Interactive Seafood Packaging Master Class

Project No. 2013/733

Tom Madigan

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Government of South Australia

SafeFish

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

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Australian Government
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CRC AUSTRALIA

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Non-Technical Summary

Interactive Seafood Packaging Master Class (2013/733)

The packaging industry is a rapidly evolving area due to the development of new plastics and films, new machinery and changing consumer trends. There is an opportunity for the seafood industry to use these latest techniques when developing packaged seafood products to satisfy consumer and retailer demands. However, there is often poor information transfer to the seafood processors regarding developments in newer packaging technologies and machines. Seafood processors that are considering the introduction of packaged products or changing existing process lines need direct experience and knowledge of the types of equipment and packaging films that are available. This Master Class aimed to provide information to industry on the latest packaging techniques that are available and provide practical experience in using a variety of packaging equipment.

The Master Class was held in July 2013 at Multivac's state-of-the-art training facility in Melbourne. It involved a combination of Australian Seafood CRC researchers presenting in combination with Multivac representatives who explained the capability of their particular equipment. The workshop was well attended, with a total of 24 attendees from industry and also scientists from the South Australian Research and Development Institute, Curtin University and the Queensland Department of Agriculture and Fisheries.

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PROJECT OBJECTIVES:

1. Disseminate information to industry on the latest packaging techniques that are available.
2. Provide practical experience in using a variety of packaging equipment.
3. Provide background information on active packaging techniques.

OUTCOMES ACHIEVED

- Increased knowledge of packaging options currently available and an understanding on how techniques can be applied. Potentially, this could allow producers to diversify their product range
- Increased knowledge on natural ingredients that can be used to extend shelf-life
- Increased knowledge of packaging trends apparent at the recent European Seafood Expo
- Increased knowledge of technical aspects and potential of modified atmosphere packaging

LIST OF OUTPUTS PRODUCED

- Master class successfully delivered to 24 attendees
- Information pack for attendees detailing latest packaging and labelling equipment
- Mock products created for attendees
- Article in SeaFOOD magazine

1. Introduction and Background

1.1 Need

There is an increasing trend for foods to be sold in a packaged format. These products are sold either as raw product, ready-to-cook (other food ingredients included) or ready-to eat. The explosion of packaged foods on supermarket shelves and other retail outlets has occurred for a variety of reasons including consumer convenience, ability to engage the consumer and in some cases extensions in shelf-life. However, the packaging industry is a rapidly evolving area due to the development of new plastics and films, new machinery and changing consumer trends.

The seafood industry is interested in developing packaged seafood products. However, there is often poor information transfer to the seafood processors regarding developments in newer packaging technologies and machines. Seafood processors that are considering the introduction of packaged products or changing existing process lines need direct experience and knowledge of the types of equipment and packaging films that are available.

1.2 Objectives

1. Disseminate information to industry on the latest packaging techniques that are available.
2. Provide practical experience in using a variety of packaging equipment.
3. Provide background information on active packaging techniques.

2. Methods

The sole activity undertaken in this project was to deliver a Master Class that disseminated the latest packaging techniques to industry. The Master Class was held in July 2013 at Multivac's state-of-the-art training facility in Melbourne. It involved a combination of Australian Seafood CRC (ASCRC) researchers (Miles Toomey ASCRC; Tom Madigan SARDI; Dr Yasmina Sultanbawa UQ; Dr Janet Howieson Curtin) presenting in combination with Multivac representatives who explained the capability of their particular equipment.

