New Opportunities for Underutilised Species

Appendix 11: Paspaley pearl meat: Frozen pearl meat shelf life determination

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1. Aim

To conduct food safety and quality testing to determine the frozen shelf life of pearl meat adductor muscle for the export market.

2. Methodology

2.0 Materials

Frozen pearl meat adductor muscle was supplied by Paspaley's. There were 4 different samples of frozen pearl meat harvested in different areas and years, as listed below:

- WA Fished Meat from 80 Mile Beach 2014 season, packed October 2014 (no size grading and frozen in 1 kg zip lock bags).
- Kimberly Farm 2014 (1R and vacuum sealed in 250g bags)
- Kimberley Farm July 2015 (1R and vacuum sealed in 250g bags)
- Gourdon Bay September 2015 (1R and vacuum sealed in 250g bags)

2.1 Frozen shelf life analysis time line

Before each stage of testing, the pearl meat was thawed overnight at 4°C. Table 1 lists the different stages of frozen shelf life when sensory and microbiology analyses (Section 1.1.4 and 1.1.5) were conducted.

Table 1 Frozen storage months when pearl meat will undergo the sensory and microbiology testing

Frozen Storage months	Sample Description	Test Month
1	Gourdon Bay 2015	October 2015
3	Kimberly July 2015	October 2015
6	Kimberly July 2015	January 2016
7	Gourdon Bay 2015	April 2016
9	Kimberly July 2015	April 2016
12	Kimberly 2014and WA Fished	October 2015
15	Kimberly July 2015	October 2016
18	Kimberly 2014	April 2016
24	Kimberly 2014	October 2016

2.1.1 Heavy metal analysis

Pearl meat from each harvest was sent to a NATA accredited laboratory for testing of the following metals, in accordance to FSANZ limits for molluscs listed in Table 2:

- Cadmium
- Lead
- Mercury
- Inorganic Arsenic

Table 2 Maximum allowable level of contaminants in molluscs, as outlined in the Food Standards Code Std 1.4.1

Contaminant	Maximum Level (mg/kg)
Arsenic (inorganic)	1
Cadmium	2
Lead	2

2.2 Microbiological Analysis

Pearl meat from each harvest was sent to a NATA accredited laboratory to measure TPC on Day 0 at each stage of the frozen shelf life specified in Table 1. In addition, *E. Coli, Vibrio Parahaemolyticus* and *Listeria Monocytogenes* were tested only in the first round of microbiology testing. The results will be assessed against the limits sent by FSANZ, as outlined in Table 3.

Table 3 Maximum allowable level of contaminants in non ASQAP molluscs, as outlined in the FSC Std 1.4.1 (noting E.coli not necessary due to ASQAP exemption for this product)

Microbiological test	Maximum Level (cfu/g)
TPC	10^6/g
E.coli	<2.3/g
Listeria monocytogenes	Not detected/25g

2.3 Sensory Analysis

20 untrained panelists were recruited to take part in the sensory analysis at Curtin University Building 400 Sensory Laboratory on three occasions: October 2015 and April 2016. The sensory acceptability of the frozen pearl meat samples was assessed on the first day of thawed shelf life at different stages of the frozen shelf life as listed in Table 1. The pearl meat was assessed in two formats: sashimi and cooked.

The sashimi pearl meat was prepared by thinly slicing the meat diagonally and stored chilled until analysis. The cooked pearl meat was prepared by placing whole pearl meat into boiling water for 2 minutes and cooled immediately in an ice slurry and drained. The cooked pearl meat was also thinly sliced on a diagonal.

The acceptability of the pearl meat was rated on a 15cm line scale, to assess appearance, odour, texture, flavour and overall acceptability. The left hand side of the scale was anchored with 'dislike extremely' (rating = 0) and the right side of the scale 'like extremely' (rating = 150). Each panelist received two slices of each sample to analyse. The panelist received the sashimi pearl meat first. Once completed, the cooked pearl meat samples were passed through. The samples were presented using a balanced-block design to ensure random sampling. All relevant forms are located in the Appendix 1.

2.4 Statistical Analysis

Statistical analysis of the sensory analysis data, where appropriate, was analysed using SPSS one-way analysis of variance (ANOVA) and Kruskal-Wallis test based on the test assumptions and normality testing.

3. Results and Discussion

3.0 Heavy metal analyses

Heavy metal testing was conducted once for the frozen shelf life trials as the levels were not expected to change during frozen storage. Trace levels of cadmium and mercury in the pearl meat adductor muscle for all samples was within the acceptable limits for FSANZ (Table 4). However, the levels reported by Laboratory 1 for inorganic arsenic exceeded the maximum limit of 1mg/kg set for molluscs (Table 4). Sample from each harvest were sent for retesting by another independent NATA accredited laboratory. The second set of inorganic arsenic results from Laboratory 2 was below the maximum limit, as shown in Table 5.

Table 4 Preliminary heavy metal test results of pearl meat conducted by Laboratory 1.

Metal	Unit of measure	*Gourdon Bay 2015*	*Kimberly 2015*	*Kimberly 2014*	*WA Fished 2014*
Cadmium	mg/kg	0.87	0.31	0.42	0.79
Lead	mg/kg	<0.020	<0.020	<0.020	<0.020
Mercury	mg/kg	<0.010	<0.010	<0.010	<0.010
Arsenic (total)	mg/kg	30	27	11	23
Arsenic (inorganic)	mg/kg	11	7	2	8
Arsenic (organic)	mg/kg	19	20	9	15

Table 5 Laboratory 2 arsenic analytical results by a NATA accredited laboratory.

Sample	Arsenic (total) mg/kg	Arsenic (inorganic) mg/kg
Gourdon Bay 2015	34	<0.05
Kimberly 2015	29	<0.05
Kimberly 2014	6.7	<0.05
WA Fished 2014	21	0.06

Paspaley's had also independently sent the samples from the same harvest to another laboratory for inorganic arsenic testing, with results confirming the results reported by Laboratory 2. The higher levels reported by the Laboratory 1 could be attributed to ongoing issues with their test equipment. With further investigation, the first laboratory mentioned they are not NATA accredited to conduct the particular test and had encountered issues with the machinery. Subsequent tests were conducted by two different NATA accredited laboratories and the results were within acceptable limits.

3.1 Microbiology

The microbiology results of all the pearl meat for each harvest at the different stages of frozen shelf life was within the acceptable guidelines set by FSANZ. Tables 4-8 show the microbiology results at the different stages of frozen shelf life for the different harvests. The TPC did not increase with frozen storage time. Freezing for long periods of time does maintain the food safety of the pearl meat, provided the food safety was within the FSANZ limits before freezing.

The first E.coli testing conducted for the pearl meat in each harvest area had limitations on reporting to <10/g as specificity is required if lower reporting levels are required. The FSANZ requirement for *E.coli* is less than 2.3/g. When the second batch of samples were sent for microbial analysis, the E.coli was retested but the limit of the testing was below 3/g. Although the levels reported were below 3/g, this was the limiting factor in the reporting.

Table 6 Microbiology results of WA Fished pearl meat harvested in 2014 after 12 months of the frozen shelf life.

Pathogen	*Unit of measure*	*WA Fished 2014*
TPC	Cfu/g	1700
Listeria Monocytogenes	(/25g)	Not Detected
E. Coli	Cfu/g	<10
Vibrio Parahaemolyticus	*(enumeration per 0.1g)*	Not Detected

Table 7 Kimberly 2015 Frozen pearl meat shelf life microbiology results

Pathogen	*Unit of measure*	Shelf life			
		3 months	6 months	9 months	15 months*
TPC	Cfu/g	1500	750	1300	<10
Listeria Monocytogenes	(/25g)	Not Detected	NA	Not detected	Not detected
E. Coli	Cfu/g	<10	NA	<3	<3
Vibrio Parahaemolyticus	*(enumeration per 0.1g)*	Not Detected	NA	NA	NA

***Sample was tested after slow thawing in freezer for an unknown number of days.**

Table 8 Kimberly 2014 frozen pearl meat shelf life microbiology results

Pathogen	*Unit of measure*	*Shelf Life*		
		12 months	**18 months**	**24 months***
TPC	Cfu/g	40 est.	1500	1400
Listeria Monocytogenes	(/25g)	Not Detected	Not detected	Not detected
E. Coli	Cfu/g	<10	<3	<3
Vibrio Parahaemolyticus	*(enumeration per 0.1g)*	Not Detected	NA	NA

*Sample was tested after slow thawing in freezer for an unknown number of days.

