

IMPACT OF POTENTIALLY CONTAMINATED SEDIMENTS FROM THE SADO ESTUARY IN HUMAN HEALTH: CYTOTOXIC AND GENOTOXIC ASSAYS IN A HUMAN CELL LINE

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As many estuaries in industrialized countries, the river Sado Estuary (W Portugal) is affected by various sources of pollution, such as heavy-industry, urbanism, mining, agriculture and maritime traffic. Mostly classified as a natural reserve, it also remains a privileged site for fishing activities performed by the local population, who not only consume but distribute their fishery. Previous studies revealed sizable amounts of contaminants in the estuary sediments, namely metals, pesticides and polycyclic aromatic hydrocarbons. These compounds can be accumulated in the edible parts of estuarine species with commercial value or local agricultural products and enter the human food chain, posing a public health concern. The present study is part of a broader project whose objective is to evaluate the environmental risk, including ecologic and human health risk, associated with the estuarine benthic environment, complemented with the analysis of a target population from a small village located near the estuary shore. This study aims to assess the cytotoxic and genotoxic potential of sediments from the Sado Estuary through the neutral red uptake assay and the alkaline comet assay (coupled with DNA repair endonucleases) in a human cell line respectively, using multiple samples collected in various points of the Sado Estuary. Sediments were collected from two geochemically distinct and potentially contaminated sites of the Sado Estuary: site F and site C. Total organic and inorganic contaminants were extracted with a mixture of methanol:dicholomethane (1:2) and recovered in DMSO. HepG2 cells were exposed for 48h to concentrations of each extract ranging from 0.1 to 20µl/ml of culture medium. A dose-related decrease in cell viability was observed for extract F from 1µl/ml up to 20µl/ml, indicating sediment contaminant-driven cytotoxicity, whereas no cytotoxicity induction was observed for extract C. Genotoxicity was only found for extract F, collected near a heavy-industrialized site. Also, increased genotoxicity was observed in cells treated with the DNA repair endonuclease FPG, for extract F, suggesting oxidative DNA damage. No significant genotoxicity was observed for extract C. Given the difference in cytotoxic and genotoxic effects between both samples, a larger number of samples is necessary to reflect the overall contamination status of the Sado Estuary. Therefore, other samples are currently being analysed in order to obtain a more complete evaluation of the cytotoxic and genotoxic potential of the sediment contaminants from the river Sado Estuary, and a sample from a non-contaminated site will be added as a reference. The results are expected to reflect the Sado Estuary contamination by different anthropogenic pressures.

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