) was measured using general biometric variables such as growth and condition indices. High growth and condition index values were reached at an 'open' sea station, followed by an outer harbour station in Zeebrugge, lower values were found at the marina of Zeebrugge followed by the marina of Oostende.

In a second approach, biomarkers such as Lysosome Membrane Stability (LMS), Cellular Energy Allocation (CEA) and 7-ethoxyresorufin-O-deethylase (EROD) were employed in order to detect the short term effects of different concentrations of micropollutants on the cellular level. In order to obtain a high level of standardization, transplanted mussels originating from the Eastern Scheldt were caged. The cages were deployed simultaneously for a period of six weeks, at three different harbour stations: Oostende marina, Zeebrugge outer harbour and Zeebrugge marina. Control measurements were obtained from the Eastern Scheldt mussels.

After *in situ* exposure the biometric variables, growth and condition indices, showed no significant change in time neither between the different stations. However the biomarker values were strongly influenced by the local pollution. The LMS results were comparable with the long term biometric results as they were significantly lower in the more polluted marinas (ZB marina 51RT; OO marina 42RT) in comparison with the blank (82RT), but not significantly different with the outer harbour station (68RT). CEA values were in all harbour stations significantly lower (range 1190h – 1207h) compared to the blank (1848h). On their turn EROD data were significantly higher in the harbour stations (OO marina 6.9 $\mu$ M; ZB outer harbour 11.2 $\mu$ M) compared to the blank (3.6 $\mu$ M), with the exception of the marina of Zeebrugge (3.4 $\mu$ M).

Based on these findings we can conclude that mussels in Belgian coastal harbours are living under very stressful conditions as negative impacts are observed on a long term on the organism level and on a short term on the cellular level.

### Reference

Janssen *et al.* (In press). SSD Final Report (Phase 1) Integrated monitoring for risk assessment of micropollutants: linking health and ecology. Belgian Science Policy.