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Review Article

Advanced detection methods for Okadaic acid and its derivatives in shellfish: ensuring food safety through accurate analysis

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ABSTRACT

Diarrhetic shellfish poisoning (DSP) is one of the most prevalent marine food poisonings in humans, being produced by toxins such as okadaic acid (OA) and derivatives, including dinophysistoxins (DTXs) and pectenotoxins. OA exerts its interference with cell processes through the inhibition of protein phosphatase activity capable of disrupting the cell cycle, tumor growth, and induction of cancer. These biotoxins are highly resistant to environmental conditions, such as heat and freezing, as well as most forms of processing; hence, contaminated shellfish have to be avoided to prevent human poisoning. The developed detection methods over time move from early qualitative ones, less accurate and more labor-intensive, to more modern quantitative ones, differing in their respective strengths and weaknesses. These are, in fact, continuous challenges for developing methodologies that are highly specific, sensitive, and yet easy to use and low in cost but able to analyze hundreds of samples per day to ensure food safety. The review will critically assess some such detection methods, their advantages, and their shortcomings.

Keywords: Biotoxin detection; Food safety; Immunosensor; Okadaic acid, Shellfish poisoning.