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**Compilation of Analytical Methods and Quality System Issues Collected  
from Core Stakeholders Relating to the Aquaculture of Seafood**  
(Response from 8 out of 11 organizations)  
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## **Areas of Interest:**

### **Chemo-Therapeutics (multi-residue):**

Banned in US for Aquaculture: chloramphenicol, furazolidone, fluoroquinolones, nitrofurazone (and other nitrofurans), clenbuterol, diethylstilbestrol (DES), dimetridazole, ipronidazole, and other nitroimidazoles, and glycopeptides.

Approved for use in US for Aquaculture: chorionic gonadotropin (HCG), formalin, oxytetracycline, sulfadimethoxine / ormetoprim, sulfamerazine, tricaine, methanesulfonate, MS222, florfenicol, and hydrogen peroxide.

Not approved for use in US Aquaculture: Quinolones, tetracyclines, sulfonamides, triphenylmethane dyes: malachite green, gentian violet, leucomalachite green, crystal violet, chloromycetin, penicillin, and streptogramin.

Matrices include: Finfish (e.g. salmonids, catfish, tilapia, eel, basa) and shellfish (e.g. lobster, shrimp, crawfish, crab). Vietnamese catfish or basa, tilapia, and turbot.

Techniques include: Rapid Detection Test Methods (such as ELISA), HPLC fluorescence, LC/MS/MS confirmatory methods, and multi-residue screening methods.

### **Species of Fish Identification:**

Species of Fish: Grouper, escolar (seabass), basa (vietnamese catfish), red snapper and other snapper, walleye, perch (pike /euro), flounder, sole, puffer fish, turbot, tuna, halibut, cod, mahi mahi, shrimp, catfish, amberjack, whitefish, and salmon.

Issues: fish substitution

Techniques: DNA Sequencing and IEF Gel electrophoresis

### **Pesticides (multi-residue):**

Pesticides: Rotenone, organotin compounds, and emamectin.

Matrices: Salmonids

Technique: Rapid detection methods.

### **Allergens:**

Allergens: Hake, halibut, haddock, shrimp, cod, mackerel, and tuna.

## Natural Toxins:

Natural toxins: Tetrodotoxin, ciguatoxin, brevetoxin, okadaic acid, paralytic shellfish poisoning (PSP), and Gempylotoxin.

## Microbial Pathogens:

Microbial Pathogens: *Salmonella*, *Shigella*, *Clostridium botulinum*, *Listeria monocytogenes*, *Vibrios*, Hepatitis A, Norwalk virus, and *Staphylococcus aureus*.

## Others:

Decomposition / histamine in all seafood

Foreign Objects (shotgun pellet, box cutter blade...) in all seafood

Tripolyphosphates

Biological hormones in tilapia using rapid detection methods

Other water enhancement additives

Cloning detection in finfish, crustaceans

Genetic modification (GMO) using DNA fingerprinting

Quantitative method to determine added phosphate

Method to determine flesh percentage in enrobed seafood product

## Comments:

- 1) Need training, particularly overseas at source prior to shipment to US.
- 2) Need fast, accurate, and cost effective methods.
- 3) The race to test to fractions of PPB in order to enforce zero tolerance regulations has cost private industry substantial monies but worse has seen the forced destruction of hundreds of thousand of pounds of products that were perfectly wholesome because the testing can show inconsequential traces of an unapproved antibiotic, some of which can occur naturally.
- 4) Need to better understand how rapid methods correlate to Official Methods.
- 5) Need proficiency testing, particularly for chemotherapeutics to ensure reliability of testing results and competency of testing labs.