



Peracetic Acid-An Exciting Chemistry
Offering for the Seafood Industry

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Outline

- What is peracetic acid (PAA)?
- Antimicrobial Ice
- Yellow Tail Snapper Trial
- Scallop Trial
- Where can peracetic acid be used?
- EU Regulatory
- Future Work
- Conclusions

What is Peracetic Acid?

- **Common names: peracetic acid, peroxyacetic acid, PAA.**
- **Stable equilibrium solutions of PAA, H₂O₂, and acetic acid**
- **Prepared by reacting acetic acid + H₂O₂ with acid catalyst. “Cure” for 3-5 days.**
- **Typical solution is 15% PAA with 5% H₂O₂, 35% acetic acid.**
- **FDA Approved for direct seafood contact**
 - **Food Contact Notification 699**

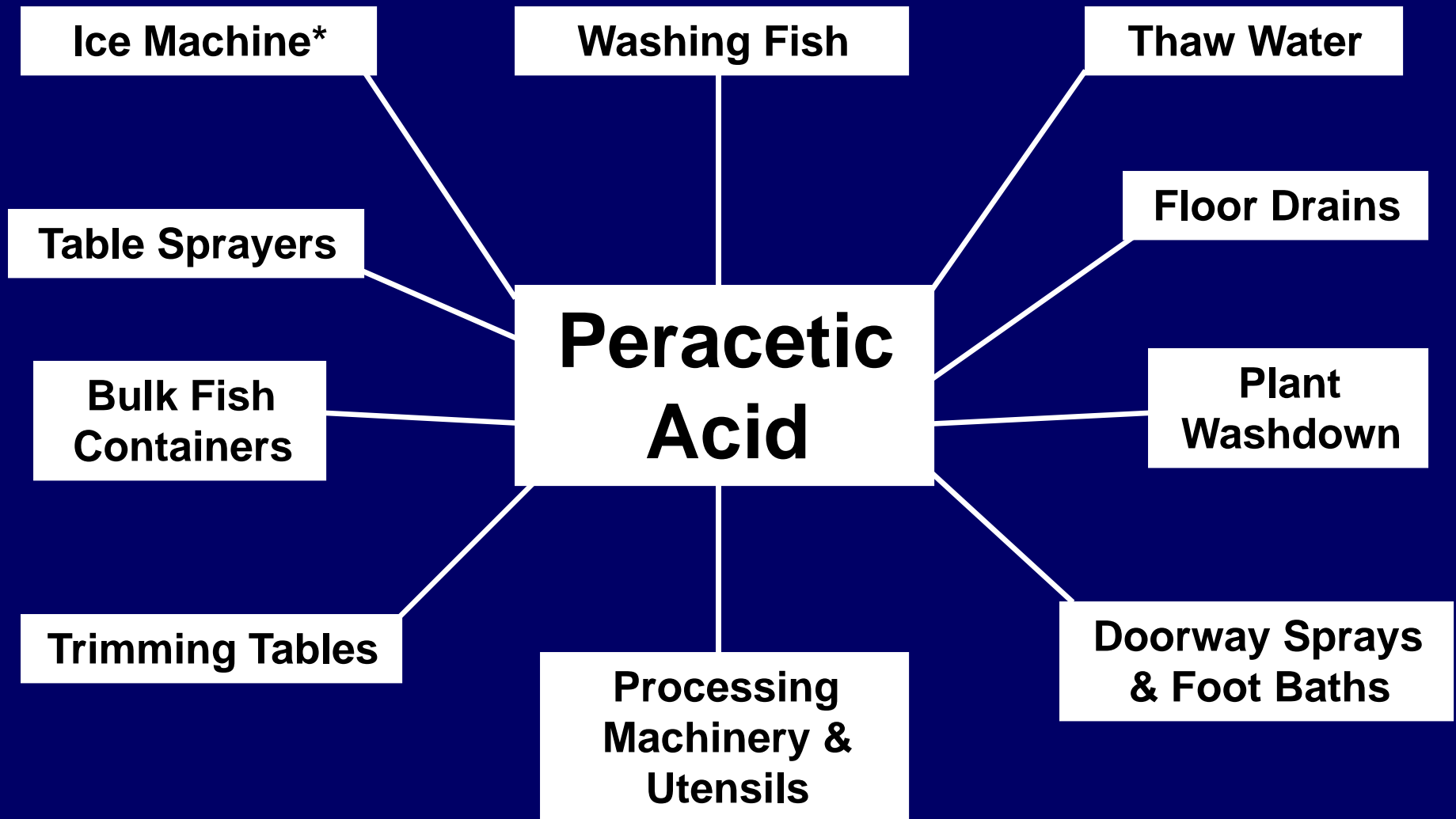
Features and Benefits

- **Highly effective against yeasts and molds responsible for odor-inducing deterioration, as well as pathogenic bacteria.**
- **Enhances product quality throughout useful shelf-life**
- **Extends time seafood remains fit for human consumption.**
- **Simple and Safe to use**
 - **No toxic by-products associated with PAA**
 - **NOP certified organic (7CFR 205.601)**
 - **Imparts no taste or odor to food.**

Antimicrobial Ice

- Contains peracetic acid (PAA).
- Peracetic acid is FDA approved as an antimicrobial for meat, poultry, and seafood.
