Farm to Plate
Post Harvest Handling and Traceability

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AIM of this presentation ....

- For the most part, this conference covers the topics well from production to marketing

- What I aim to address ... steps from post harvest to distribution affecting quality and safety ...
Aquaculture Workshop

September 29-30, 2011

Bell Aquaculture

Registration at
www.conf.purdue.edu/aquarecorded

Purdue Aquaculture and Sustainable Seafood (PASS)
Post Harvest Handling

Fish are susceptible to deterioration by

- Fast destruction by enzymes
- Oxidation of lipids
- High pH
- High water activity
- Formation of non-protein nitrogen compounds
“Fresh to stale” continuum

Live Animal

Point of Death

Rigor Mortis

EU Quality Standards

Peak

Resolution

Unfit

E

A

B

C
**Why Manage Stress?**

Why manage stress?

It is widely recognised that stress in fish is a major contributor to disease, unexplained mortalities and poor growth performance. AQUI S® is the answer to minimising stress during all animal handling and harvesting activities, including vaccination and broodstock handling. The correct management of stress provides positive benefits through rapid return to feeding and improved health performance.

http://www.aqui-s.com/
Pre- & Post-harvest handling

How harvest technique affects flesh quality
Excessive fish activity prior to and during harvest affects the external and internal appearance of the fish or fillet. External injuries including scale loss, bruising and open injuries as well as internal injuries including fillet gaping, blood spotting, reduced translucency and void and a reduced shelf life all lead to reducing market acceptability and a reduction in the fish value. The AQUI-S® rested harvest technique dramatically reduces the occurrence of these injuries which results in a premium market price for the product.

Blood Spotting
Blood spotting can be significantly reduced or eliminated in fish that have been harvested in a rested state using AQUI-S®. Most blood spotting occurs in fish that have been highly active and stressed from the harvest procedure. Stress culminates in the blood vessels being weakened and rupturing during harvest leading to pooling of the blood in the tissue. During processing the blood leaks into the white muscle appearing as distinct areas of discoloration. This is an issue for value added products, particularly smoked products. Often the blood spotting is not visible until after smoking and this will result in a downgrading of the product. Removal, where possible, is time-consuming and expensive.

Gapping
Fish at the point of sale are predominantly presented in the form of fillets or steaks. The customer therefore must rely on the appearance of the “gape” as the key factor to be considered in making a buying decision. The occurrence of gapping is significantly reduced or completely eliminated in fish that have been harvested in a rested state using AQUI-S®.

Shelf Life
Shelf life or spoilage is another key quality factor that will determine the value of the final product. Shelf life can be attributed to the action of autolysis (muscle breakdown) and consequent microbial growth in the muscle. Unstressed fish flesh delay autolytic activity and microbial spoilage thus extending the shelf life and maximising the period of highest quality and sellability.

AQUI-S® NEW ZEALAND LTD
Flesh Quality

http://www.aqui-s.com/
Managing Harvest of Fish

How to conduct a rested harvest

Rested harvesting can be done in cages, ponds, or nets. Separate the bag into continually moving parts to achieve the desired result.

**Continual Flow**

The most effective in treatment. Tarps are used, and fish are guided through a system. The net lining between zones 1 and 2 is lowered to allow fish to move from zone 1, and zone 2 is then raised. Opening lowered to move fish to zone 1, and continue the cycle to zone 3.

**Design**

This rested harvesting system uses horizontal and diagonal supports, and design of the system.

http://www.aqui-s.com/
Seafood Traceability
The FDA Food Safety Modernization Act (FSMA) was signed into law by President Obama on January 4th, 2011.

It aims to ensure the U.S. food supply is safe by shifting the focus of federal regulators from responding to contamination to preventing it.

FSMA contains an exemption for a facility in compliance with FDA's seafood HACCP regulations.
Aquaculture & Food Safety

Major Regulatory Considerations

- Food, Drug and Cosmetic Act as amended, 2011
- Food Allergen Labeling and Consumer Protection Act of 2004
- The Public Health Security and Bioterrorism Preparedness and Response Act of 2002
- Procedures for Safe and Sanitary Processing and Importing of Fish and Fishery Products of 1995
The FDA mandatory seafood inspection program incorporates a Hazard Analysis Critical Control Point (HACCP) approach for control of human pathogens and chemical contaminants.

The law requires every processor to conduct, or have conducted for it, a hazard analysis to determine whether there are food safety hazards that are reasonable likely to occur for each kind of fish and fishery product processed by that processor and to identify preventive measures that the processor can apply to control those hazards. 21 CFR 123.6(a)
21 Chapters with bibliographies

Clarifications based on 10+ years experience

Additional recommended
- controls
- monitoring procedures
- corrective actions
- verifications
Aquaculture Food Safety

What Hazards are Most Likely to Occur?

- Environmental chemical contaminants and pesticides
- Aquaculture drug residues
- Potential pathogenic bacteria, viruses and parasites
Environmental Chemical Contaminants and Pesticides

UNDERSTAND THE POTENTIAL HAZARD

Environmental chemical contaminants and pesticides in fish pose a potential human health hazard.

Products of Concern include all seafood, both wild harvested and farm-raised (aquaculture) that could be exposed to contaminated waters.

Federal tolerances and action levels are established for most toxic and persistent contaminants found in fish.
Aquaculture Drugs

UNDERSTAND THE POTENTIAL HAZARD

Use of unapproved drugs or misuse of approved drugs in aquaculture fish poses a potential human health hazard.

Products of Concern include all aquacultured (farm, enclosed, pen or cage-raised) seafood.

- Approved aquaculture drugs
- Low regulatory priority aquaculture drugs
- High enforcement priority aquaculture drugs
- Drugs prohibited for extra-label use
Potential pathogenic bacteria, viruses and parasites

UNDERSTAND THE POTENTIAL HAZARD

Pathogenic bacteria, viruses and parasites can cause consumer illness.

Products of Concern include all seafood, both wild harvested and farm-raised (aquaculture) that could be exposed to contaminated waters.

Pathogens of concern:
- *Vibrio* spp., *Salmonella* spp., *Shigella* spp., *Campylobacter jejuni*
- *Hepatitis A virus, norovirus*
- *Anisakis spp., Pseudoterranova spp.*
Farm to Plate continuum

Farm producer

- Hazard analysis to identify risks
- Preventive controls to prevent, eliminate or reduce risks to insignificant level on the farm
- Identify and maintain records for trace back
Farm to Plate continuum

Fish processor

- Develop and implement HACCP plan
- Maintain GMP compliant facility
- Establish SSOP and record-keeping
- Establish traceability system
Farm to Plate continuum

Fish distributor
- Develop and implement HACCP plan
- Establish SSOP and record-keeping
- Maintain traceability system
FINAL COMMENTS

Seafood HACCP Alliance set of training manuals used in the standard SHA Basic HACCP Course available at the same websites and purchase site

www.ifasbooks.com