Table 9 Gourdon Bay 2015 frozen pearl meat shelf life microbiology results

Pathogen	*Unit of measure*	*Shelf Life*	
		1 month	***7 months***
TPC	Cfu/g	550	500
Listeria Monocytogenes	(/25g)	Not Detected	Not detected
E. Coli	Cfu/g	<10	<3
Vibrio Parahaemolyticus	*(enumeration per 0.1g)*	NA	NA

The two Kimberly harvest samples, Kimberly 2014 and Kimberly 2015 were assessed in October 2016 at 24 months and 15 months, respectively. When the samples were removed from the long term storage freezer, it was immediately apparent that the samples had slowly thawed, due to an issue with the freezer. It was unknown how long the pearl meat had been 'slowly thawing', but this would have compromise the sensory quality. No sensory analysis was conducted, however the samples were sent for microbiology testing to determine the effect of the slow thawing. The microbiology results were acceptable for TPC, *Listeria monocytogenes* and *E.coli* for both samples, which indicate the sample was still below the temperatures which allowed the growth of bacteria.

One vacuum packaged bag from each treatment Kimberly harvested pearl meat after 15 and 24 months frozen storage, had air present, enabling moisture to leech from the pearl meat into the bag (Figure 9 and Figure 10). The affected Kimberly 2014 pack had significant moisture loss.

Figure 1 Vacuum packaged Kimberly 2014 pearl meat stored frozen for 24 months

Figure 2 Vacuum packed Kimberly 2015 pearl meat stored frozen for 15 months

The samples of pearl meat harvested in different areas were acceptable from a food safety aspect at each stage of frozen shelf life. The microbial and heavy metal levels were within the FSANZ limits. The frozen storage time will not affect the food safety aspect of the product if stored correctly. Longer frozen storage time will only impact on the sensory characteristics of the pearl meat, ultimately determining the shelf life.

3.2 Sensory Evaluation

3.2.1 ***Session 1: October 2015***

19 panellists assessed pearl meat as sashimi and 21 in a cooked format. In Session 1, there was an observable difference in the sensory acceptability of the pearl meat when assessed in both formats. The WA fished pearl meat had a significantly lower acceptability rating in comparison with the other 3 samples. The average rating score fell in the slight to medium dislike range for each sensory attribute with average scores below 70 out of 150, as shown in Figure 1 and Figure 2.

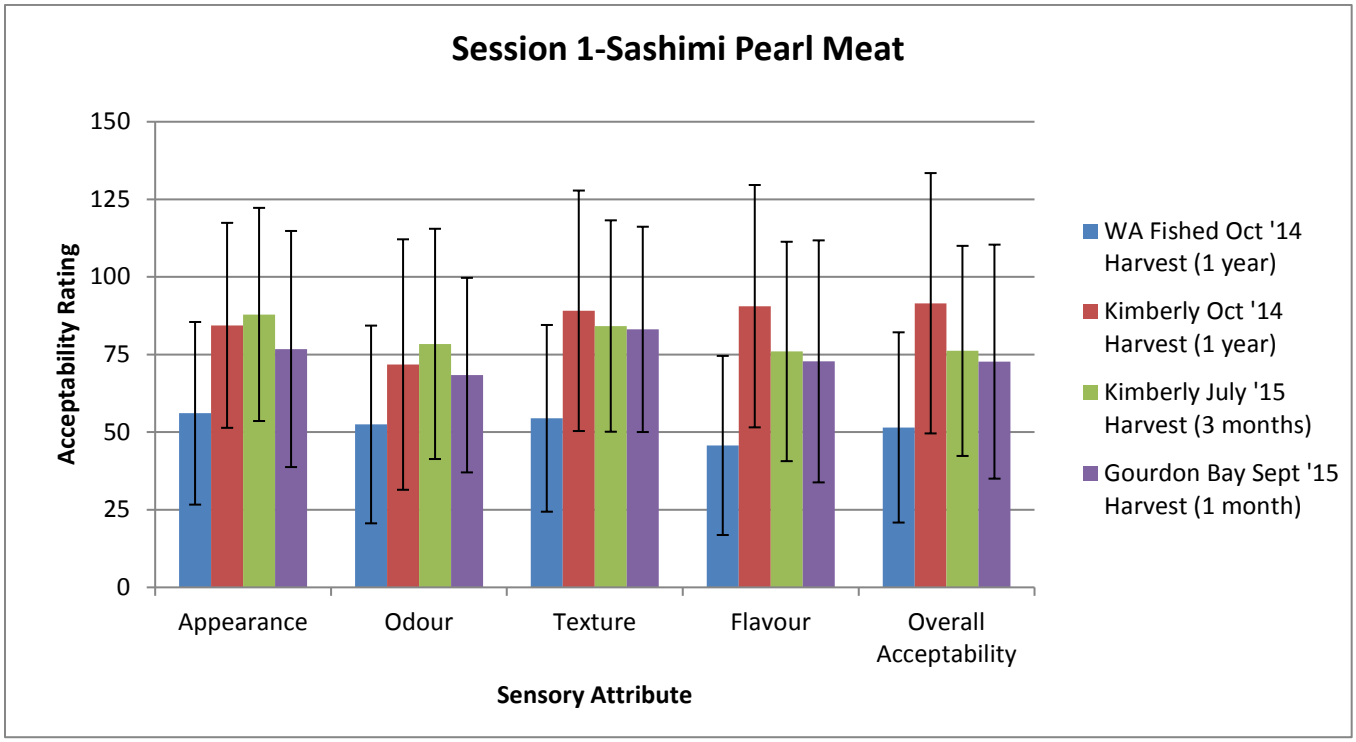

Figure 3 Sensory evaluation results of frozen pearl meat sashimi- session 1 (n=19)