- FDA Approved for use in ice (FCN 699).
- Offers controlled time release of PAA as ice melts, to eradicate microorganisms remaining on fish.

Where can PAA be used?

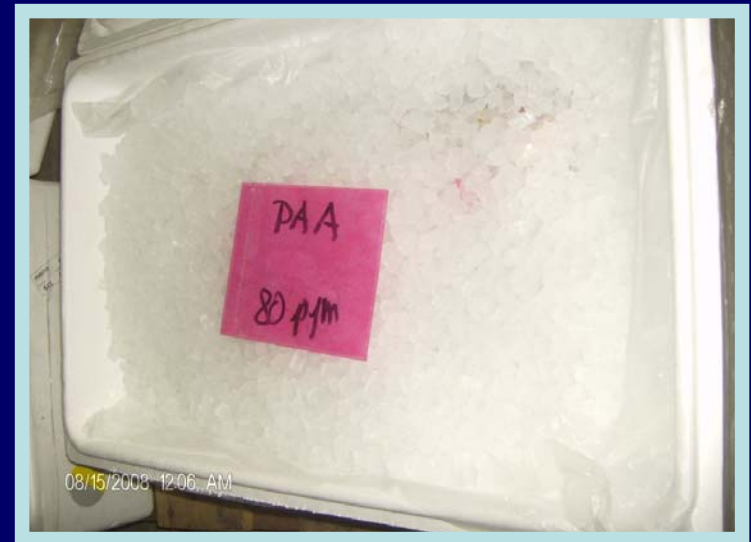


Trial Design

- 6 Yellow Tail Snappers (1-2 lb ea. scales on, gutted, gills removed)
- Fish were sourced from nearby fish market, lot was brought 8/12/2008.
- Fish were separated into 2 clearly labeled, covered Styrofoam boxes previously washed and plastic lined.
- Using Dosatron pump, PAA was introduced to an ice machine with a target concentration of 80 ppm. Ice for the control group was made using industry standard practice.

Trial Design (continued)

- 3 fish were randomly selected for each treatment group, and completely covered with ice in their respective ice chests.



Day 2 Observations

CONTROL



Smell: Slight fish smell

Color: Perfect

External conditions: Perfect

PAA



Smell: None

Color: Perfect

External conditions: Perfect

Day 16 Observations

Control



Strong, unpleasant, decomposed fish smell

External color brighter than PAA ice fish

External Conditions: Bad- Eyes have lost shine and shape, flesh soft

PAA



Slight fish smell

Slight discoloration

External conditions: Fair. Discolored. Belly getting brown.

