Accelerated New Product Development Blue Swimmer Crab Pilot

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PROJECT OBJECTIVES:

1. Develop at least two processed crab products ready for large scale production.
2. Pilot of an innovative new accelerated product development methodology

OUTCOMES ACHIEVED

a. Abacus crab cakes successfully launched on market.
b. Abacus bisque piloted on commercial market.
c. New accelerated seafood product development methodology developed, implemented and evaluated.

LIST OF OUTPUTS PRODUCED

1. Commercially produced Abacus Crab cakes.
2. Commercially produced Abacus bisque.
3. Four other crab value added products close to commercial production.
4. Crab Cake Specification Sheet.
5. Industry User Guide for Accelerated Product Development.
6. Magazine articles and conference presentations

NON – TECHNICAL SUMMARY

This report summarises the outputs and outcomes of the Seafood CRC project: 2010/706 Accelerated Product Development: Blue Swimmer Crab Pilot. The project industry partner was Abacus Fisheries, an integrated fishing company located in Carnarvon Western Australia and involved in the catching, processing and marketing of blue swimmer crab products. The aim of the project was to develop a new series of value added Abacus crab products that have been researched, developed, costed, branded and trialled in the marketplace prior to further large financial commitment to facilitate production. This new accelerated product development methodology, building the products from desk-top to cook-top, and improving the likelihood of market success prior to large scale production, represented an innovative approach to seafood product development in smaller businesses.

Initially and during a four day collaborative ideation process, an ideation team of up to 15 chefs and food service distributors resulted in identification of over 90 possible product concepts from the Abacus Fisheries base ingredients, cooking liquor, crab mince and premium crab meat. These concepts were reduced to 19 following analysis by the technical team against parameters such as marketability, ease of preparation, and production constraints at the Abacus factory. The 19 products were prepared by a professional chef and the ideation team reconvened to assess the products against a number of criteria including value for money, texture and general acceptability. This ideation/consultation process resulted in seven products being chosen for the next stage of the process.

Subsequently a commercial production trial for the seven products was conducted at a seafood processing facility in Brisbane. The trial utilised production methodologies, techniques, ingredients, recipes and packaging formats which would be applied to full scale production of the products. The products produced were assessed based on ability for cook top practices to be scaled to commercial production levels without impacting on product quality. As a result the test products were reduced to five: crab consommé, crab bisque, crab mousselline (presented as a boudin and timbale), crab rillette and crab cake were finalised in the commercial production trials. These products were also subjected to analyses for shelf-life, packaging options, production costings and nutritional composition. HACCP plans for the products were also commenced.

The next stage of the process was an extended, secondary round of consultation/product assessment through one on one chef meetings and exposure at a trade shows. Following assessment of the results from this secondary chef consultation, the test product concepts were reduced to two (crab cake and crab bisque) and commercial trials at the Abacus facility were conducted.

Following successful completion of the trials, and following factory modification to facilitate crab cake production, 16 palletts of crab cakes were produced (~288,000) and the product reached the market in September 2011. The crab bisque has also been market tested, but further production and marketing of this product is the subject of a commercial partnership between Abacus and Prestige Foods.

The accelerated product development methodology, loosely based on the stage gate methodology for new product development has been shown to be an alternative and feasible approach for new product development in the seafood industry.

1. Introduction

Product innovation is a necessity in competitive food markets,[1] especially in the context of today"s global markets and consumers" increasing influence in the food chain.[2] However, new product development (NPD) is a risky undertaking;[3-4] a high proportion of new food products developed never make it to market, and approximately 50 % of those that do are „dead" within a year.[5] Consumer-driven NPD has been explored as a strategy to address the market uncertainties within the food industry;[6-7] however, this approach has been criticised because it does not address the role of other stakeholders in the food chain, such as producers, suppliers and retailers.[2]

Seafood NPD faces specific challenges. The seafood industry operates in a highly differentiated market environment where raw material supply can be volatile and tightly regulated,[8] and a more integrated global market has led to more intensive competition.[9] In Australia, exports have become a necessity in a saturated domestic market, whilst at the same time the seafood industry is competing with more financially attractive industries and is struggling to attract and retain human resources.[10] Furthermore, the sector faces difficulties raising finance to expand or diversify.[11] Australian consumer surveys have shown, however, that ready-to-eat seafood meal options, based on Australian product, are gaining in popularity;[12] this represents a value-adding opportunity for Australian seafood businesses. The Stage-Gate® process is a conceptual and operational map designed to move new product projects from idea to launch and beyond.[13] The model consists of a series of stages – designed to gather information – and gates or decision points (Figure 1); it begins with an ideation stage and ends with a post-launch review.[13] Although the Stage-Gate® approach has successfully been applied in other food industry sectors,[14] there is limited literature on the application of the model to the seafood industry.[4] Altintzoglou and colleagues used qualitative data on barriers to seafood consumption obtained through focus groups as input for a Stage-Gate® approach to inspire the development of new seafood concepts [4] which were subsequently tested by consumers.[15] This report describes an example of expert-led seafood NPD based on a modified Stage-Gate® model and developed in partnership with a seafood company, Abacus Fisheries.

