For Your Information

Seafood Initiative

Meetings

April 17–18, 2008: Europe Section, Lisboa University, Lisbon, Portugal, Theme: "Enforcement of European Legislation on Food and Water: Analytical and Toxicological Aspects." ***Contact***: Margreet Lauwaars, Tel: +31-318-418-725, lauwaars@tiscali.nl

September 21–25, 2008: 122nd AOAC INTERNATIONAL Annual Meeting and Exposition, Dallas, Texas, USA. ***Contact***: Lauren Chelf, AOAC INTERNATIONAL, 481 N. Frederick Ave, Suite 500, Gaithersburg, MD 20877, USA, Tel: +1-240-912-1449, Fax: +1-301-924-7089, lchelf@aoac.org

September 13–17, 2009: 123rd AOAC INTERNATIONAL Annual Meeting and Exposition, Philadelphia, Pennsylvania, USA. ***Contact***: Lauren Chelf, AOAC INTERNATIONAL, 481 N. Frederick Ave, Suite 500, Gaithersburg, MD 20877, USA, Tel: +1-240-912-1449, Fax: +1-301-924-7089, lchelf@aoac.org

Toward a Collaboration Between Government and Industry to Prevent Contaminants in Seafood

A Proven AOAC Model

Seafood imported into the United States may be contaminated with antibiotics, pesticides, and other contaminants. Federal and state governments do not have the necessary resources to adequately monitor imported seafood. For the industry, reliable screening tools are essential to help avoid the loss of seafood and revenue when contaminated seafood enters U.S. ports—and this is where AOAC can help.

AOAC held two high-level meetings among AOAC, FDA, and the seafood industry to discuss a government-industry-AOAC collaboration to develop, validate, and evaluate rapid and affordable detection systems that meet or exceed the consensus performance requirements established and articulated by the government, industry, and other relevant stakeholders for monitoring contaminants in seafood.

An initial meeting in early April at AOAC headquarters in Gaithersburg, Maryland, USA, laid the groundwork for the collaborative effort, but it was the July 26, 2007, meeting with top-level FDA and seafood industry representatives hosted by FDA that proved to convince all parties that a collaborative effort will benefit all, including the consumers, by helping prevent contaminated seafood products from coming into the United States. The meeting ended with enthusiasm and agreement of key representatives from government and industry to collaborate and participate in the program. The goal is to try to solve the issue with collaborative effort through a science-based solution. As always, key to the effort are AOAC volunteers whose expertise helps to ensure that the methods are scientifically sound.

The effort, however, is contingent on the financial support from the seafood industry, including producers, importers, retailers, and kit manufacturers, that will be necessary to evaluate and validate rapid technologies to test for seafood contaminants. Companies and organizations participating in the program, including the test kit manufacturers, are being asked to become AOAC Organizational Affiliates. The industry will also need to financially support the activities of the stakeholder representatives as well as the validation studies themselves.

Once supported, the short-term focus of the effort will be for the stakeholders to establish performance requirements for antibiotic residues (e.g., chloroamphenicol and nitrofurans), and then to evaluate and validate rapid, realistic, and affordable detection systems and confirmatory

Seafood Stakeholders' Meeting Attendees

At a meeting hosted by FDA on July 26, 2006, between AOAC, FDA, and the seafood industry, all parties agreed that a collaborative effort to evaluate and validate screening methods to prevent contaminated seafood from entering U.S. ports would benefit everyone involved. As shown in the photos on the following pages, key representatives from government and industry were in attendance: Robert Buchanan, Senior Science Advisor, CFSAN; Nega Beru, Director, Office of Food Safety, CFSAN; Donald Kraemer, Deputy Director, Office of Seafood, CFSAN; Marleen Wekell, Director, Office of Research, FDA-CVM; Michael Thomas, Deputy Director, Office of Research, FDA-CVM; Daniel McChesney, Director, Office of Surveillance and Compliance, FDA-CVM; Mark Mignogna and Ron Diem, Sysco Corp.; Jim O'Brien and Carlos Sanchez, Beaver Street Fisheries, Inc.; Roger Lin, Ocean Duke; Jeff Stern, Central Seaway; Mike Smith, Slade Gorton; Russ Mentzer, King and Prince Seafood; Patrick Bowe, Pacific Supreme Co.; and Mike Dunn, Sodexho, USA. Also present were Lisa Weddig, National Fisheries Institute, and Ron Johnson, bioMérieux, Inc. (a test kit manufacturer). AOAC was represented by James Bradford (Executive Director), Anita Mishra (Scientific Business Development), and Krystyna McIver (Senior Director, Communications).

methodologies for the antibiotic residues against the performance requirements established by the stakeholders.