Day 16 Observations (continued)

Control

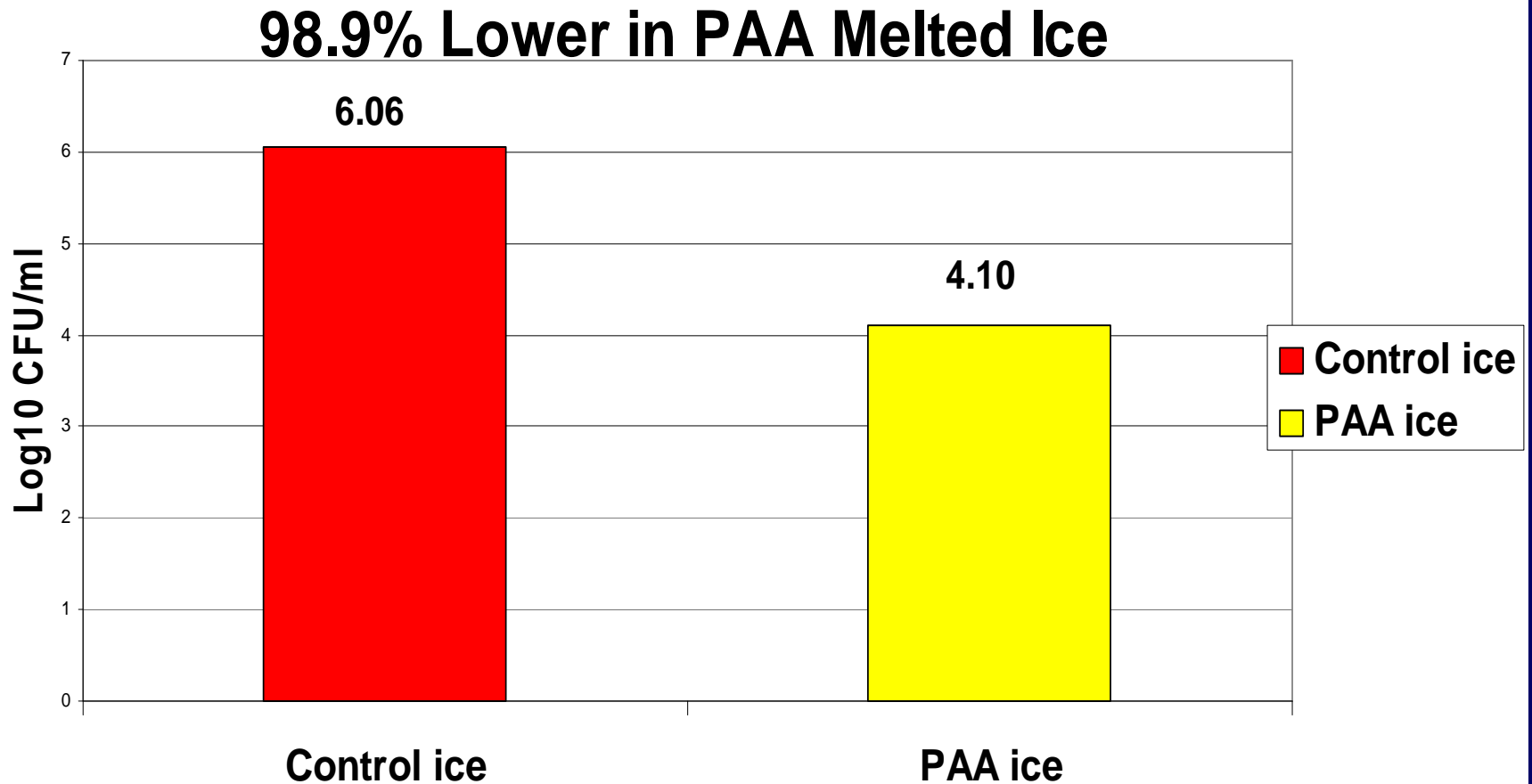


PAA



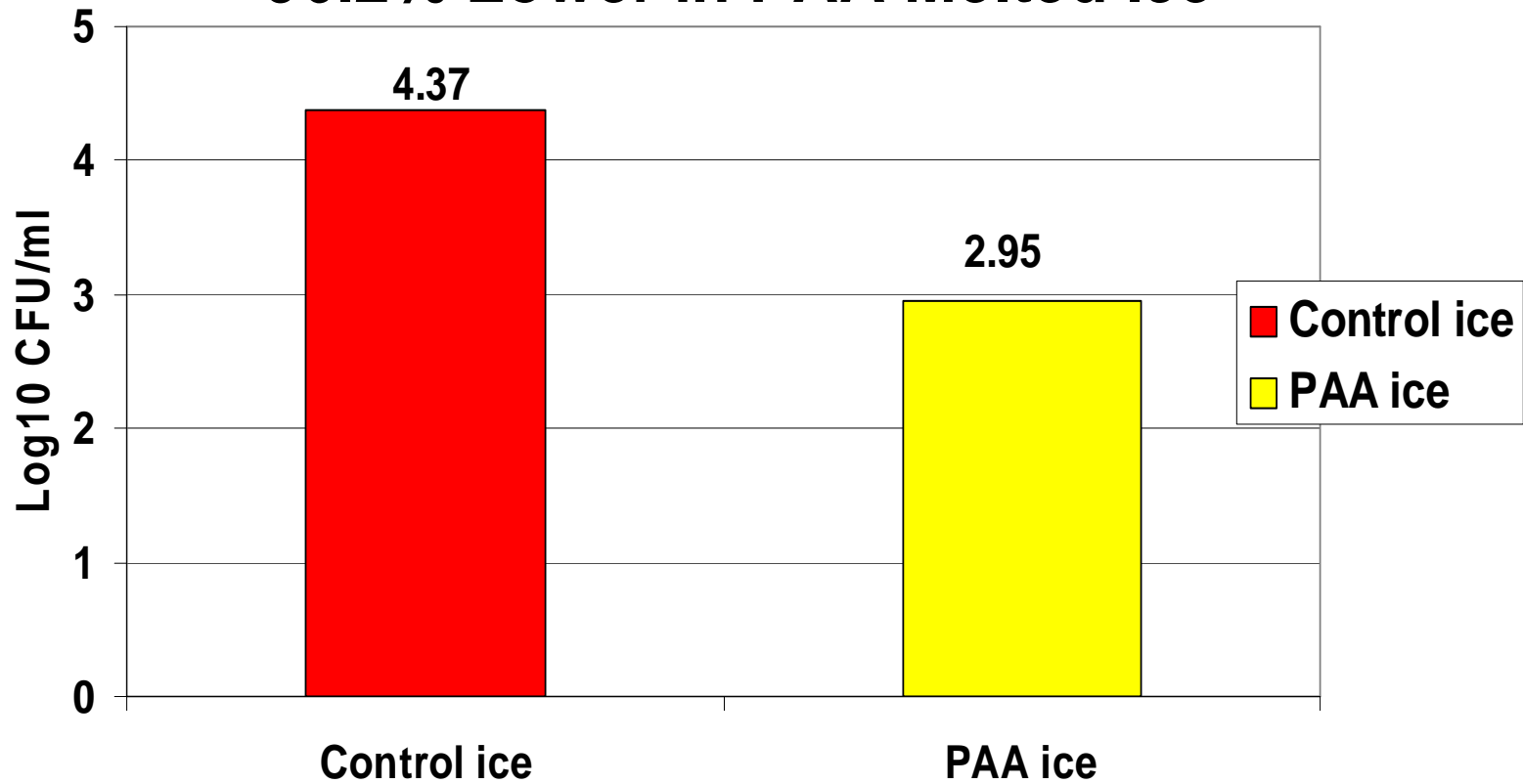
- Note difference in eye shape and clarity.
- Eye condition is a key visual indicator of freshness.

