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In vitro bioaccessibility of the marine biotoxin okadaic acid and dinophysistoxin-2 in steamed and raw shellfish

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Okadaic acid (OA), Dinophysistoxins (DTX1 and DTX2) and their derivatives (DTX3) are lipophilic marine toxins responsible for the human diarrhetic shellfish poisoning (DSP). To date the amount of toxins ingested in food has been considered equal to the amount of toxins available for uptake by the human body. In this study, OA and DTX2 fractions released from the food matrix into the digestive fluids (bioaccessibility) were assessed using a static *in vitro* digestion model. Naturally contaminated mussels, cockles and clams, collected from the Portuguese coast naturally contaminated with OA, DTX2 and DTX3 were used to assess bioaccessibility in raw and steamed shellfish. Bioaccessibility of OA total content varied among species, with higher % of bioaccessibility being found in mussels. Toxins unreleased from the food matrix were found in non-bioaccessible fractions, and no toxin degradation was observed. A significant reduction of DTX3 and a slight increase of OA and DTX2 were observed in the bioaccessible fraction, suggesting that DTX3 undergo conversion into parent compounds. Steaming seafood matrices lead to increased concentrations of lipophilic toxins, but no significant differences were observed on bioaccessibility fraction when comparing to raw matrices. This study provides relevant new data that can improve and lead to more accurate food safety risk assessment studies concerning these toxins. Risk assessment based solely on DSP toxins occurrence in seafood can conduct to an overestimation of the exposure and lead to regulatory measures more conservative than taking into account the amount of toxins that can be absorbed by the intestinal epithelia.