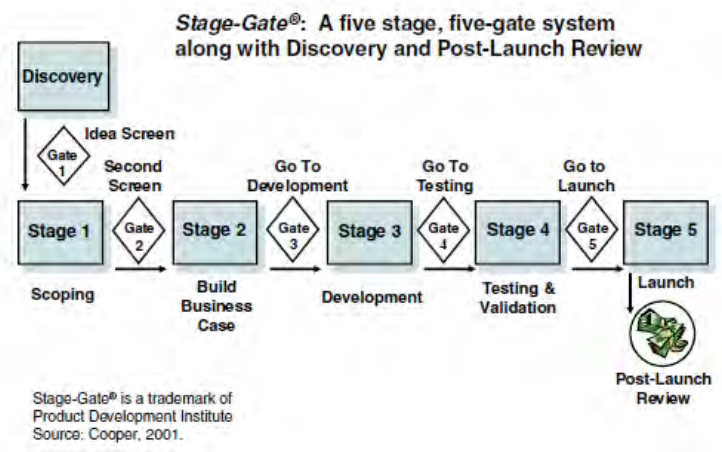

Figure 1 Stage-Gate® model Source: Cooper.[13]

Abacus Fisheries (Abacus) is a vertically-integrated crab catching, processing and marketing business based in Carnarvon, Western Australia. Abacus produces a range of products including whole raw and cooked blue swimmer crab (*Portunus armatus*), and various frozen crab meat products. Abacus operate a fleet of day-boats which fish in the World Heritage-listed waters off Shark Bay.[16] Crabs are returned to the processing factory alive, and they are then cooked and frozen, as the distance from market (approximately 1,000km) precludes transporting the product fresh.

Abacus has previously undertaken preliminary market and product development research to extend its blue swimmer crab product range; this resulted in the utilisation of excess product and production waste to produce a crab mornay and a crab stock. However, these products had limited success in the marketplace.

This project aimed to build on the preliminary product development work undertaken by Abacus and develop at least two crab products that have been researched, developed, costed, branded and trialled in the marketplace, hence providing an informed basis for the large financial commitment necessary to facilitate production of value-added products.

1.1. Need

Commonly, the success of new product development for the seafood industry has been hindered by the business needing to commit significant financial outlay for production despite uncertainties of the marketability of the product The innovative product development and marketing methodology based on the stage gate approach developed and piloted in this project aimed to decrease the risk in value added seafood product development. The method involved all of the participants in the supply chain, from manufacturer to consumer, working together for a short, intense period of product "ideation" and development before developing the agreed product concept. The process exploited the natural entrepreneurialism of staff at Abacus Fisheries, plus experts brought in to assist. The successful technique may now be transferred to other seafood sectors, increasing the chance of success of developing economically viable value-added seafood products.

1.2. Objectives

1. Develop at least two processed crab products ready for large scale production.
2. Pilot of an innovative new accelerated product development methodology

2. Methods

The methods for the project are divided into different phases, based on a modification of the stage gate approach for new product development (see Figure 1).

The stages as described in this project were

Phase 1: Ideation (Discovery/scoping) including Phase 1A preparation and Phase 1B Ideation)
Phase 2: Commence Building business case
Phase 3: Development/Feasibility for Commercial Production
Phase 4: Testing and validation (secondary end-user consultation)
Phase 5: Launch

Ethics approval was required as the investigation involved the participation of humans. Ethics Form C was submitted to Curtin University and approved (approval number RD-03-11).

2.1. Phase 1: Ideation (Discovery/Scoping)

2.1.1. Phase 1a: Preparation

Facilitator

The facilitator for the ideation process was John Susman, Fisheads Strategy.