AOAC proposes to:

- Hold a 1-day stakeholders meeting. With input from seafood importers, AOAC will identify key scientists from exporting countries (China, India, Thailand, Ecuador, and possibly others). For those that cannot afford to attend the meeting, this program would support their travel.
- Identify key test kit companies and instrument manufacturers to attend the meeting.
- Include members of the AOAC Chemical Residues and Contaminants and Marine and Freshwater Toxins communities as experts in residue analysis and identification.
- Locate and include stakeholders from diverse sectors (government agencies, industry, trade associations, academia, and international organizations) to build a rich pool of collective experience, as well as to create buy-in and acceptance of decisions from all those sectors. AOAC works closely with trade associations to ensure industry's participation in methods selection and validation. That buy-in and acceptance of decisions is done by consensus.
- Reach consensus on the fitness-for-purpose statement (matrixes, analytes, instrumentation, intended use, and analytical range) and performance requirements for antibiotic residue methods. Future steps will be the development and evaluation of rapid screening methods and confirmatory technologies that meet both the industry and government needs.
- Issue a call for methods. On the basis of the performance requirements for antibiotic residue in seafood as articulated by the stakeholders, AOAC will issue a call for methods and appropriate validation data.
- Submit potential methods and technologies to an Expert Review Panel (ERP). The ERP, led by AOAC's Chief Scientific Officer, will conduct a science-based peer review and a gap analysis of rapid screening and confirmatory methods for antibiotic residue methods in seafood to assess their fitness-for-purpose against the performance requirements developed by the stakeholders. The ERP will also recommend a proficiency testing program for the antibiotic residues in seafood.

It is hoped that the plan can be put into action in the very near future, with the goal of a stakeholders meeting soon after the AOAC Annual Meeting in September 2007 and the final ERP report at the end of November 2007. The next steps will be the development and validation of the selected methods and a pilot program for the proficiency testing program.

The proficiency testing program would be designed to assess users' competence in the use of the ERP-chosen methods.

Longer-term plans will involve similar meetings and evaluation of methods for pesticide residues, toxins, and *Vibrio vulnificus* and *parahaemolyticus*, identifying species of fish, and allergens.

An AOAC Model That Continues to Work Today

During the July 26 meeting, Michael Thomas, FDA-Center for Veterinary Medicine (CVM), described how a similar problem of food contaminated by

antibiotics (milk in the United States) was solved by highly sensitive rapid test kits.

In 1988, milk samples began showing positive results for the antibiotic sulfamethazine; eventually, 20% of samples were found to have levels higher than permitted. A collaborative effort between AOAC and the FDA began a search for a rapid screening kit that could check all milk samples for sulfamethazine shortly after the contamination was discovered. By 1992, a method suitable for screening milk in dairies and on the farm had gone through the AOAC *Performance-Tested Method*℠ (PTM) validation program.

Once the test kit was available (there are now three listed on the AOAC Web site), dairies and dairy farmers began to test their milk, and contamination in milk bound for the stores dropped precipitously. Thomas reported that rates of positive tests for sulfamethazine in milk dropped from about 1% in 1992 to about 0.1% in 1998, reaching 0.04% in 2006. Clearly, when there are good screening methods that can be applied early in the production, the quality of the final product improves enormously.

AOAC proposed that a similar effort focus on finding and validating methods for antibiotics in seafood. The AOAC process for finding methods that has been so successful lately would involve industry-government collaboration, innovative test kits from private industry, and an independent, third-party (AOAC) evaluation and validation.

Seafood presents many challenges for developing a rapid test, some similar to the milk situation, and some different. In both of these cases, intense media and government attention raised a public demand for action.

Unlike the milk situation, which was completely domestic, farmed seafood is mostly imported, so that the FDA has no direct control over the production practices. Milk was the only commodity affected in 1988, while there are many species of seafood raised on farms and shipped to the United States. The drugs found in milk were approved for use, while seafood farmers use a great many antibiotics, many of them not approved and even banned in the United States. Finally, a fluid sample like milk presents fewer analytical difficulties than inhomogeneous solid samples like seafood.