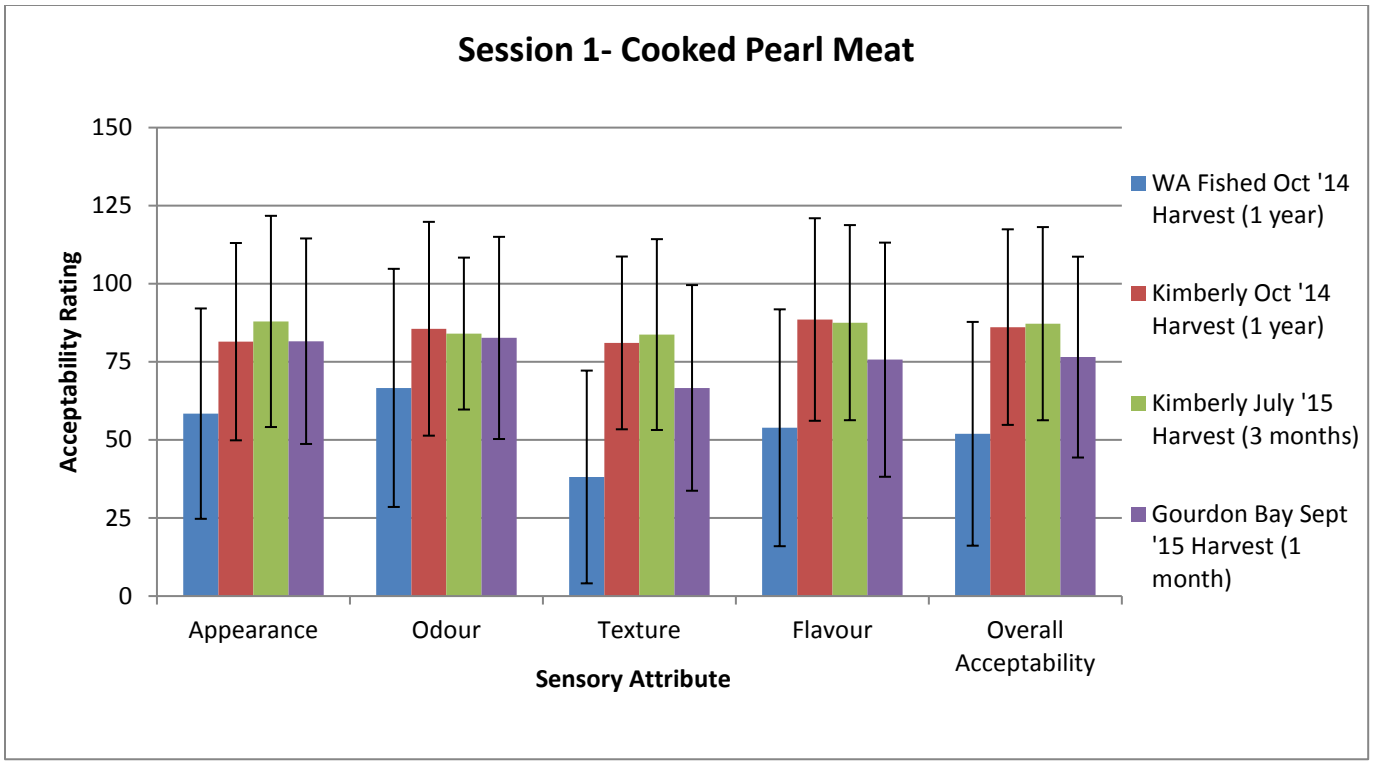

Figure 4 Sensory evaluation results for cooked pearl meat in session 1(n=21)

The WA Fished 2014 had reached the end of the frozen shelf life by 12 months. With no sensory acceptability testing conducted prior to this point, the end of the WA Fished pearl meat shelf life is unknown, but in between 1-12 months. There was no significant difference in acceptability rating of the Kimberly 2014, Kimberly 2015 and Gourdon Bay 2015 pearl meat in all attributes. The acceptability rating for odour of the sashimi pearl meat was below 75 for most samples with many panelists noting they were unable to detect an odour; therefore unsure how to rate it. Although the average was below 75 which normally indicates it is slightly disliked, in this circumstance it is not a true reflection of the acceptability of the pearl meat odour. The Kimberly harvested pearl meat had acceptable sensory characteristics at 12 months frozen storage. The Kimberly 2014 pearl meat had the highest acceptability rating for texture, flavour and overall acceptability, and the Kimberly 2015 had the highest acceptability ratings for appearance and odour. Although the Gourdon Bay 2015 pearl meat had only been frozen for 1 month, the sensory evaluation results indicate it did not rate as highly as the Kimberly harvested pearl meat, with ratings just below 75 for flavour and overall acceptability.

The odour ratings of the sashimi pearl meat in session 1 were below 75, which normally indicates a dislike. However, in this instance the panelists noted they could not detect an odour and were unsure how to rate this. With our familiarity with pearl meat and seafood we understand that no detectable odour is an indicator of good quality. In future, to capture this information another question should be added asking if the panelists can detect an odour and if yes, describe it.

Table 10 lists the other comments made by the panellists on the sashimi pearl meat. The WA Fished 2014 pearl meat at 12 months frozen storage has several negative comments noting the rubbery hard texture, overly fishy smell, bland flavour and dark appearance.

Table 10 Comments from panellists for the sashimi pearl meat sensory analysis

WA Fished 2014	Kimberly 2014	Kimberly 2015	Gourdon Bay 2015
12 month	**12 months**	**3 months**	**1 month**
• Rubbery tough texture • The least fresh of all samples • Looks grey, tough, slightly bitter, like sawdust odour, old in all aspects • Hard and crunchy	• Had highest acceptability x2 • Had worst odour	• Shiny and has nice texture • Tasted very unfresh • Good flavor and texture	• No odour at all • Unfresh • Not as much flavor

The WA fished pearl meat acceptability rating for the above attributes was significantly the lowest, with a significant difference with at least one of the other samples. For appearance, it was significantly lower than the Kimberly 2015 pearl meat. The texture acceptability rating was significantly lower than all 3 pearl meat samples. For the flavour and overall acceptability, the WA fished pearl meat was significantly lower than the Kimberly 2014 and Kimberly 2015 pearl meat.

The WA fished pearl meat had the lowest acceptability rating when cooked with ratings below 75 for every sensory attribute (Figure 2). With ratings towards the "dislike extremely" side of the line scale for each attribute and the statistically significant differences it shows that the WA fished pearl meat is at the end of the frozen shelf life. The Kimberly harvested pearl meat at 3 and 12 months frozen storage were rated acceptable in each attribute when cooked. The Gourdon Bay 2015 pearl meat after one month frozen storage were liked in all attribute except texture, with a slight dislike reported.

3.2.2 Effect of harvest method on pearl meat shelf life

There are many different harvest areas for the pearl meat and the technique varies depending on the equipment available on board the vessels where harvesting occurs. The WA fished pearl meat is harvested on boats with older equipment, therefore unable to implement the new best practice procedures followed on the newer vessels in the Kimberly region. Pearl meat harvested in the Kimberly is packaged into 250g packs with the pieces laid in a flat layer before being vacuum sealed on board and frozen in a blast freezer immediately (Figure 3). The WA fished pearl meat is placed together in 1 kg batches into a thin film zip lock bag and frozen in a standard freezer as shown in Figure 3.

Figure 5 Left: Vacuum packed Gourdon Bay pearl meat. Right: WA fished pearl meat

Both samples of pearl meat were assessed in session 1 after 12 months of frozen storage, with the results displayed in Figure 4 and Figure 5. Although the samples had been frozen for the same period of time, there was a significant difference in results for all attributes. The WA Fished pearl meat rated significantly lower, towards 'dislike extremely'. The Kimberly 2014 harvested pearl meat rated significantly higher, with a liking preference in most attributes.

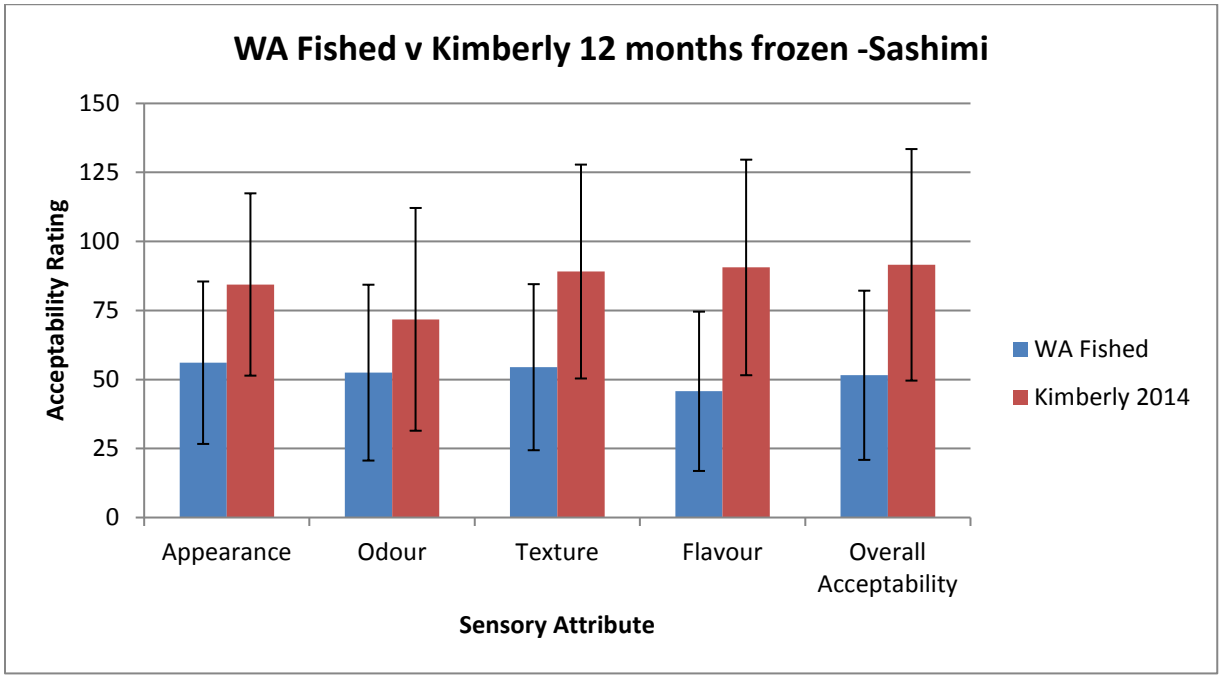

Figure 6 Sensory results of sashimi pearl meat harvested using different methods assessed after 12 months frozen storage.