Venue

The venue for the ideation process was Blanco Restaurant, 5 – 9a Roslyn St, Potts Point, Sydney – New South Wales
This venue was selected as it provided facilities for the discussion and assessment of the ingredients and the developed products. As the facility is also a commercial restaurant, a full commercial kitchen was available for the development and testing of the concepts

Project Teams

Two teams of foodservice and retail industry professionals were recruited to participate in the ideation process.
The first, the "technical" team, comprised stakeholders from the catching, processing, end-user and academic sectors; the second "ideation" team, comprised stakeholders from the end-user and retailer community, including chefs, restaurateurs, purchasing managers and menu designers.
The team members are described below.

Technical

1. Peter Jecks – Abacus Fisheries
2. John Susman – Fisheads Seafood Strategy
3. Diana Thomson – Fisheads Seafood Strategy – Company Chef
4. Roger Graf – Shells – Value Added Seafood Manufacturer
5. Grant Stinson – Flavour House - NewlyWeds
6. Kerry Choo – Curtin University – Research Assistant

7. Janet Howieson – Curtin University – Project Manager.

Ideation

1. Kate Barker – Rockpool Group – Development Chef
2. Roger Barstow – Qantas In flight Services – Global Development Chef – First and Business Class
3. Peter Morgan Jones – Trippas White Catering – Group Executive Chef
4. John Ross – Rooty Hill RSL – Group Executive Chef
5. Simon McNamara – Executive Chef – Canterbury Leagues Club Group
6. Vicky Fimognari – Daily Fresh Wholesalers – General Manager – Frozen and Value Added Foods
7. Terry Nishihari – Japanese Restaurant Group – Jurin – Executive Chef
8. Narito Ishii – Neptune Wellstone – Specialist Asian Wholesalers
9. Martin Teplitsky – Consultant Chef – Conran Restaurant Group – London
10. Peter Weisburger –Executive Chef – Westin Hotels
11. Scott Mason Hails – Chef Patron – Blanco Restaurant
12. Anthony Mercer – Head Buyer – DeCosti Seafood – Retail Division

Preparation of Background Summary

A background summary was developed which included background on the primary production operation, summary of products currently available and summary of the base ingredients to form the basis for any further value added product development.

2.1.2. Phase 1b Ideation

Initially the raw ingredients produced by Abacus were assessed and an open forum discussion allowed for cross discussion and idea development, between sectors and stakeholders in the industry. The raw materials were crab mince, crab stock (from the crab cooking water) and premium crab meat.
Following this initial assessment, a forum was held to discuss the prospects for these raw materials. Initially, the forum was conducted as a group to determine key product concept areas. Sub groups were then created comprising of team members from different disciplines. These smaller groups were then presented with the same ingredients and requested to develop ten ideas per ingredient and ten ideas combining the ingredients.
All ideas were then aggregated in a final group session.

2.2. Phase 2: Commence Building Business Case

Product concepts/ideas were captured and then assessed for their technical production and commercial opportunities/viability by the technical team. This included an assessment of the potential production costs of the product. Following this technical team assessment a reduced number of the product concepts/ideas were chosen to be further assessed for their potential commercial, culinary and production capabilities.

Subsequently an executive chef prepared the concepts and re-presented these dishes to the ideation team for sensory, culinary and commercial assessment. An initial costing was also completed at this stage.

Figure 2 is an example of the assessment form.

Product Number:

How would you describe this product:

This product will cost ____, how likely are you to purchase this product

Figure 2 Example of ideation team product assessment form

The results of the sensory, culinary and commercial assessments were assessed and products to be taken to Phase Three were selected.

2.3. Phase 3: Development/Feasibility for Commercial Production

Commercial recipes, developed from the final Phase Two concepts were reproduced by the team on-site at Creative Cuisine, a commercial seafood processing facility in Brisbane.

Products were rendered into industrial recipes and produced using the industrial equipment, ingredients and processes which would be used going into full production. The products were re-assessed by the technical panel for flavour, texture, form and packaging.

2.3.1. Project Team

1. Di Thompson – Fisheads Seafood Strategy
2. Kerri Choo – Curtin University
3. Rodger Graf – Creative Cuisine
4. Darryl Holioke – Creative Cuisine
5. John Susman – Fisheads Seafood Strategy
6. Peter Jecks – Abacus Crab
7. Janet Howieson – Curtin University

2.3.2. Preparation

Prior to commencement of the commercial trials the following were documented.

- The recipe formulation and production method for each of the benchmark products
- The ingredients and equipment required for trials were specified, sourced and prepared
- The following documents were prepared and circulated
    - Original formulations and methods
    - Culinary and commercial criteria that needed to be met for each product
    - Possible changes that could be tried for each of the products
    - Reporting documents for each product to capture any ingredient, formulation or methodology changes
- Protocols, running schedules and production planning for each day were determined prior to the trials.
- Packaging and labelling options were also discussed and forwarded.