The Master Class included two hands-on sessions where participants were provided with the opportunity to "get their hands dirty" trialling the equipment. Participants were invited to bring their own products to package and several types of seafood were also provided for use in trialling different packaging styles. The outline for the workshop is provided below:

9.15 Welcome (M. Toomey, ASCRC; A. Taalikka, Multivac)

9.30 Package presentation and labelling – a consumer perspective (M. Toomey, ASCRC)

9.35 Benefits and pitfalls of modified atmosphere packaging (T. Madigan, SARDI)

9.45 Benefits of vacuum packaging with active ingredients (Y. Sultanbawa, QDAFF)

9.55 Overview of equipment for Session 1 (Multivac)

10.05 Practical session 1- MAP and vacuum packaging equipment

12.30 Lunch

1.15 Ready-to-cook, packaged seafood - Benefits to value chain (J. Howieson, Curtin Uni)

1.25 Innovation in processing – a processor's perspective (B. Rallis, The One that Got Away)

1.35 Overview of equipment for Session 2 (Multivac)

1.45 Practical session 2- DuPont films, labelling and integrated process line solutions

3.45 Group discussion

4.00 Close

3. Results

The workshop was well attended, with a total of 24 attendees from industry and also scientists from the South Australian Research and Development Institute, Curtin University and the Queensland Department of Agriculture and Fisheries. Attendees had the opportunity to experience the use of tray sealing machines, thermoforming equipment and were also shown the latest MYLAR® COOK films from DuPont Teijin Films™. This

new style of film allows packaged products (including vacuum and modified atmosphere packaged) to be cooked within the packaging films and still allows the product to brown. The latest automatic labelling, weighing and metal detection technologies were also showcased. Photographs of the event are provided in Figures 1 to 8.

Presentations were delivered by CRC researchers that provide background knowledge on the techniques used, information on ways to further extend shelf-life using natural additives and current trends at the recent seafood expo in Brussels. Multivac staff gave an overview of the types of equipment available. Copies of the PowerPoint presentations by Miles Toomey, Tom Madigan, Dr Yasmina Sultanbawa and Dr Janet Howieson are provided in Appendix 1.

Figure 1: Photograph of attendees listening to a presentation by a Multivac representative.

Figure 2: Photograph of attendees seeing a thermoformer in operation.

Figure 3: Photograph of packaged finfish. These packets are thermoformed with a top film draped across the product forming a tight vacuum.

Figure 4: Photograph of mussels ready to be packaged using a thermoformer.

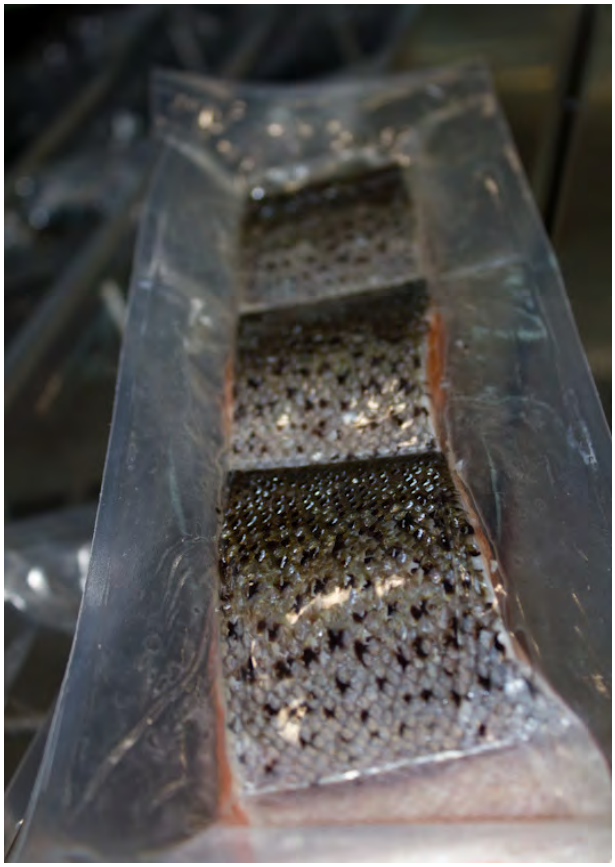


Figure 5: Photograph of vacuum packaged fish.

Figure 6: Photograph of packaged mussels.

Figure 7: Photograph of packaged prawns.

Figure 8: Photograph of attendees inspecting labelling and metal detection equipment.

