Prodiamesa olivacea as a novel non-model organism for ecotoxicity studies in natural scenarios

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Since toxicological studies on non-model organisms complement and provide powerful information in terms of natural ecosystems, these confer a breakthrough in ecotoxicology along with traditional approaches.

Chironomus (Diptera) has four OCDE standardized tests for the evaluation of water and sediment toxicity, which assess classical parameters of toxicity (survival, immobilization, reproduction and development).

Prodiamesa olivacea (Diptera) is a non-model aquatic insect species not used in toxicity tests. It frequently shares habitat with *C. riparius* but requires higher oxygen levels and lower extreme conditions. Considering this fact, it is of special interest to study the possible differences in the response of both species to pollutants.

Since information about *P. olivacea* in genomic databases is scarce, the transcriptome of this species was obtained using *de novo* RNAseq. Genes commonly used as molecular biomarkers in *C. riparius* were identified in *P. olivacea*: 1) EcR and ERR coding for hormone receptors; 2) hsp70 involved in cellular stress response 3) GPx (glutathione peroxidase) and GST (glutathione S-transferase), involved in biotransformation pathway. Quantitative real-time PCR was used to evaluate the expression of selected genes. Ribosomal gene 26S, GAPDH and actin were used as reference genes.

In the present study, the toxicity of butyl benzyl phthalate (BBP; CAS No. 85-68-7) was elucidated in both species from a polluted river (Sar) in Galicia (Spain). The effects of acute 4-h and 24-h exposures to 1 μgL^{-1} BBP were evaluated at transcriptional level. Results revealed different responses of genes depending on the species. More severe effects were observed in most of the markers studied in *P. olivacea*, showing greater sensitivity to this compound compared to *C. riparius*. This work highlights the importance of a multi-organism study at molecular level in order to deep into the toxicity of the BBP. In addition, it is essential to assess the tolerance / sensitivity of not only natural populations of model organisms, but also non-model insect species chronically exposed to complex mixtures of pollutants. This kind of approach will allow us to have a broader view of the risk associated with the presence of pollutants in ecosystems in short, medium and long term.