Aerobic Bacteria in Melted Ice Water



Yeast & Mold Counts in Melted Ice

96.2% Lower in PAA Melted Ice

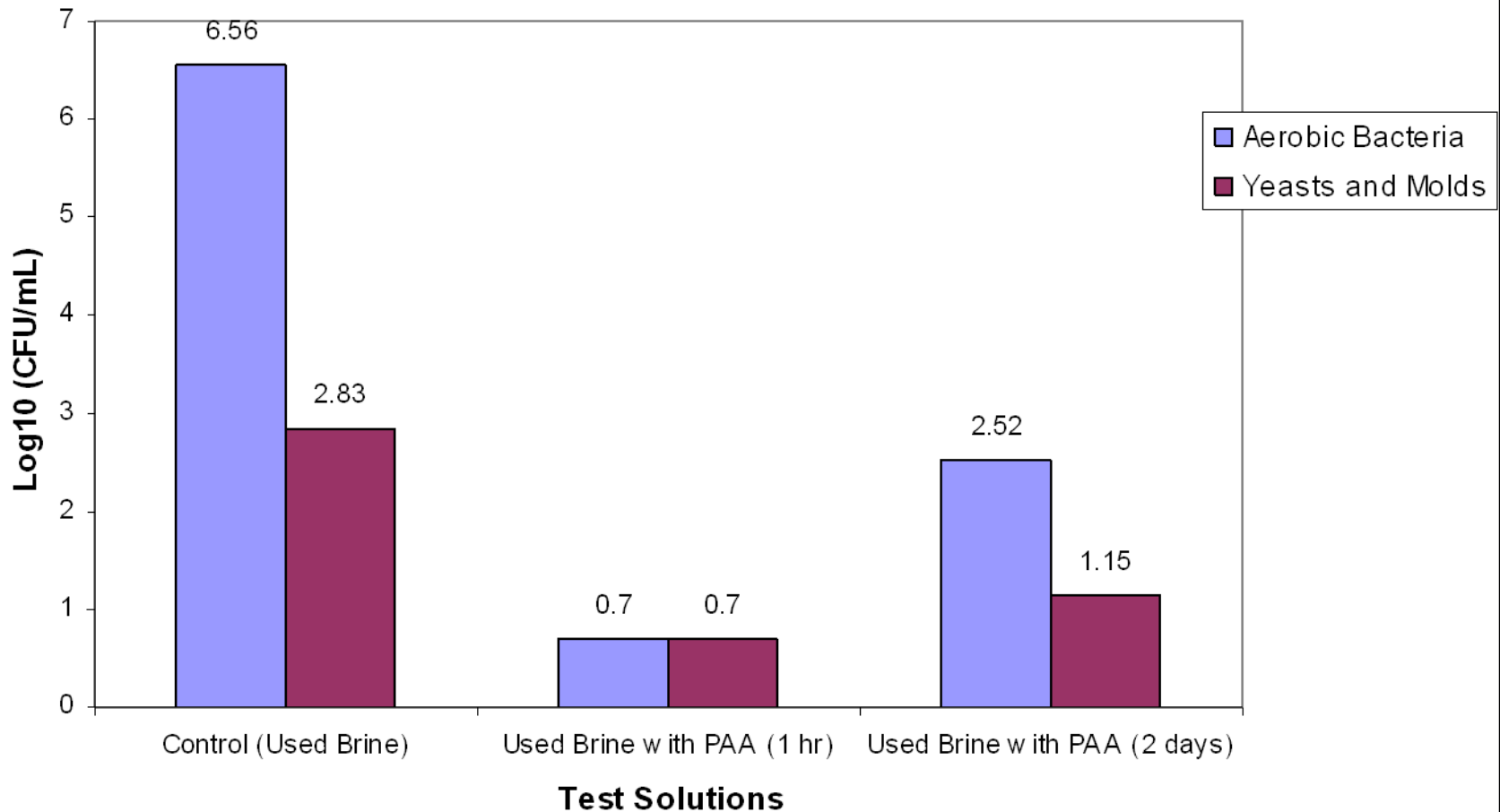


Scallop Brine Trial Design

- A sample of TSP brine that had been used to soak scallops was received from a New England area processor of fresh seafood.
- One pound of scallops from a local supermarket were submerged in the brine and chilled to 40°C.
- The brine was sampled, diluted, and plated for aerobic bacteria, yeasts, & mold.
- Then, the TSP brine was dosed with 100ppm of peracetic acid and sampled after 1 hour and again after 2 days.

