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Assessing the presence of marine toxins in bivalve molluscs from southwest India

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Abstract

The south west coast of India has been showing a steady increase in shellfish cultivation both for local consumption and fishery export, over recent years. *Perna viridis* and *Crassostrea madrasensis* are two species of bivalve molluscs which grow in some selected regions of southern Karnataka, close to the city of Mangalore. In the early 1980s, shellfish consumers in the region were affected by intoxication from Paralytic Shellfish Poison present in local bivalves (clams and oysters) resulting in hospitalisation of many, including one fatality. Since then, there have been no further reports of serious shellfish intoxication and there is little awareness of the risks from natural toxins and no routine monitoring programme in place to protect shellfish consumers. This study presents the findings from the first ever systematic assessment of the presence of marine toxins in mussels and oysters grown in four different shellfish harvesting areas in the region. Shellfish were collected and subjected to analysis for ASP, PSP and lipophilic toxins, as well as a suite of non-EU regulated toxins such as tetrodotoxin and selected cyclic imines. Results revealed the presence of low levels of PSP toxins in oysters throughout the study period. Overall, total toxicities reached a maximum of 10% of the EU regulatory limit of 800 µg STX eq/kg. Toxin profiles were similar to those reported from the 1980 outbreak. No evidence was found for significant levels of ASP and lipophilic toxins, although some cyclic imines were detected, including gymnodimine. The results indicated that the risk to shellfish consumers during this specific study period would have been low. However, with historical evidence for extremely high levels of PSP toxins in molluscs, there is a strong need for routine surveillance of shellfish production areas for marine toxins, in order to mitigate against human health impacts resulting from unexpected harmful algal blooms, with potentially devastating socio-economic consequences.

Keywords

Shellfish, India, Lipophilic toxins, Paralytic Shellfish Poisoning, Amnesic Shellfish Poisoning, LC-FLD, LC-UV, LC-MS/MS

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