4. Discussion

The workshop was well regarded by attendees. A total of four attendees completed an internet-based survey on their experiences at the master class. The responses were very positive and all respondents rated the master class as very good overall. When asked about what they liked about the event, the responses included:

- A good balance of information and hands on.
- Hands on, practical and plenty of time for questions
- The interaction and discussion with existing customers of the supplier were very valuable.
- Good information and range of equipment

An informal comment from one attendee on the day stated that the balance of presentations and practical sessions was perfect and further stated that this workshop

was much more useful than other food processing workshops that they had previously attended.

5. Benefits and Adoption

Benefits

- Uptake of the technologies presented at the master class could lead to increased profitability for the seafood sector.
- Increased knowledge of the benefits and draw backs of individual technologies will lead to reduced capital expenditure. i.e. reduced purchase of items that are not fully utilised or cost effective.
- The material presented at the master class represented the latest packaging technologies. Use of these technologies could result in increased convenience and health attributes for consumer and may lead to increased sales of seafood.

Adoption

- One of the attendees purchased vacuum packaging equipment and has installed it into their retail facility. They feel that this has added versatility to their shop from in terms of offerings to their customers.

6. Further Development

There is potential that another master class will be delivered in 2014.

7. Planned Outcomes

Public Benefit Outcomes

- Increased availability of premium seafood in retail environments
- Increased availability of consumer friendly packaging; i.e. no spill

Private Benefit Outcomes

- Increased knowledge of packaging options currently available and an understanding on how techniques can be applied. Potentially, this could allow producers to diversify their product range
- Increased knowledge on natural ingredients that can be used to extend shelf-life
- Increased knowledge of packaging trends apparent at the recent European Seafood Expo
- Increased knowledge of technical aspects and potential of modified atmosphere packaging

Linkages with CRC Milestone Outcomes

The project has linkages to CRC Outcome 2 - Increased demand and access to premium markets for Australian seafood; fulfilment of consumer demands for safe, high-quality, nutritious seafood products; and increased profitability throughout the value chain. In particular it relates to Output 3.7 - Knowledge from Research Program 2 converted into education and training tools.

8. Conclusion

The Master Class was successfully delivered and provided the opportunity for industry to develop an understanding of the packaging options available to them. The Master Class also raised awareness of the benefits of working with the ASCRC.

Appendix 1: Intellectual Property

There has not been any intellectual property developed as part of this project.

Appendix 2: Staff

Tom Madigan, South Australian Research and Development Institute

Appendix 3: Presentations delivered

Benefits and pitfalls of MAP packaging

Tom Madigan

South Australian Research and Development Institute

Government of South Australia

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

MISA marineinnovationsa

SARDI R&D SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Overview

- What consumers want
- What is modified atmosphere packaging?
- How does it work?
- What are the benefits?
- What are the bear traps?

Consumers and supermarkets

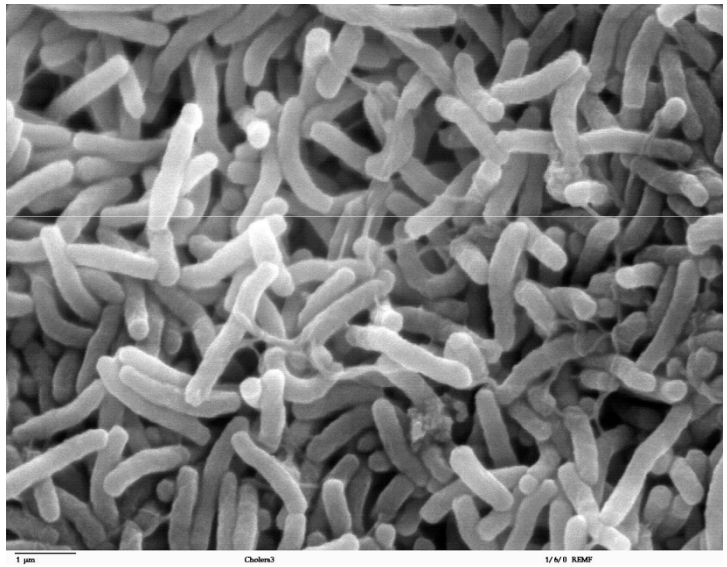
- Unprocessed foods
- Simplicity
- Healthy
- No preservatives
- Longer shelf-lives

What is MAP packaging?