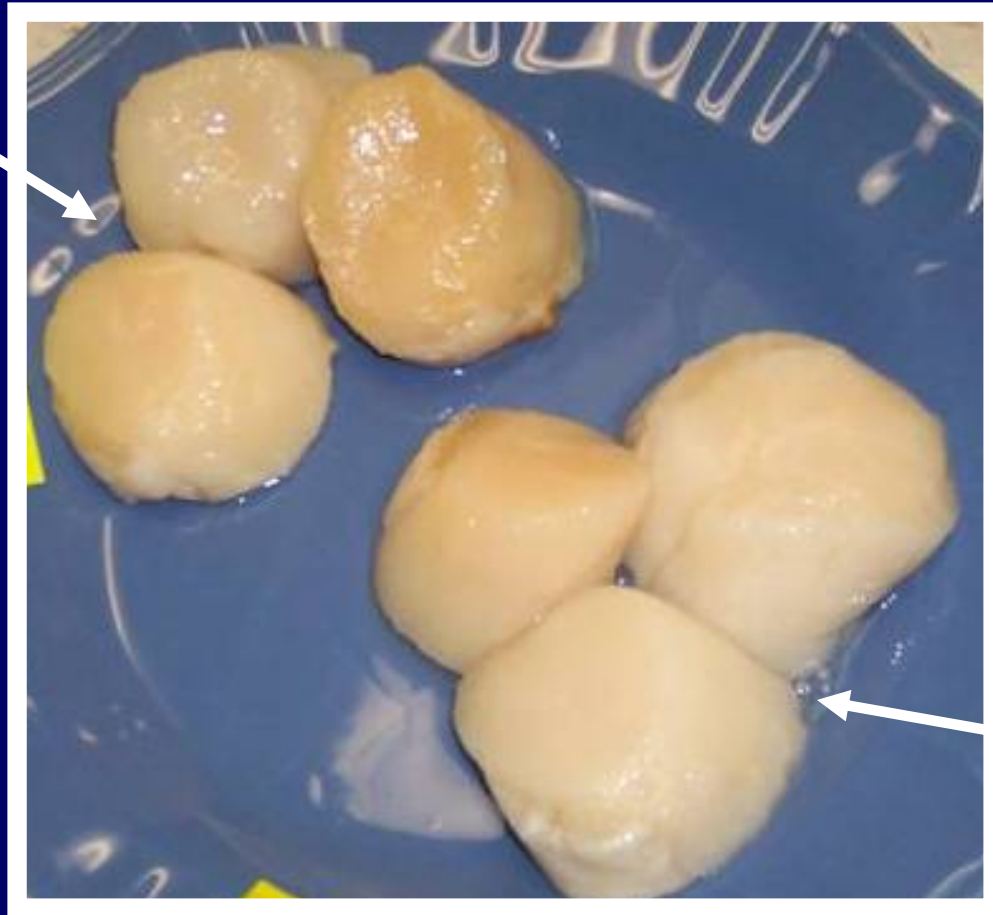
Scallop Brine Microbiological Results

Log₁₀ (CFU/mL) of Aerobic Bacteria and Yeasts and Molds in Used Scallop Brine Treated with Perasan MP-2 at 120 ppm



Scallop Brine Trial Results (continued)

Untreated scallops



PAA treated scallops

Scallop Observations

- No differences noted for any other physical characteristics, such as odor or texture.
- The Perasan MP-2-treated scallops exhibited no noticeable loss or gain in weight compared to the control group.
- Taste testing of the 2 groups indicated no difference in texture but the PAA treated scallops exhibited a “more pleasant and slightly stronger scallop flavor.”

EU Regulations

- Must be included in HACCP program, as an antimicrobial.
 - Not labeled as an additive.
 - Default MRL of 0.01 mg/kg
- [http://Art 18\(1\)\(b\) Reg 396/2005.](#))*

Future Work

- Histamine
 - *Morganella morganii*
- Sea Lice
- Anemia Virus
- PAA Decay Profile on Surface of Fish
 - Supporting data for use in EU.
- Additional full scale trials

Conclusions

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- **Enhances product quality throughout useful shelf-life**
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Acknowledgements

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