ABSTRACT

The major objective of this study was to evaluate the safety of oysters and green mussels from Trinidad and Venezuela, for human consumption, with reference to heavy metals, paralytic shellfish toxins and domoic acid. A preliminary investigation into the potential use of oysters and mussels as biological indicators of heavy metals in sediments was also undertaken.

Oysters (*Crassostrea spp*) and the green mussel (*Perna viridis*) were collected at six locations in Venezuela and five in Trinidad, the latter along the coastline of the Gulf of Paria, between November 1999 and May 2000.

Simple and low cost methods of analysis of heavy metals were optimised and validated using certified reference materials. Cadmium, chromium, copper, lead, nickel and zinc were analysed by flame atomic absorption spectrometry. Mercury was determined by cold vapour atomic absorption spectrometry.

In this study, metal levels were determined in sediments (<63 μm grain size fractions). Results of analysis of certified references material for estuarine sediment agreed well with certified values. An in house control material was prepared and used to monitor the quality of shellfish analyses for heavy metals.

The present study has confirmed that oysters have a much greater capacity for accumulation of copper and zinc than *P. viridis,* and that oysters may be better indicators of heavy metals pollution than *P. viridis*. In addition, concentrations of copper and zinc in oysters, at many of the sites in the Gulf of Paria, exceeded

maximum permissible levels for shellfish, while *P. viridis* was generally acceptable for human consumption.

No significant correlation in metal concentration between oysters and sediments was found. However, concentrations of Cd, Hg and Zn correlated significantly ($p<0.05$) between *Perna viridis* tissues and sediments, indicating the usefulness of *P. viridis* as an indicator of sediment pollution, for these metals.

Paralytic shellfish poisoning (PSP) toxins detected in mussel and oyster samples were C1,2, GTX2, GTX3, dcSTX, dcGTX and STX. These results represent the first chemical determination of PSP toxins in shellfish from Trinidad and Venezuela. While levels of PSP were between 15 and 40 µg STX eq/100g tissue, these values will still render the contaminated mussels unacceptable for local consumption under existing legislation of Trinidad and Tobago. A revision of such legislation is recommended to harmonise it with international standards, as well as a consistent monitoring program for PSP in local and imported shellfish.

High performance liquid chromatography (HPLC) with photodiode-array ultraviolet detection was used to analyse domoic acid. A certified reference mussel material containing DA (MUS-1B) was used to validate the method, with domoic acid recoveries between 94-107%. However, domoic acid was not detected in mussels and oysters analysed.

Key words: *Perna viridis*, oyster, *Crassostrea*, heavy metal, PSP, toxins, domoic acid.