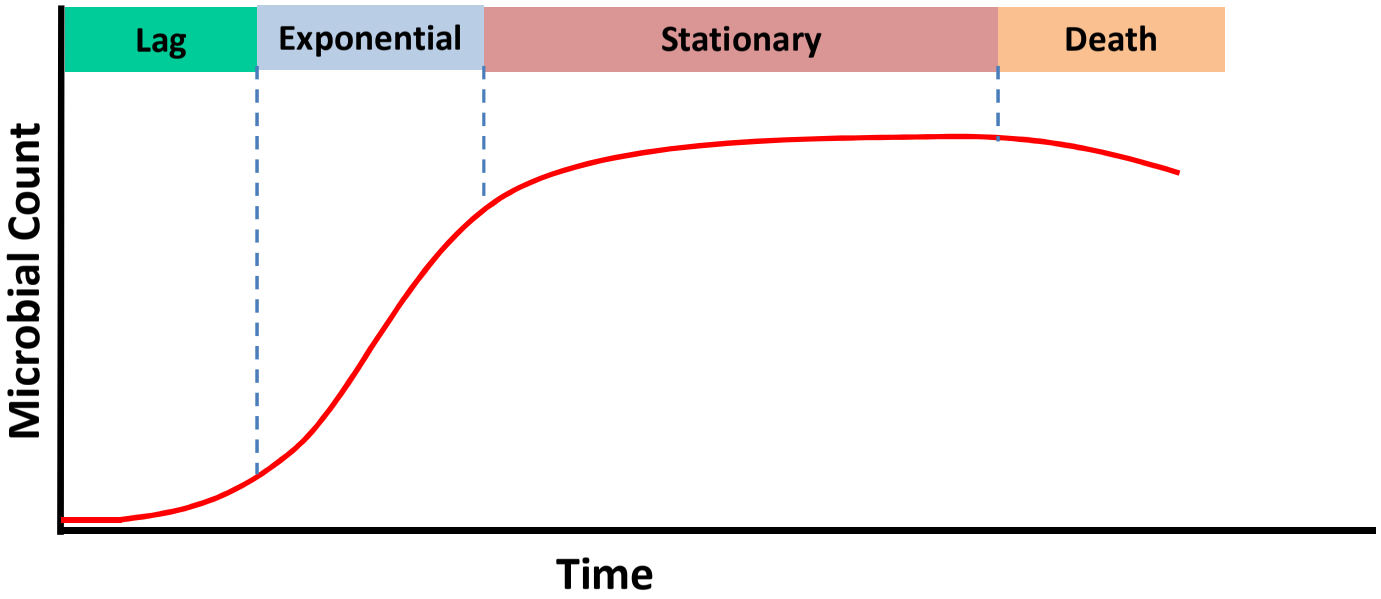
- Way of extending the shelf life of fresh foods
- Modifying gas composition within an enclosed chamber
  - Vacuum
  - Gas flushed
- Various formats
  - Traditional rigid tray
  - Thermoformed tray
  - Traditional plastic bag
- Barrier layer

