

Application of a Quantitative ELISA Screening Procedure Suitable for Shipboard and/or Dockside Analysis of Marine Algal Toxins in Shellfish Tissue

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The need for quantitative, real time, shipboard detection methods for risk management of shellfish poisons is eminent. Harvesting resources are more effective when they have the ability to accurately determine the level of toxins that may be present in shellfish. Current semi-quantitative, lateral flow, shipboard procedures for Paralytic Shellfish Poisoning (PSP) have been shown to have a false positive rate in excess of 30%. Harvesting costs have increased as product, whose samples were determined to be positive by the shipboard procedure, were passed by and later determined by dockside mouse bioassay (MBA) to be safe to harvest. A quantitative, microtiter plate format, Saxitoxins (STX) ELISA procedure has been adapted and customized for shipboard testing for PSP. The PSP assay range is from 20 ug to 120 ug (STX equivalent)/100 g composite sample of shellfish, with harvesting protocol and regulatory interests at 40 ug and 80 ug/100 g. The application employs a handheld, durable photometric analyzer with LCD readout. Absorbances are entered into a tailored program in a mini-laptop computer and concentrations calculated. Crews have achieved timely, reproducible results while at sea with both ease and precision. During 25 cruises from April 2009 thru September 2010 with samples obtained in Georges Bank off the coast of Northeastern United States, a false positive rate, based on MBA results, is less than 1%. **At the ISSC 2011 Biennial Meeting, 1-7 October 2011, in considering Proposal 05-111, the Laboratory Review Committee "...recommend(ed) acceptance of the Abraxis shipboard ELISA method with the rapid extraction method (70% isopropanol:5% acetic acid, 2.5:1) for PSP as an Emerging Method...". The FDA has concurred with the conferences' recommendation.** The shipboard protocol can be applied to other marine toxins in shellfish such as ASP, DSP and NSP as well as petroleum hydrocarbon contamination using Benzo(a)Pyrene as a marker. A protocol for dockside PSP analysis of lobster tomalley is also available. The Abraxis shipboard application allows shellfish harvesting operations to make specific, measurable, actionable, realistic and timely decisions enabling improved cost efficiency while managing the public health risks associated with shellfish poisons.

KEYWORDS:

Saxitoxin, Paralytic Shellfish Poisoning, PSP, ASP, DSP, NSP, Shellfish harvesting, Onsite testing, Shipboard testing, Dockside testing, Shellfish Petroleum Hydrocarbon contamination, Benzo(a)Pyrene, B(a)P, Lobster tomalley, ISSC