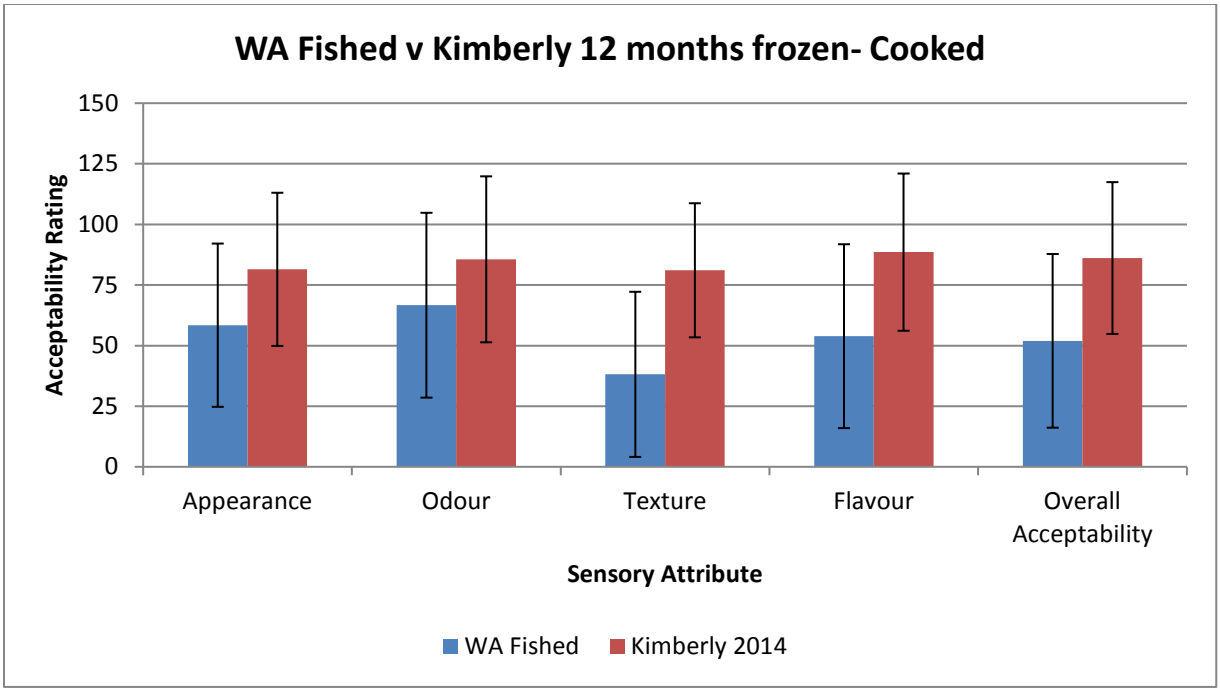

Figure 7 Sensory results of cooked pearl meat harvested using different methods assessed after 12 months frozen storage.

It appears that freezing the pearl meat in a large batch and with less efficient freezers for the WA Fished pearl meat negatively affects the overall quality of the meat. The thicker packaging, removal of air, thin laying the meat and very short freezing time for the Kimberly harvested pearl meat retains the quality of the pearl meat prior to freezing and reduces the impact of freezer burn and freezer taint, which affected the WA fished pearl meat. Although the products had been frozen for the same length of time, the sensory quality was greatly influenced by the post-harvest process. The food safety aspect was acceptable for both samples, but the effect of the post-harvest processing technique reduced the WA fished pearl meat to less than 12 months, whereas the Kimberly 2014 pearl meat was still acceptable in a food safety and food quality aspect. The results reinforces the importance of post-harvest processing and the impact poor handling and processing have on product quality and shelf life.

Figure 8 Thawed pearl meat assessed in session 1 from left to right: Kimberly 2014; Kimberly 2015; WA Fished 2014; Gourdon Bay 2015- October 2015

3.2.3 Session 2: April 2016

The experimental design for the preference sensory evaluation of the 3 samples was done using a balanced–block design. A total of 30 participants assessed the sashimi and cooked pearl meat. Appearance, odour and texture sensory acceptability ratings for the sashimi pearl meat were analysed using One-way ANOVA. Flavour and overall acceptability data was analysed using Kruskal Wallis. Statistically, there was no significant difference in the appearance, odour, flavour and overall acceptability of the 3 samples of pearl meat assessed in April 2016. There was a significant difference in the acceptability rating of the texture between samples, with preference for the Kimberly 2014 pearl meat. The texture acceptability rating was acceptable for all samples, with the Kimberly 2014 with an 18 month frozen shelf life significantly higher than the other two samples. The texture acceptability rating for the Gourdon Bay 2015 and Kimberly 2015 pearl meat were not significantly different with comparable ratings (Figure 7).The average odour acceptability rating was below 75,with several panelists detecting varying degrees of 'fishiness', from slight to strong but all samples similar. Other comments made by the panelists on the sashimi pearl meat samples are listed in Table 11. One panelist noted it was "hard to discern odour between samples as they were all on the same plate." The flavour and overall acceptability rating of the Kimberly 2014 pearl meat at 18 months frozen shelf life was just below 75, with the Kimberly 2014 pearl meat just above 75 for these attributes.

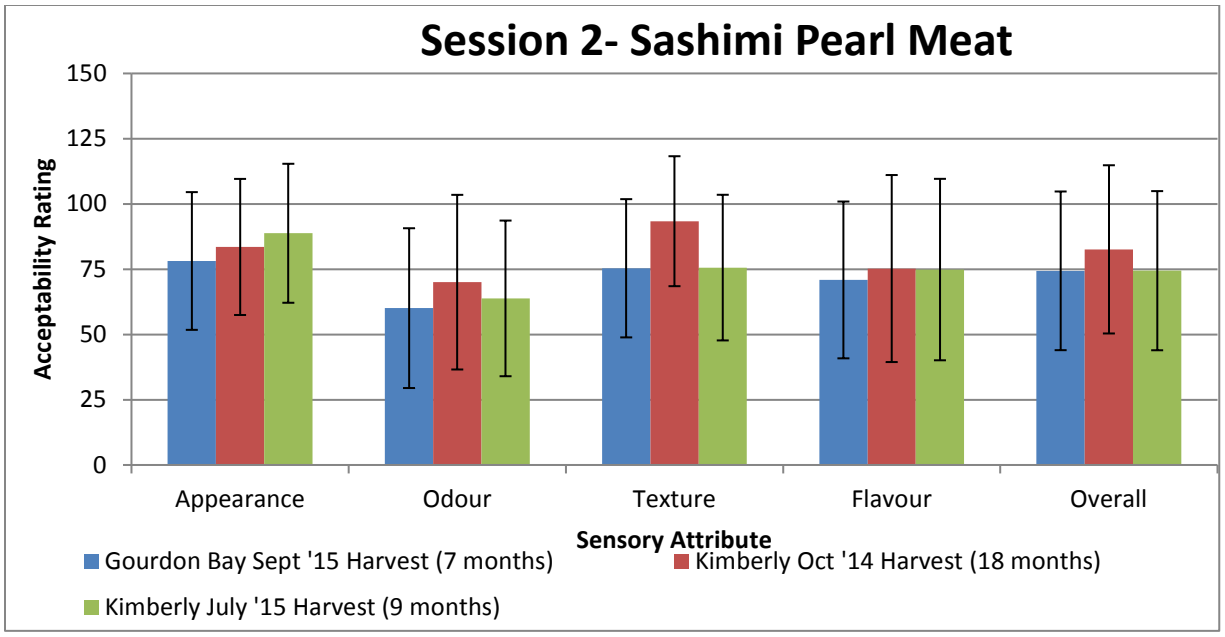

Figure 9 Sensory evaluation results for sashimi pearl meat in session 2 (n=30)