Gas Mixtures

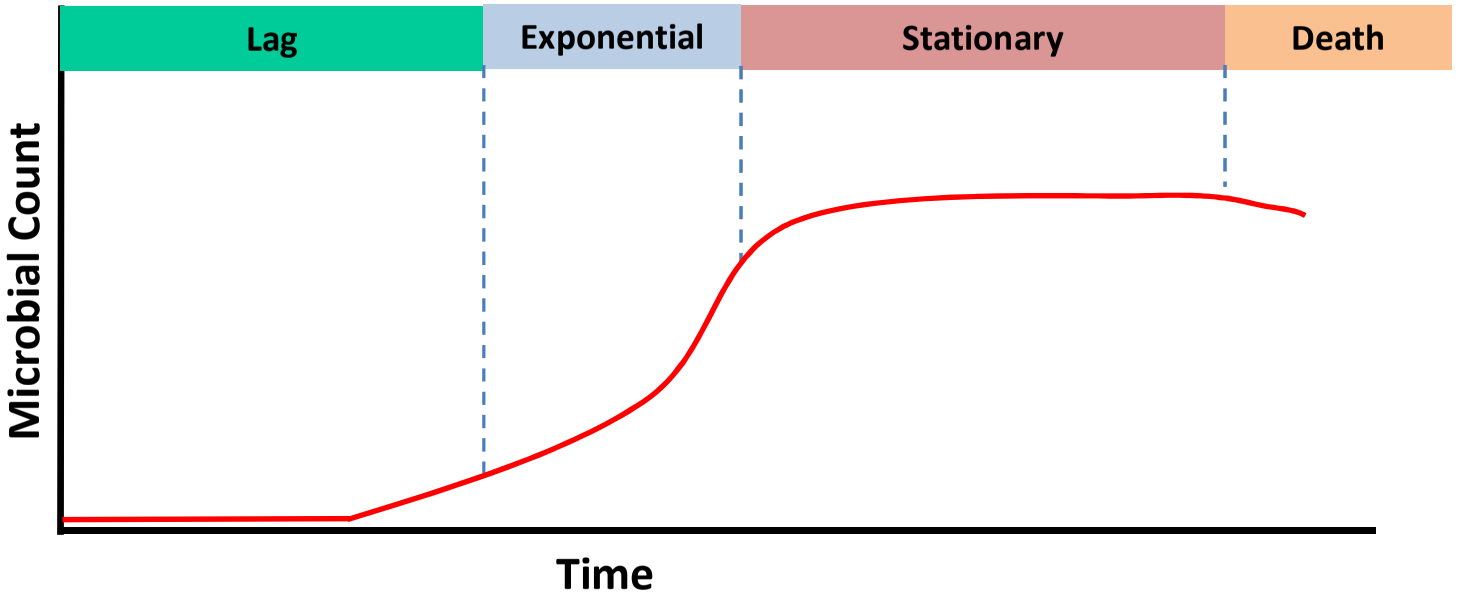
- Oxygen
  - Colour
  - Live product
  - **Rancidity**
  - **Detrimental colour**
- Nitrogen
  - Inert filling gas
- **Carbon dioxide**
  - Bacteriostatic
- **Gas mixture is product specific**