2.3.3. Product Testing

Commercially produced products from Phase Three were tested for the following parameters at accredited commercial laboratories.

- Microbiological shelf-life test to determine use by date.
    - *Total Plate Count*
    - *Salmonella*
    - *Staphylococci*
- Nutritional Composition (NUTTAB followed by testing)
- Allergens

Sensory shelf-life testing was completed at the Curtin University Food Science Laboratories.

2.4. Phase 4: Testing and Validation (Secondary End-User Consultation)

In this phase commercially produced products resulting from Phase Three were reassessed by end-users.

2.4.1. Instruments for Data Collection

The data collection instruments used for the secondary consultation phase were designed to assess the sensory aspects of the products and to understand how the market would prefer to receive the product. Draft copies of the data collection instruments were forwarded onto the technical panel for review. The instruments were then modified based on the feedback from the technical panel. The following data collection instruments were developed.

2.4.2. Information Forms

Prior to commencing the questionnaire, the participants were required to fill in two forms. The first was an Informed Consent Form (see Appendix 2: Instruments for data collection – Informed Consent Form) which participants had to sign stating they understood the conditions of the project and what they were taking part in. The second was a panellist information sheet (Appendix 3: Panellist Information Form) which asked general questions about where the establishment, job title and contact details. This information was to be used to segment the panellists.

2.4.3. Sensory Analysis Forms

Sensory analysis was conducted to assess each product in terms of appearance, aroma, flavour, texture and overall acceptability. As the products were being accessed on acceptability, the method used was acceptance testing using a rating scale[17]. Line rating scales used in phase one of this project were used for the sensory analysis of the six products (see Figure 2). Line scales are an example of a continuous scale allowing amongst the responses an unlimited fineness of differentiation responses [18].The panellists placed a vertical line on the 10 cm line rating scale which was anchored by the two extremes (dislike extremely and like extremely). The vertical line corresponded with how acceptable they thought each product was for each of the five sensory attributes (for assessment forms see Appendix 4: Chef One on One Interview Questionnaires (one on one chef consultation) and 5 (restaurant fair consultation).

2.4.4. Market Research Forms

Market research consultation was also completed. Relevant forms are shown in Appendix 4: Chef One on One Interview Questionnaires (one on one chef consultation) and 5 (restaurant fair consultation).

Costings

A more informed cost of each product (from the Phase 1 estimate) for the end user was determined by the technical team using CALCMENU. This costing included ingredients and packaging costs, productions costs, marketing costs and a markup of 20 %. The approximate costings for the different products are shown in Appendix 7- Product Costings. These

costings were used as the basis for the possible responses panellists" could give to the following question: „How much are you willing to pay for a portion of this product?" The interviewees were given five possible responses ranging from prices lower and higher than the actual product cost. The responses to this question would determine price points for the product.

Usage

Two further questions that would indicate how much potential there is for the product to be successful in the market place were: How likely are you to purchase the product? And how applicable is this product to your business?

A five point hedonic purchase intent scale[19] was used as the answer key for the above questions.

Optimised packaging and portion sizes

Interviewees were asked to give an opinion which would potentially shape the final/ end products presentation on the market. Questions included were: how they would use the product, reasonable portion sizes and preferred packaging type and volume. The options for preferred packaging type were based upon packaging material available and formats currently used in the market.

Additional comments

At the end of each questionnaire was a section for additional comments regarding any other feedback the interviewees had which did not fit into the other sections.

2.4.5. Developing Interview Protocols

The interview process was standardised such that the results could be compared when different people conducted the interviews. The following documents/protocols were developed to ensure a consistent approach to the interviews was followed.

Ethics approval was required before the consultations could commence, as the investigation involved the participation of humans. Ethics Form C was submitted to Curtin University and approved (approval number RD-03-11).

User Guides

Draft user guides were developed for each product and summarised the following aspects of the products:

- product description
- serving suggestions
- menu suggestions
- details (cost to end user, ingredient list, allergens, shelf life, storage)

Draft user guides are shown in Appendix 7: Draft Product User Guides.

2.4.6. Protocols

A uniform interview protocol was developed. The protocol not only included the interview format but also the equipment and products that were required to present the products to the interviewees. Copies of the protocol are available in Appendix 8: Interview Protocols.