Table 11 Other comments made by panellists on the sashimi pearl meat in session 2

Gourdon Bay 2015	Kimberly 2014	Kimberly 2015	General comments on all samples
7 months	18 months	9 months	
• More chewy • Smells off • Very fishy • Sweet flavour	• Slightly metallic aftertaste	• Strong fishy flavour	• Preferred as sashimi, chewier when cooked • hard to discern odour between samples as they were all on the same plate • odour is similar • appearance is similar • all samples very similar in quality • slight difference in texture but all seem ok

The appearance and aroma acceptability data for the cooked pearl meat in session 2 in April 2016 was analysed using non parametric test Kruskal Wallis. Texture, flavour and overall acceptability data was analysed using One-way ANOVA. The statistical analysis indicates there was no significant difference in the appearance, aroma and flavour of the cooked pearl meat with different frozen shelf life with a p value >0.05. However, there was a significant difference in the texture and overall acceptability of cooked pearl meat. The significant difference was between the Gourdon Bay 2015 and Kimberly 2015 pearl meat, with preference for the Kimberly 2015 pearl meat at 9 months frozen shelf life, whereas the Gourdon Bay 2015 frozen shelf life was 7 months.

The Kimberly 2015 (9 months) pearl meat had the highest acceptability rating in all attributes, followed by Kimberly 2014 (18 months) and the lowest acceptability was for the Gourdon Bay 2015 (7 months).

The Kimberly 2015 pearl was rated acceptable (above 75) in all sensory attributes at 9 months when cooked (Figure 8). The Kimberly 2014 pearl meat at 18 months frozen shelf life was above 75 in all attributes except texture. The Gourdon Bay 2015 pearl meat after 7 months frozen storage had a texture and overall acceptability rating below 75, normally indicating a degree of dislike of that particular attribute.

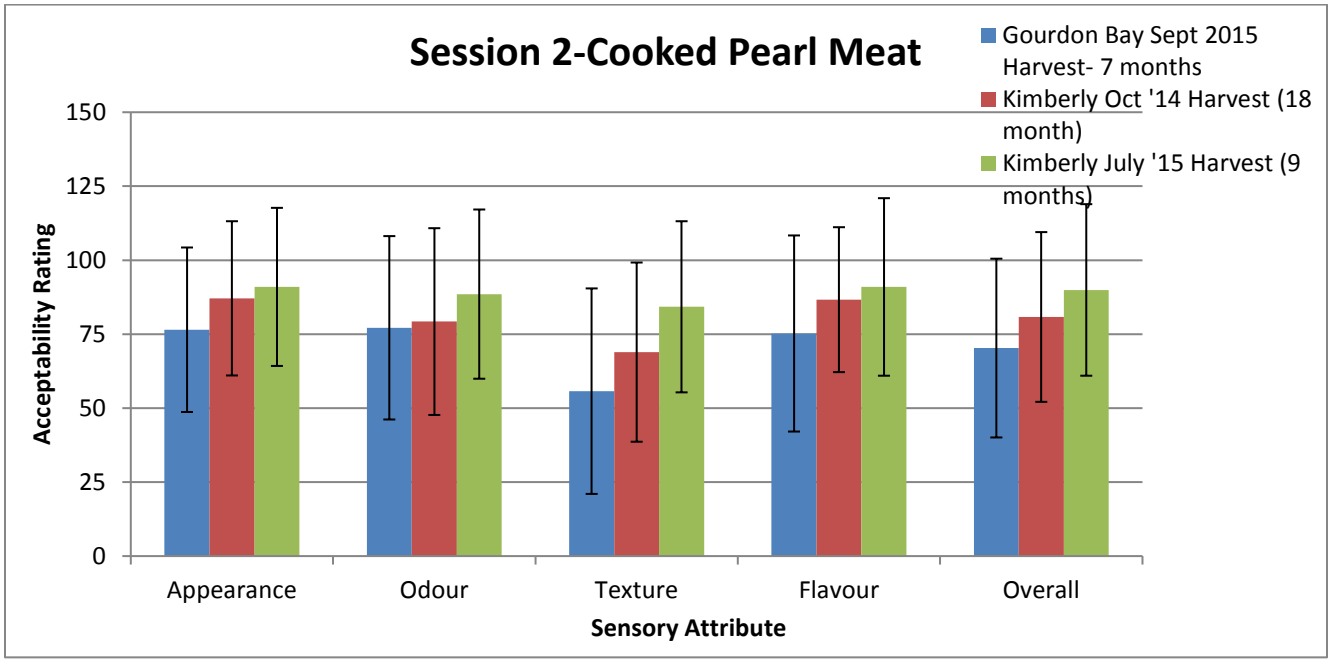

Figure 10 Sensosry evaluation results for cooked pearl meat in session 2 (n=31)

Some of the comments from the panellists for the cooked pearl meat sensory evaluation are listed in Table 12. Many of the panellists commented that the Gourdon Bay 2015 and Kimberly 2014 pearl meat was chewy when cooked.

Table 12 Other comments made by panellists on the cooked pearl meat in session 2

Gourdon Bay 2015	Kimberly 2014	Kimberly 2015	General comments on all samples
7 months	18 months	9 months	
• Bit overcooked in texture • Tough/chewy/rubbery • Slightly bitter, very hard to chew • Most chewy • Less fishy odour than others	• Bit overcooked in texture • chewy	• Had a really strong flavor • Best, not chewy • Nicer texture • Slightly rubbery • Least chewy	• Better taste when cooked • A lot harder to eat as tougher but overall better taste • Chewiness off putting, hard to swallow • Slight difference in texture • Not much flavour, mild • Odour less fishy when cooked • All had chewy texture

It was expected the Gourdon Bay pearl meat would rate higher than the other samples as it was harvested months after the Kimberly pearl meat. The reason for the higher ratings for the older Kimberly pearl meat may be attributed to harvest area, transport and post- harvest practices, however further investigation is required. A point of note is the Kimberly 2014 and 2015 harvested pearl meat was transported to Perth in a large quantity, allowing the thermal mass to remain cool enough to keep the samples frozen during transport. The Gourdon Bay harvested pearl meat used in the sensory analysis in April 2016, was received in Perth during summer and only one 1kg box was sent. By the time the sample arrived in Perth, it defrosted slightly. It was placed in the freezer on arrival.

The pearl meat acceptability rating scores for the top rating samples did not reach 100. This may be due to the general population would not have tried pearl meat before taking part in the sensory evaluation; therefore unfamiliar with the characteristic qualities. Normally pearl meat would be prepared with seasonings to enhance the product. With the unfamiliarity of the product and lack of additional flavours, the sensory ratings were expected to be towards the middle of the line scale as observed in session 1 and 2 results.

3.2.4 Frozen Shelf Life of Kimberly Harvested pearl meat

The Kimberly harvested pearl meat at 18 months shelf life was the oldest product assessed and had acceptability ratings around 75 when assessed as sashimi. Although the acceptability rating of the pearl meat was below 75 for odour, overall it is acceptable and when prepared by chefs the additional flavours and cooking techniques would increase the acceptability of the product.