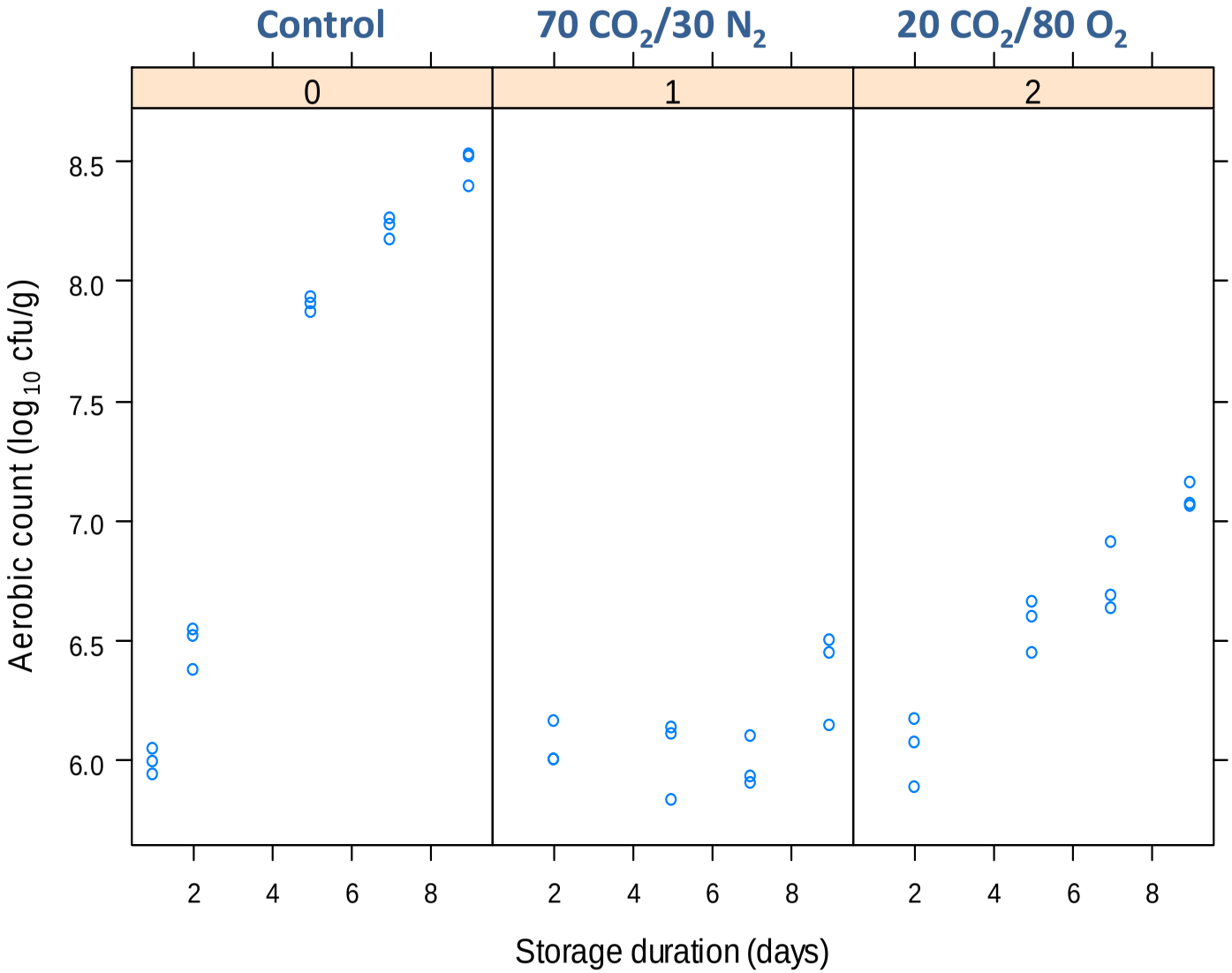
Typical growth profile



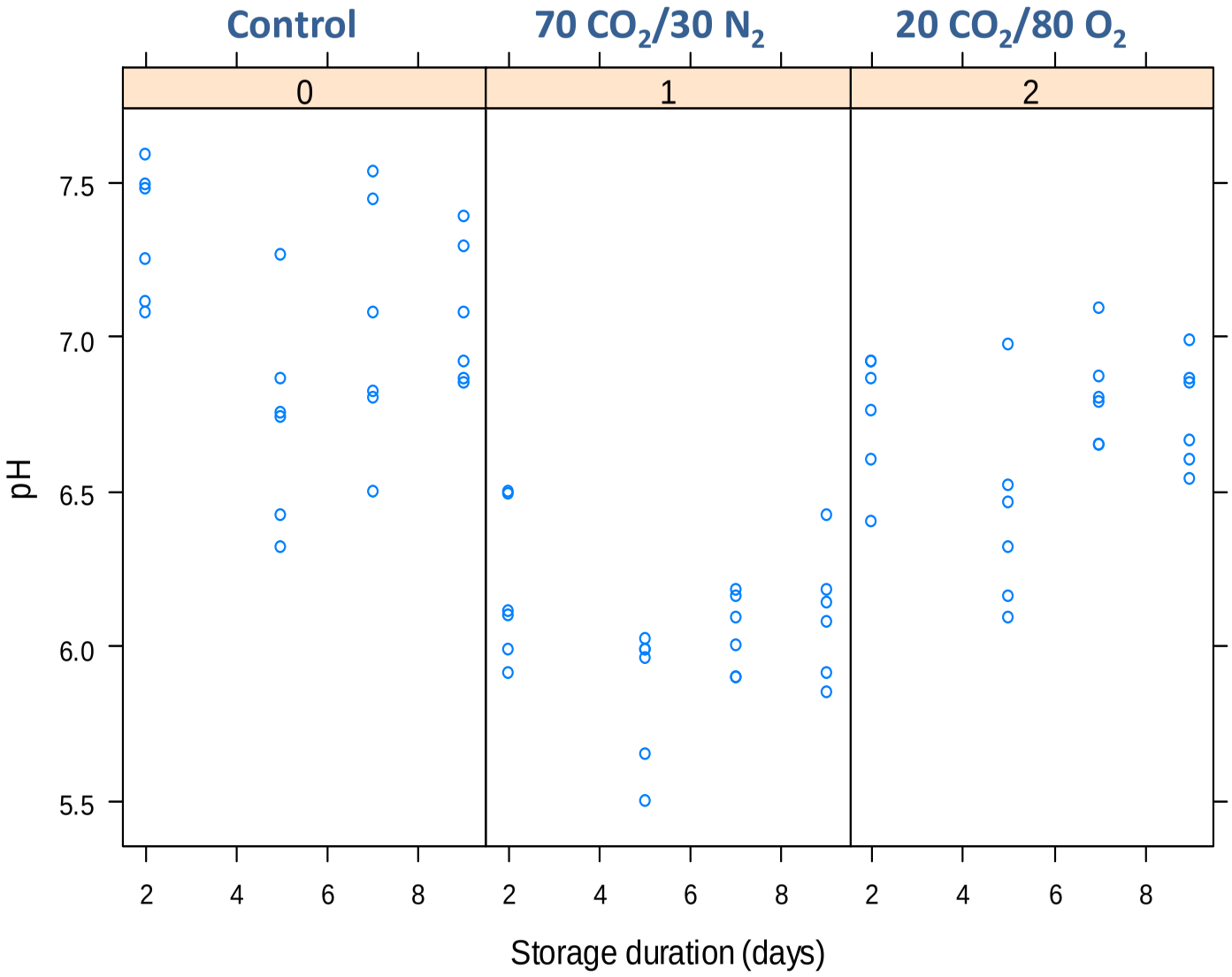
Map growth profile



Microbial counts from oysters



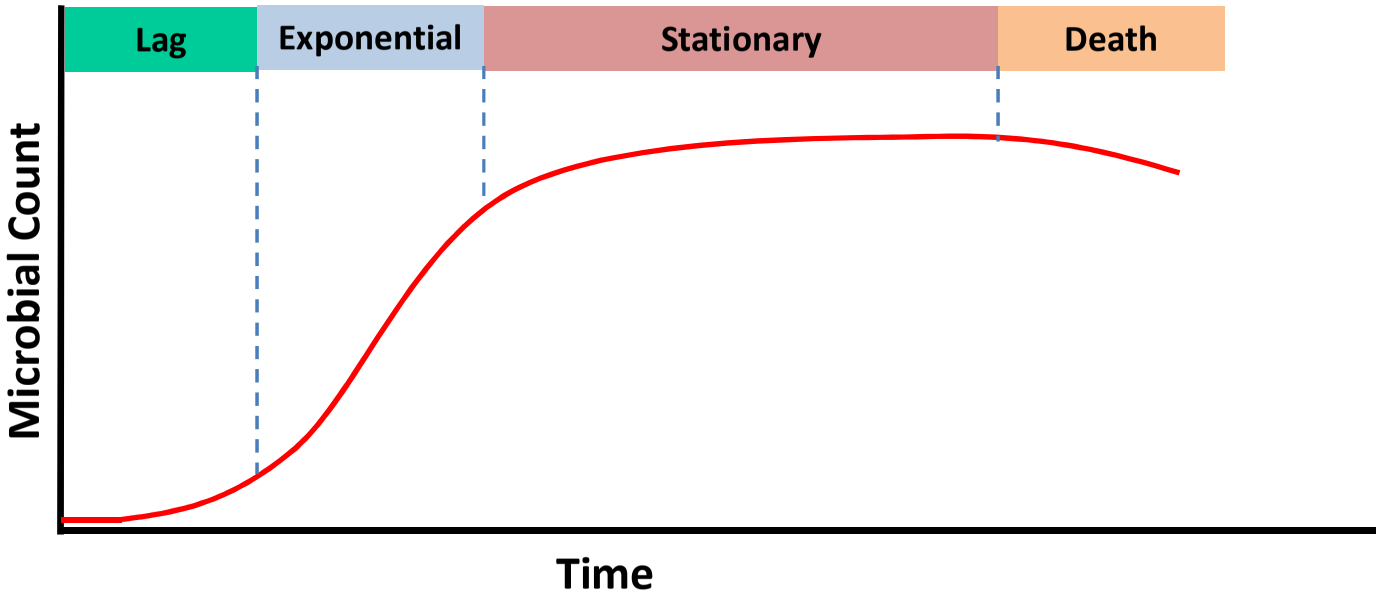
Surface pH of oysters



Potential issues

- Loss of gas/ wrong gas- need headspace analyser
- Enzymatic spoilage
- Pack collapse
- Gas ratio
- Increased drip loss
- Detrimental flavours
- Solubility of carbon dioxide
- **Microbial growth not controlled**

Importance of temperature



- Temp abuse pre-packaging
- Temp abuse post-packaging
- **Temperature control is critical**

Simple, achievable technique that is already accepted by consumers

Acknowledgements

- Australian Seafood CRC
- Multivac

- Contact: tom.madigan@sa.gov.au

Consumer Insights

Miles Toomey

Packaging Masterclass

24 July 2014

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What do Australians want in a range of fresh/chilled pre-packaged seafood?

For the most part, they want it simple and natural

- a natural fillet
- or for variety
  - garlic
  - herbs
  - lemon
  - light marinades

Notable quotes…

As a cook, I like to make things from scratch. I like to use fresh ingredients rather than frozen. I am not afraid to experiment and break out from the recipe.

