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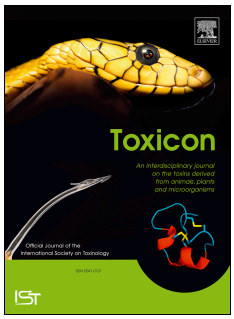

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Sources of paralytic shellfish toxin accumulation variability in the Pacific oyster *Crassostrea gigas*

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Abstract

This study was designed to assess the contribution of feeding behavior to inter-individual variability of paralytic shellfish toxin (PST) accumulation in the Pacific oyster *Crassostrea gigas*. For this purpose 42 oysters were exposed for 2 days to non-toxic algae and then for 2 other days to the PST producer *Alexandrium minutum*. Individual clearance rate (CR) of oysters was continuously monitored over the 4 days using an ecophysiological measurement system. Comparison of CR values when exposed to toxic and non toxic algae allowed to estimate a clearance rate inhibition index (CRII). Toxin concentration of oysters was quantified at the end of the experiment. These data allowed to estimate the toxin accumulation efficiency (TAE) as the ratio of toxin accumulated on toxin consumed. Changes of clearance rate during the experiment indicated that all individuals stopped feeding immediately after being exposed to *A. minutum* for at least 7h. This fast response likely corresponded to a behavioral mechanism of avoidance rather to a toxin-induced response. Individuals also showed high inter-variability in their recovery of filtration after this period. Most of the inter-individual variability (78%) in PST accumulation in *C. gigas* could be explained by the consumption of *A. minutum* cells, thus emphasizing the importance of the feeding behavior in accumulation. Based on the toxin concentration in their tissues, oysters were clustered in 3 groups showing contrasted patterns of PST accumulation: the high accumulation group was characterized by high feeding rates both on non-toxic and toxic diet and subsequently a low CRII and high TAE. Inversely, the low accumulation group was characterized by low filtration rates, high CRII and low TAE. Both filtration capacity and sensitivity of oysters to toxins may account for the differences in their accumulation. The contribution of TAE in PST accumulation is discussed and might result from differences in assimilation and detoxification abilities among individuals.