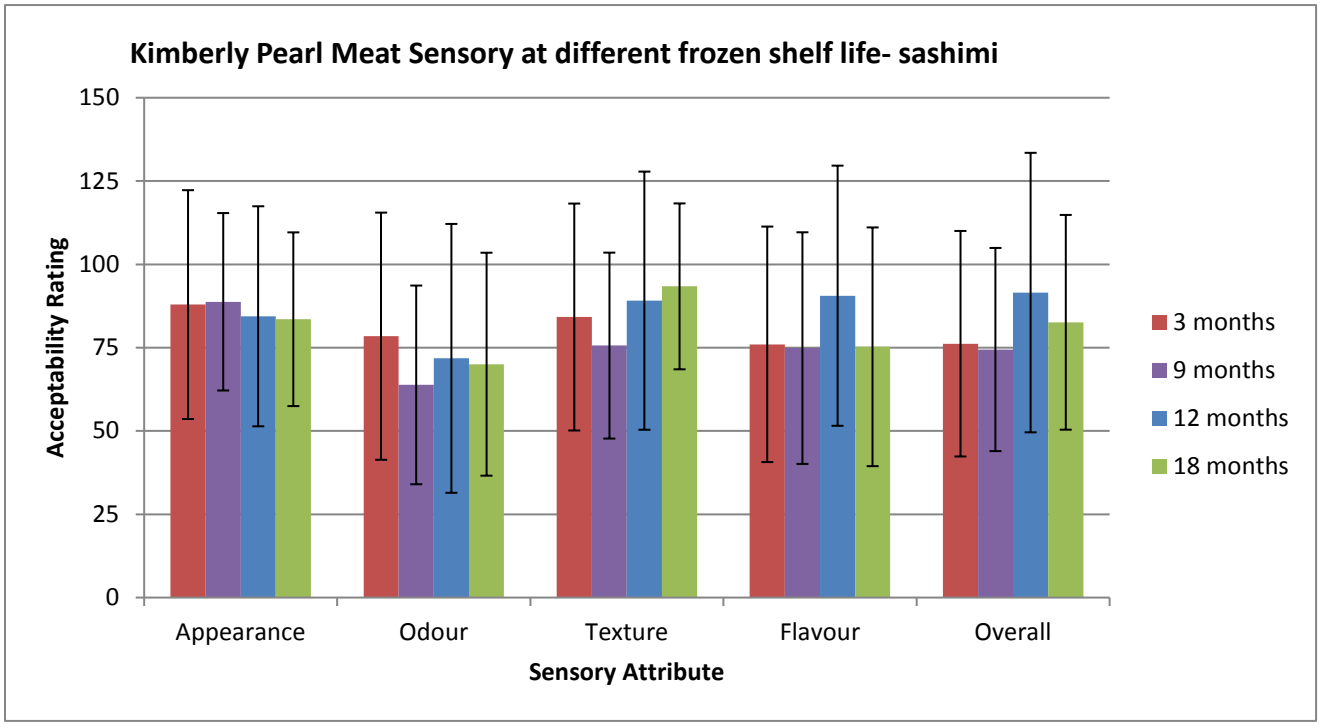

Figure 11 Graph displaying sensory results for sashimi Kimberly pearl meat at different stages of frozen shelf life. Note: samples were tasted on separate occasions.

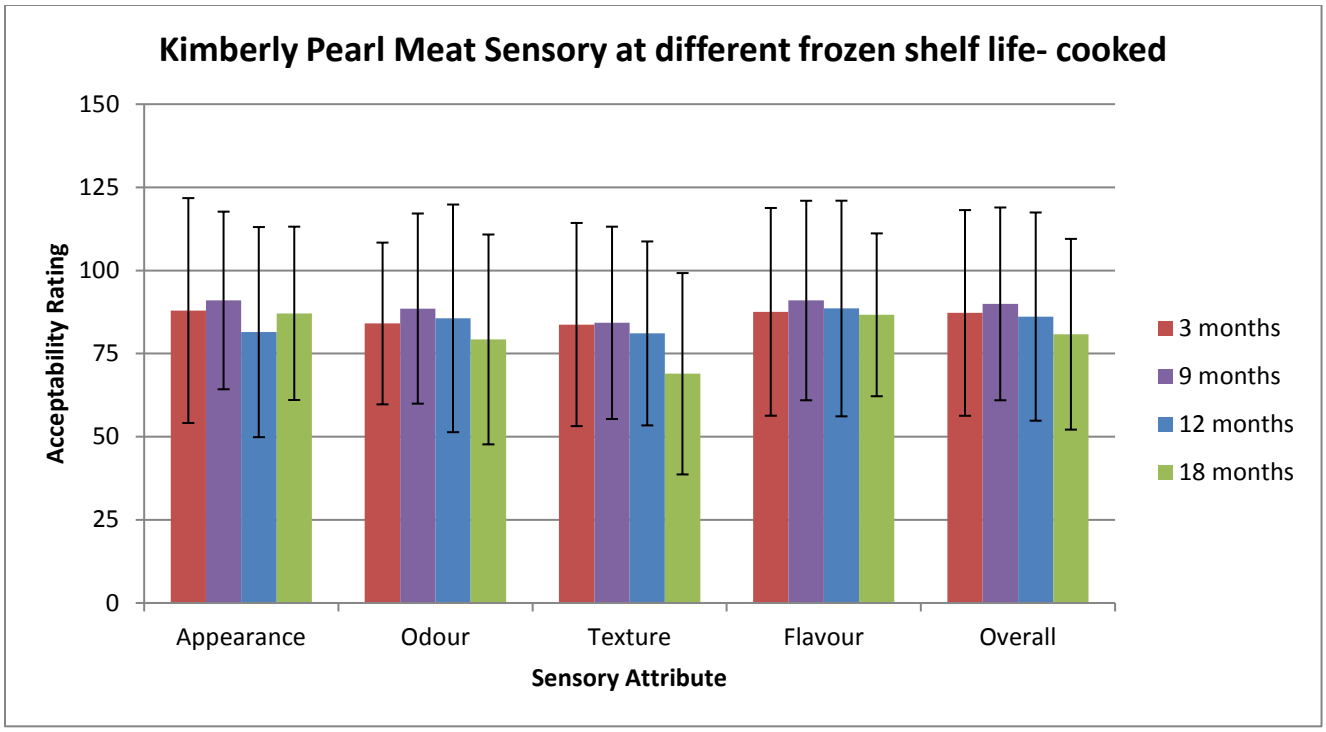

Figure 12 Graph displaying sensory results for cooked Kimberly pearl meat at different stages of frozen shelf life. Note: samples were tasted on separate occasions.

3.2.5 Gourdon Bay pearl meat frozen shelf life

Figure 10 and Figure 11 display the sensory results for the Gourdon Bay pearl meat when assessed at different stages of frozen shelf life. Overall, there was no observable difference between the pearl meat at 1 month and 7 months of frozen storage. The texture of the cooked pearl meat at 7 months was lower than at 1 month of frozen storage. A limitation to the results is the samples were not assessed in the same session. The rating scores for each attribute were around the middle of the rating scale. As mentioned previously, as the panelists are unfamiliar with the product the pearl meat is often prepared in other methods with additional ingredients, these results, along with the food safety results are acceptable for pearl meat after 7 months of frozen storage.