2.4.7. Training

A day long training session was conducted at a restaurant kitchen in Sydney for the people chosen to conduct the interviews. The session included a briefing on how to prepare and serve up the products for the consultations, going through the interview protocol and conducting trial runs of the interview to a chef.

2.4.8. Consultation Recruitment

Two types of interviews were planned: Chef one-on-one interviews and interviews with participants at a trade show (Restaurant Fair) held in Sydney at Royal Hall of Industries.

2.4.9. Chef One-On-One Interviews

A database of several different clubs, pubs, caterers and resorts located in Sydney, Melbourne, Brisbane and Perth was devised with an aim to conduct 20 chef interviews in each city (Appendix 9: Creative Team Assessment of Product Concepts Assessment Staff). The different businesses would be called with the anticipation that 60 % of those asked would volunteer their time to take part in the interview. If they agreed to take part, a time would be scheduled for one of the interviewers to come to the businesses kitchen to conduct the 30 minute interview. When setting up the interview, the interviewer had to determine what equipment was available for the preparation of the products for each interview.

2.4.10. Restaurant Show 2010

The Restaurant Show is an annual trade event held over two days in Sydney, Australia. Food and wine producers and kitchen equipment suppliers showcase their products at the event which attracts a high volume of food service professionals.

A stand was developed at the Restaurant Fair to facilitate conducting the interviews. The stand included cooking and storage facilities for the products. The display was set up to be welcoming to the visitors. A display fridge was set up with all six products neatly presented as some of the serving suggestions stated in the user guides.

A professional chef was hired to prepare all the products for the interviews as product consistency is a very important factor that must be controlled to ensure results were valid. A

food preparation station was set up on one side of the stand/booth with the rest of the space available to conduct the interviews.

A member of the technical team was positioned in front of the stand to recruit visitors of the Restaurant Show to volunteer their time to fill in the questionnaire. Within the stand there were interviewers conducting the interviews.

Figure 3 Abacus Fisheries/ CESSH Display at Restaurant Show 2010

2.4.11. Sample Size

The testing at the Restaurant Show was classified as a „central location". According to Meilgaard, Civille and Carr [19] a minimum of 50- 100 people are required to take part in consumer panel. However with the use of consumer panellists, the sample size should be increased to compensate for the expected higher variability attributable to test environment limitations and the consumers inexperience [20].

In determining the sample size required for the Restaurant Show product analysis, power was an important factor influencing the final sample size [21]. As the number of participants increases, the power increases [21].

Based on the „total sample size needed to detect effects at alpha =0.05, two-tailed" table in Christensen [21], the minimum number of panellists required to take part in the sensory analysis of the products to produce results with a power equal to 0.95 and an effect size 0.50, is 46 panellists per product.

2.4.12. Perth Chef event

An event held in Perth on 5 may 2011 was subject to similar analyses as the Restaurant Fair but only the crab cake was showcased.

2.4.13. Analyses of Results

Statistical analysis on the sensory and market research data was conducted using SPSS 17.0.

2.5. Phase 5: Production and Launch

A launch phase was planned and implemented.

3. Results

3.1. Phase 1: Ideation (Discovery/Scoping)

The summary of the four day ideation process is below.

3.1.1. Day 1 Preparation

Day one focussed on the ideation team reviewing the current status of the Abacus programme including getting an understanding for the market metrics, uses and issues facing the Abacus range. Presentations were made by John Susman and Peter Jecks to introduce the combined teams to the aims, objectives and desired outcomes for the ideation programme. A background to the Abacus fishery was delivered, – including the provenance and history of the fishery, current production and processing issues; and desired outcomes from the project. A tasting of the raw ingredients (crab stock, mince and premium meat) was conducted, followed by an assessment of some existing benchmark products from within the category. The outcome of day one was to confirm with the technical and creative teams, the opportunities and limitations of the investigation; along with a clarification of the desired outcomes.

The creative team members were provided with samples of the ingredients to take with them for further independent consideration.

Agenda for day one

- Project overview
- Project aims
- Abacus operation – current
- Fishery background
- Existing Abacus products
- SWOT by existing products
- SWOT of Abacus facilities, resources, capabilities
- Evaluation of existing product
    - Meat
    - Mince
    - Stock
    - Shell
    - Mornay
    - Review of existing products from within the value added seafood category

3.1.2. Day Two-Concept Ideation

Day two saw both the Teclmical team and the Creative Teams considering the cwrent base ingredients and how they might be used to create further value added ingredients and items for food service and retail application. Both teams were involved in an initial ideation of products into specific categories (for some participants see Figure 4).