Nonetheless, the challenges to kit development are not insurmountable. Thomas outlined the steps to developing a kit or kits for the job:

- Identify or develop rapid tests that are applicable to many seafood products
- Modify existing validation protocols to address the unique characteristics of seafood
- Prioritize the target contaminants that have been identified so far
- Set target levels for tests
- Ensure validity and integrity of testing

All of these steps are familiar to AOAC and its members.

Thomas reported that the FDA-CVM has established a plan for approaching screening tests and highly selective confirmatory tests for the target antibiotics. The FDA has already developed LC/MS methods which are the only ones available at this time for screening or confirming the identity of antibiotics in shrimp and finfish.

Development of quantitative LC/MS methods for imported species is an ongoing effort. New technologies for high-sensitivity screening tests (e.g., biosensors) are in the exploration stage.

For more information on AOAC's initiative to analyze imported seafood for antibiotic residues, or if you are interested in participating, contact Anita Mishra at amishra@aoac.org.

FDA Announces Long-Awaited GMPs for Dietary Supplements

In 1994, when the Dietary Supplement Health and Education Act (DSHEA) charged the FDA to regulate dietary supplements as foods, the industry received a promise that Good Manufacturing Practices (GMPs) would be forthcoming. Thirteen years later, FDA has issued a Final Rule establishing regulations to require GMPs for dietary supplements.

AOAC and GMPs

So how will the new GMPs impact AOAC's industry stakeholders? AOAC has been working to provide industry with validated analytical methods for the analysis of dietary supplements for ingredients of interest since 2001 in support of an FDA/NIH-ODS contract. The results have been, and continue to be, impressive. And now that the FDA has issued a Final Rule to require GMPs for dietary supplements, interest in standardized methods will surely continue to grow.

The Final Rule has not caught the dietary supplement industry unaware. Companies have watched developments since DSHEA was first proposed and made plans accordingly. Rick Myers of Schiff Nutrition International (Salt Lake City, Utah, USA) and a member of an AOAC Expert Review Panel (ERP), commented, "Like most larger companies, we have generally come up to speed with the recent GMPs. Arrival of the rule was fairly well anticipated without surprises. There were a few relatively minor issues to be addressed but nothing substantive as regards analytical."

Barry Titlow, CEO of Compound Solutions, Inc. (Escondido, California, USA) and a member of the AOAC Board of Directors, agrees with Myers. "This has been so many years in the making that we, like everyone in the dietary supplements industry, are well aware of its ramifications. Everybody welcomes it—it provides some direction from the regulators. Now we have it and have to comply. The question now is, 'Who will police it?' The FDA has a limited budget and staff. The industry can be self-policing to a degree. All ingredients have to be tested, but the Final Rule didn't address the need for consensus [standard] methods, which is AOAC's territory." Mark Roman, President of Tampa Bay Analytical Research, Inc. (Largo, Florida, USA) and an AOAC Subject Matter Expert, addressed the methods issue in considerable detail:

"Some dietary supplement manufacturers and contract labs that test dietary supplements seem to think that the recently published dietary supplement GMP Final Rule will create a free-for-all in regards to analytical testing, with inappropriate and unvalidated methods being used by manufacturers solely because they produce the most desirable results. This, in fact, is the situation that existed before publication of the GMPs, and the rationale is based on the fact that the GMPs do not require manufacturers to use 'validated' methods. In fact, the terms 'validated' and 'method validation' appear nowhere in the Final Rule. The Final Rule does state, however, that manufacturers must use 'scientifically valid' methods. The term 'scientifically valid,' and what the FDA means by this term, has created considerable confusion in the industry.

"The FDA clearly states in the preamble that they 'believe a scientifically valid method is one that is accurate, precise, and specific for its intended purpose.' They also state that a 'scientifically valid method is one that consistently does what it is supposed to do', and that 'it is the responsibility of quality control personnel to approve the use of scientifically valid tests that will ensure a product's identity, purity, strength, and composition'. The only way to document that a method is accurate, precise, and specific for your particular product in your lab is to carry out a series of experiments to prove it—i.e., perform an in-house validation. The fact that the FDA did not mandate the use of 'validated methods' means that manufacturers are relieved of the obligation to use formally validated official methods (i.e., AOAC or USP methods). Keep in mind, however, that for enforcement actions, FDA will be using these official methods. Therefore, if an official method exists for an ingredient, it behooves manufacturers to either use that official method after verifying its performance on their product, demonstrate that their in-house method produces equivalent results to the official method, or demonstrate that the official method is not suitable for analysis of their product.