Proposal Subject: ASP ELISA for Determination of Domoic Acid in Molluscan Shellfish

Specific NSSP Guide Reference: Section IV Guidance Documents, Chapter II. Growing Areas, .11 Approved National Shellfish Sanitation Program Laboratory Tests

Text of Proposal/ Requested Action

I am submitting for your consideration an ELISA method for the determination of domoic acid in molluscan shellfish. The method is a direct competitive ELISA based on HRP –conjugated polyclonal sheep antibodies, and has been developed and commercialized in collaboration with AgResearch (Hamilton, NZ) under the name of *ASP cDirect ELISA* and *ASP ELISA* by my company Biosense Laboratories AS, Bergen, Norway. The commercially available ASP ELISA kit is being produced under a strict QC/QA program, and manufactured in compliance with the written quality policy.

The ASP ELISA has been subject to a single laboratory validation study in accordance with the AOAC guidelines, and the SLV performance parameters were published in J AOAC (Kleivdal *et al*, 2007a). The SLV study demonstrated that the ASP ELISA is a fully quantitative analytical method with good recovery and precision.

Furthermore, a comprehensive inter-laboratory study was organized with the aim to obtain collaborative study data on precision and accuracy on the ASP ELISA according to AOAC Collaborative Study Guidelines (Kleivdal *et al*, 2007b). This study involved 16 laboratories in 10 countries (including US laboratories), which also performed a method comparison between the ASP ELISA and LCMS and the HPLC reference method. The collaborative study data showed that the ASP ELISA is both accurate and precise between analytical laboratories, and that the sample data compared well with the analytical methods based on liquid chromatography. The collaborative study data was submitted to the AOAC for Official Method accreditation in 2005, and was approved First Action in 2006 (AOAC OMA 2006.02).

The AOAC accredited ASP ELISA method was then proposed to the European Union (EU) as an alternative to the HPLC-based reference method used by the EU member states for the regulation of domoic acid levels in shellfish products intended for human consumption. The ASP ELISA was approved by the EU Central Reference Laboratory on Marine Biotoxins and the National Reference Laboratory network as an alternative method suitable for official use and implemented in EU regulations (EC 1224/2007).

The ASP ELISA of Biosense has not previously been presented/submitted to the ISSC, but the method was mentioned in the 2005 ISSC Summary of Actions as a separate document "AOAC Review of Biotoxin Laboratory Methods" 10-08-
2004. In this document the ASP ELISA was mentioned as a method that would "supply alternatives to existing official methods" once it attained the AOAC official status.

Through comprehensive validation studies we have demonstrated that the ASP ELISA from Biosense is accurate and precise, and a suitable alternative to analytical methods based on liquid chromatography. This has been acknowledged by the AOAC through Official Method Accreditation, leading to the approval by the European Union and implementation in the EU regulations.

Based on the attached documentation, I request that the ASP ELISA is considered by the ISSC LMR Committee as an analytical method for the determination of domoic acid in molluscan shellfish as an alternative to the current HPLC-based method.

Public Health

While the analytical methods based on liquid chromatography is acknowledged

Significance:

by NSSP for the determination of domoic acid in shellfish, such methods require special facilities, expensive instrumentation, in addition to high-infrastructure laboratories and highly skilled operators. The strict method requirements allow only some specialized laboratories to operate the LC-methods, and these test laboratories are in many cases located far away from the production or processing site. The shellfish grower, fisher, processor or dispatch center must therefore ship their samples away from their operation (*off-site testing*) and wait for several days before the results are returned. This time lag between sampling and return of sample results can cause problems – in particular when there is a rapid onset of toxicity in the harvesting area. The delayed communication of sample results, caused by the logistics of shipping samples and a low sample turnaround time at the off-site test laboratories cause loss of processed product, delays in product recalls and withdrawals. The continued practice with off-site testing and the lack of an effective HACCP system with *on-site monitoring* of shellfish toxins, may lead to future cases of late product recalls putting the public health at risk. Without an on-site ability to test for shellfish toxins, the risk based food safety management approach is limited to traditional monitoring programs and intensive end-product testing regimes being examples of *retroactive* and *reactive* countermeasures. While these countermeasures are useful, they still do not contribute to *solve* any of the *identified* problems occurring locally in shellfish harvesting areas.

The development of an accessible, cost-efficient, and relatively simple ASP ELISA test kit for domoic acid, will make it possible to implement on-site testing at test facilities close to the point-of-problem. Such a *preventive* countermeasure will be a valuable risk management tool for pre-harvesting and post-harvest testing, allowing an immediate on-site response to elevated domoic acid levels in shellfish. The ASP ELISA will contribute to the empowerment of the shellfish industry, as they will be able to make sound harvesting decisions based *rapid and reliable* test results. Such preventive countermeasures will generally lead to reduced harvesting and catching of contaminated shellfish, with a lower fraction of non-compliant shellfish products released on the market for human consumption.

Cost Information (if available):

The full cost per ASP ELISA 96-well kit is USD 500. Based on this the cost of obtaining a fully quantitative test result pr sample on a full plate is USD 13.9.

Action by 2013 Laboratory Method Review and Quality Assurance Committee

Recommended no action on Proposal 13-100. Rationale - There is insufficient data to determine if the method is fit for purpose within the NSSP

Action by 2013 Task Force I

Recommended adoption of Laboratory Method Review and Quality Assurance Committee recommendation on Proposal 13-100.

Action by 2013 General Assembly

Adopted recommendation of 2013 Task Force I on Proposal 13-100.

Action by FDA May 5, 2014

Concurred with Conference action on Proposal 13-100.

NOTE:

Click here for Proposal 13-100 Supporting Documentation