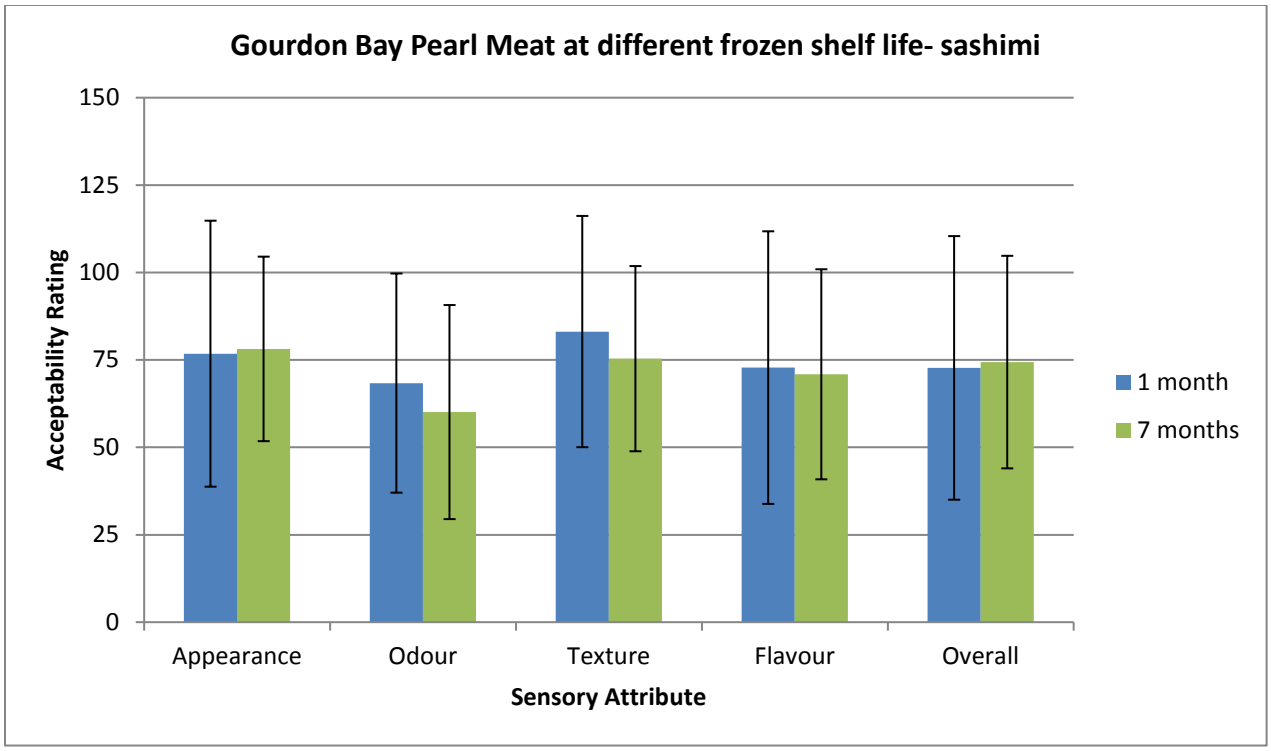

Figure 13 Graph displaying sensory results for sashimi Gourdon Bay pearl meat at different stages of frozen shelf life. Note: samples were tasted on separate occasions.

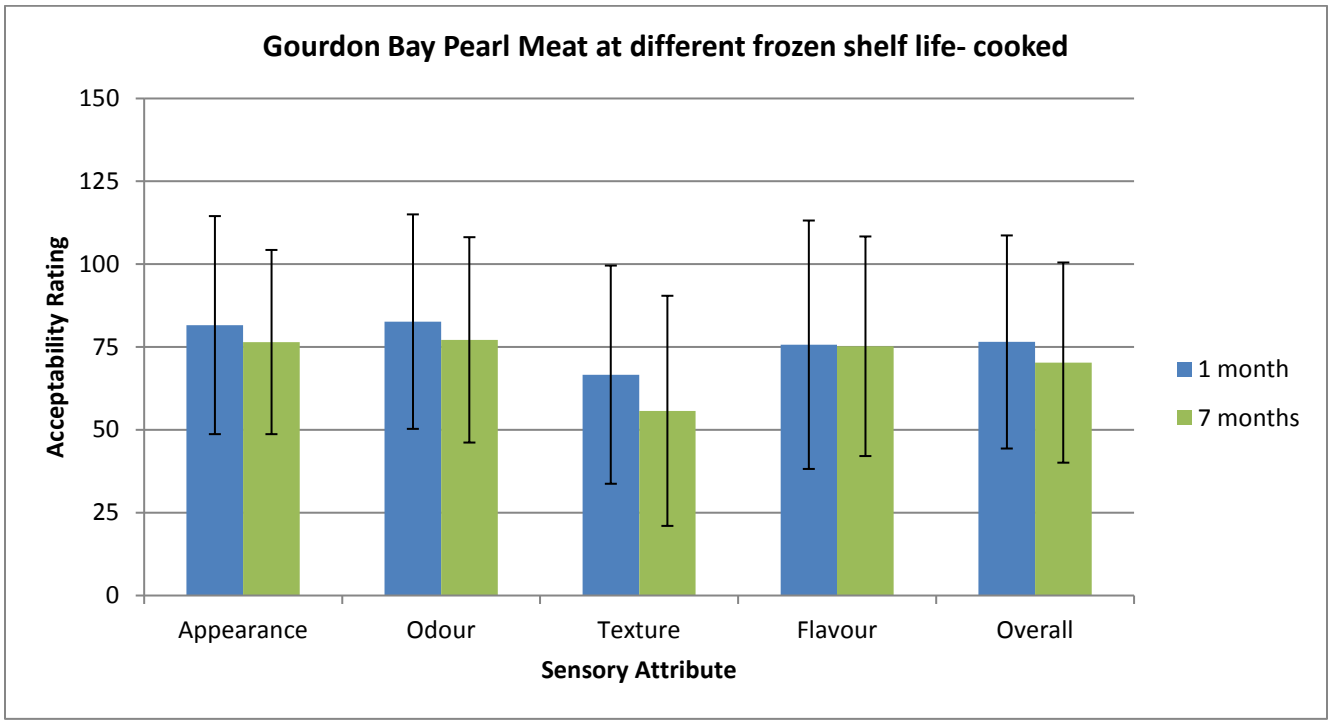

Figure 14 Graph displaying sensory results for cooked Gourdon Bay pearl meat at different stages of frozen shelf life. Note: samples were tasted on separate occasions.

Figure 15 Thawed pearl meat assessed in session 2 from left to right: Kimberly 2014; Kimberly 2015; Gourdon Bay 2015- April 2016

4. Conclusion

The frozen shelf life of pearl meat can be prolonged to 18 months for consumption in a sashimi style dish and cooked, as it is acceptable in food safety and quality, as shown from the results for Kimberly 2014 harvested pearl meat. Post-harvest processing and poor handling technique does negatively affect the quality of the pearl meat, consequently shortening the frozen shelf life of the product. To ensure consistent and prolonged pearl meat quality during frozen storage for up to 18 months, it is recommended the best practice techniques used to process the pearl meat in the Kimberly region be adopted in the other processing areas if possible.

For further shelf life testing conducted on the sensory characteristics of the pearl meat in the future more samples of pearl meat should be assessed from the same harvest area at different stages of frozen storage during one session, including a freshly frozen sample to use as the benchmark for the testing. As the sensory analysis was conducted by consumer panelists that are unfamiliar with pearl meat, any further sensory analysis participants should be screened for familiarity with product and potential target market consumers and end users.

5. Appendix

5.0 Panellist Recruitment Poster October 2015

CESSH
CENTRE OF EXCELLENCE SCIENCE SEAFOOD HEALTH

Curtin University

Did you know that pearls are harvested from oysters which contain an edible delicacy?

Now it's your chance to try it!

The aim of this project is to evaluate the effect of post harvest methods on quality. Participants are invited to take part in a sensory panel to evaluate the appearance, texture, flavour of sashimi and/or cooked pearl meat.

If you not allergic to seafood, would love to try something new and are available for up to 10 minutes, please contact Kerri Choo at **k.choo@curtin.edu.au** or **9266 7782.**

The session will be held in Building 400, Level 1 on:

Thursday 29th October 11-2pm

This project has ethics approval RD33-13.

5.1 Pearl Meat Sensory Evaluation October 2015 Informed Consent Form

Information Sheet

The aim of this research project is to determine acceptability of pearl meat adductor muscle from *Pinctada maxima* and crustacea roe.