You've got two extremes. Got the lazy cook, who is "the frozen" or this one [ready-to-cook offering] and that one [natural fillet offering] who is "buy the fresh fish and do all the prep yourself." Occasionally, you do want it from scratch. It's fun to cook. It's fun to play with your own herbs.

What about the packaging?

Clean, simple, classy packaging and labelling

Must be able to see the product

- clear packaging and not covered with labelling

Keep it natural and authentic looking

- not too uniform, too neat, or too processed looking

Colours of the sea (blue/green)

What do consumers like and dislike about fresh chilled seafood?

Responses to pre-packaged seafood products

I think a lot of the stuff tastes terribly massed produced, and a bit yucky rather than being authentic and flavoursome, like maybe home-made.

That's right it doesn't look natural. Fish look like fish, they don't look like this.

Everything is so incredibly uniform you sort of wonder how that happened. If you buy a couple of fish fillets anywhere else they're not exactly the same shape or size.

Barriers to fresh chilled seafood consumption

- Price 53%
- Concerns about source 46%
- Don't know how to determine quality 35%
- Concerns about freshness 33%

What are the benefits?

Fresh chilled category is growing

- Consumers like the convenience of not having to wait at the deli
- Price per portion
  - no nasty surprises at the deli
- Use by date
- Country of origin information
- Other useful information

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Notable quotes...

See, that [pre-packaged seafood] would be quicker to just select. You don't have to muck around with a ticket waiting to be served.

You can just throw it in your trolley and keep going. It's convenience, because sometimes you've only got 20 minutes to do your shopping. I'm on a mission.

Notable quotes...

They've got a use by date, and the use by date is usually about 5 days. I wouldn't normally buy fish and keep it at the bottom of the fridge for that long, but because it's vacuum sealed it lasts in your fridge for 3 or 4 days.

I would think it [pre-packaged seafood] could be even fresher. It's all under control and you've got a use by date on it.

Notable quotes.....

You can see the price. You get it out of the deli and you never know how much it's going to cost you.

At least you know how much it is before you actually buy it. At least in the frozen section you can't work out how much it is per kilo. In the deli though, it's never 1 kilogram, it's always 1200gms.

And the labelling?

Readable label

Use by date essential

Country of origin

Portion size
- for 1, 2 and 4

Price per portion

Serving suggestions and recipes on back

Does not need the heart tick – consumers know it is healthy

Suitable for freezing
- implies it is fresh and can be frozen for later