The sensory focus group will be carried out within Building 609. The whole process will be carried out by Centre of Excellence Science Seafood and Health (CESSH) staff and students under the supervision of Dr Janet Howieson. The panellists will be asked to taste up to 8 samples and rank them based on their preference. The time required for each panellist taste will be approximately 10 minutes. All recruited panellist will be allowed to taste, except those with seafood allergies and intolerance.

To participate in this study is completely voluntary. Any participant is free to withdraw from this evaluation at any time with no negative consequences or prejudice. All personal information from the panellists will not be identifiable and stored with all data obtained from this study in a secure location within the CESSH, Curtin University for a period of 5 years. All the electronic data will be stored in the secure network within Curtin University.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number RD 33-13. Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

CONTACT DETAILS

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Email: j.howieson@curtin.edu.au

Product Sensory Evaluation Panel Consent Form

I signing this form I confirm that:

- I have been informed and understand the purpose of this study
- I have been given opportunity to ask questions
- I understand that I can withdraw from the study at any time without prejudice or negative consequences.
- I understand that any information from this study that might potentially identify my personal detail will not be published.
- I understand that all data from this study will be treated as confidential and stored in secured location within the Centre of Excellence for Science, Seafood and Health at the Curtin University of Technology Bentley campus.
- I declare that I am not allergic or intolerant to seafood's.

I agree to participate in the study as outlined to me.

Name: _____

Signature: _____

Date: _____

5.2 October 2015 Frozen Pearl Meat Shelf Life Sensory Evaluation Form

Panellist Number: _____ Date: _____

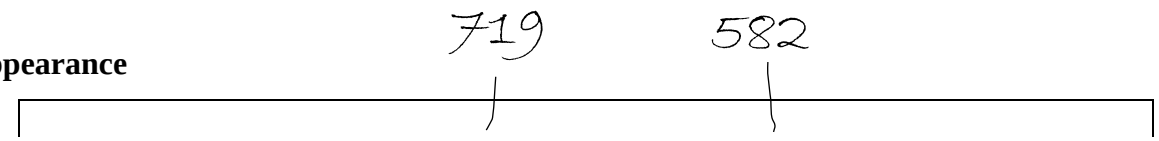
Sensory Evaluation Questionnaire

Please read all instructions before filling in this questionnaire and before tasting any samples. You will taste 6 samples today. The 1st plate will have 3 sashimi samples of pearl meat.

Please observe and taste the samples from left to right. Use the accompanying line scale according to your preference of appearance, odour, texture, flavour and overall acceptability by writing their code number (e.g. 152) on the appropriate section of the line scale. Please rate and label sample provided on the same line scale as demonstrated below. Take a sip of water and a bite of the cracker after each sample.

For example:

Appearance



Dislike extremely Like extremely

When you have evaluated the samples on the 1st plate, please press the button to receive the final plate. The 2nd plate will have 3 cooked samples of pearl meat. Please rate the preference of the appearance, odour, texture, flavour and overall acceptability following the instructions above. Please rate these samples on the line scale provided on page 3.

Sashimi

Appearance

Dislike extremely — Like extremely

Odour

Dislike extremely — Like extremely

Texture

Dislike extremely — Like extremely

Flavour

Dislike extremely — Like extremely

Overall Acceptability

Dislike extremely — Like extremely

Please provide any other comments:

_____

_____

_____

_____

_____

Please press the button to receive the next samples

Cooked

Appearance

Dislike extremely — Like extremely

Odour

Dislike extremely — Like extremely

Texture

Dislike extremely — Like extremely

Flavour

Dislike extremely — Like extremely

Overall Acceptability

Dislike extremely — Like extremely

Please provide any other comments:

_____

_____

_____

_____

_____

_____

Thank you for participating

5.3 Panellist Recruitment Poster April 2016

CESSH
CENTRE OF EXCELLENCE
SCIENCE SEAFOOD HEALTH

Curtin University

Did you know that pearls are harvested from oysters which contain an edible delicacy?

Now it's your chance to try it!

The aim of this project is to evaluate the effect of post harvest methods on quality. Participants are invited to take part in a sensory panel to evaluate the appearance, texture, flavour of sashimi and/or cooked pearl meat.

If you not allergic to seafood, would love to try something new and are available for up to 10 minutes, please contact Kerri Choo at **k.choo@curtin.edu.au** or **9266 7782.**

The session will be held in Building 400, Level 1 on:

Wednesday 13th April 10-2pm

This project has ethics approval RD33-13 .

5.4 Pearl Meat Sensory Evaluation April 2016 Informed Consent Form

Information Sheet

The aim of this research project is to determine acceptability of pearl meat adductor muscle from *Pinctada maxima*, in a sashimi and cooked format. Panellists can choose to taste the samples in either format.

The sensory focus group will be carried out within Building 400 Level 1, Sensory Laboratory. The whole process will be carried out by Centre of Excellence Science, Seafood and Health (CESSH) staff and students under the supervision of Dr Janet Howieson. The panellists will be asked to taste up to 6 samples and rank them based on their preference. The time required for each panellist taste will be approximately 10 minutes. All recruited panellist will be allowed to taste, except those with seafood allergies and intolerance.

To participate in this study is completely voluntary. Any participant is free to withdraw from this evaluation at any time with no negative consequences or prejudice. All personal information from the panellists will not be identifiable and stored with all data obtained from this study in a secure location within the CESSH, Curtin University for a period of 7 years. All the electronic data will be stored in the secure network within Curtin University.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number RD 33-13. Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

CONTACT DETAILS

Dr. Janet Howieson
7 Parker Place, Technology Park.
Phone: 9266 2034/ 0423 840 957
Email: j.howieson@curtin.edu.au

Product Sensory Evaluation Panel Consent Form

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- I have been given opportunity to ask questions
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- I declare that I am not allergic or intolerant to seafood's.

I agree to participate in the study as outlined to me.

Name: _____

Signature: _____

Date: _____

5.5 April 2016 Frozen Pearl Meat Shelf Life Sensory Evaluation Form

Panellist Number: _____ Date: _____

Sensory Evaluation Questionnaire

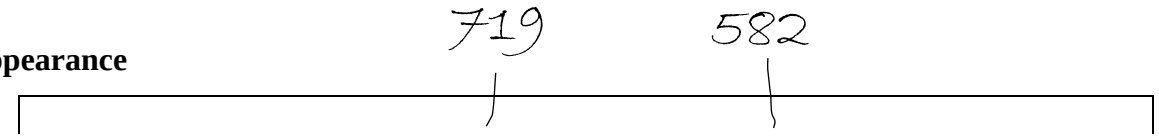
Please read all instructions before filling in this questionnaire and before tasting any samples.

You will taste 6 samples today. The 1st plate will have 3 sashimi samples of pearl meat.

Please observe and taste the samples from left to right. Use the accompanying line scale according to your preference of appearance, odour, texture, flavour and overall acceptability by writing their code number (e.g. 719, 582) on the appropriate section of the line scale. Please rate and label sample provided on the same line scale as demonstrated below. Take a sip of water and a bite of the cracker after each sample.

For example:

Appearance



When you have evaluated the samples on the 1st plate, please press the button to receive the final plate. The 2nd plate will have 3 cooked samples of pearl meat. Please rate the preference of the appearance, odour, texture, flavour and overall acceptability following the instructions above. Please rate these samples on the line scale provided on page 3.

Sashimi

Appearance

Dislike extremely — Like extremely

Odour

Dislike extremely — Like extremely

Texture

Dislike extremely — Like extremely

Flavour

Dislike extremely — Like extremely

Overall Acceptability

Dislike extremely — Like extremely

Please provide any other comments:

Please press the button to receive the next samples

Cooked

Appearance

Dislike extremely — Like extremely

Odour

Dislike extremely — Like extremely

Texture

Dislike extremely — Like extremely

Flavour

Dislike extremely — Like extremely

Overall Acceptability

Dislike extremely — Like extremely

Please provide any other comments:

_____

_____

_____

_____

_____

_____

Thank you for participating!