Figure 4 Ideation session

The creative team were then split into groups for the development of specific concepts. All of these concepts were presented to the entire panel and filtration of the initial ideas was conducted, with both the technical and creative teams combining to eliminate products which could not readily be developed.

From the ideation process a total of 92 product concepts were developed (Figure 5).

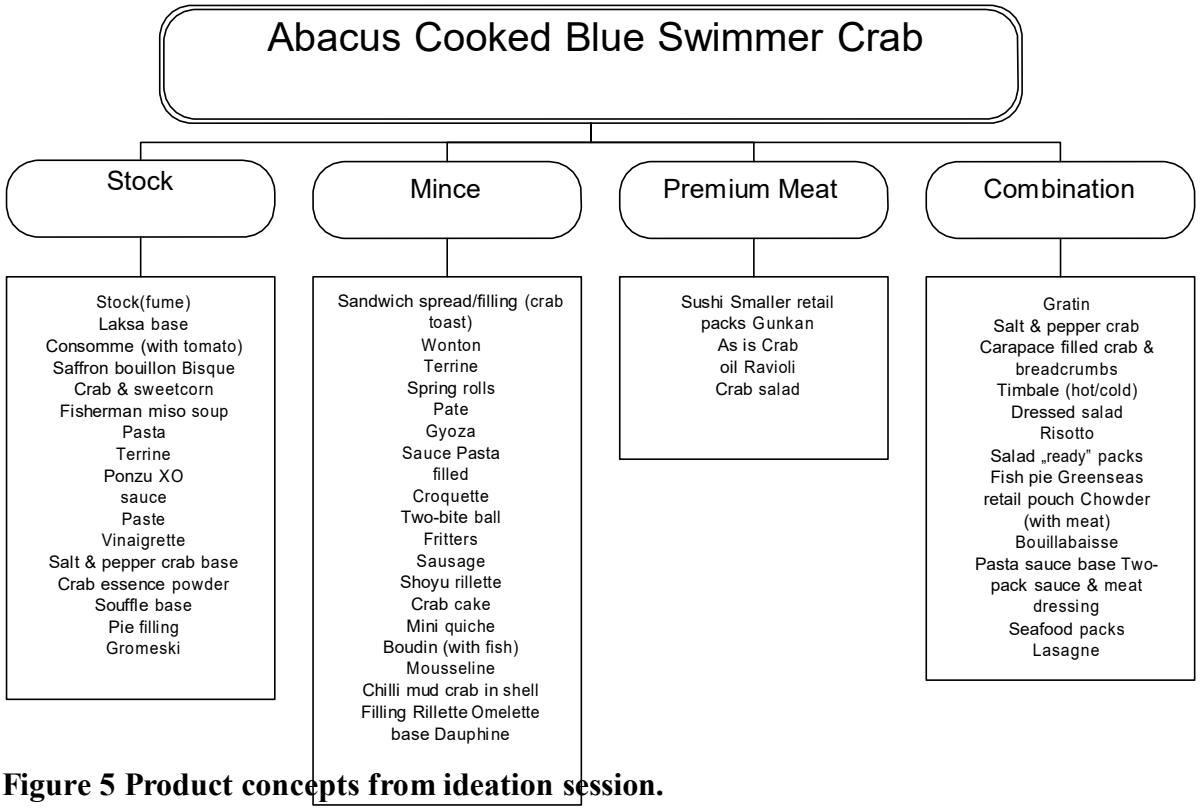

Figure 5 Product concepts from ideation session.

Agenda for day 2

- Review of project aim – review of current Abacus situation
- Review of ideation programme and approach, including culinary, commercial and production requirements
- Re introduction of base Abacus products – whole crab, meat, mice, stock, shell, fat, mornay
- Tasting of existing Abacus base products
- Introduction of predeveloped products by Fisheads Chef, Di Thomson
    - Soup/stock
    - Bisque
    - Croquette
    - Rillette
- Review of „ideation criteria"
    - Marketability – foodservice, retail
    - Viability – production, technical, food safety
- Brainstorming session of prospective concepts

3.2. Phase 2: Commence Building Business Case

3.2.1. Day Three Technical Assessment of Concepts

On completion of the Day Two ideation session, the technical team reviewed the 92 concepts against pre-determined criteria such as feasibility of production and distribution from Abacus Carnarvon facility, market pressures, etc. On completion of the filtration session, concepts were reduced to 15 items (Figure 6).

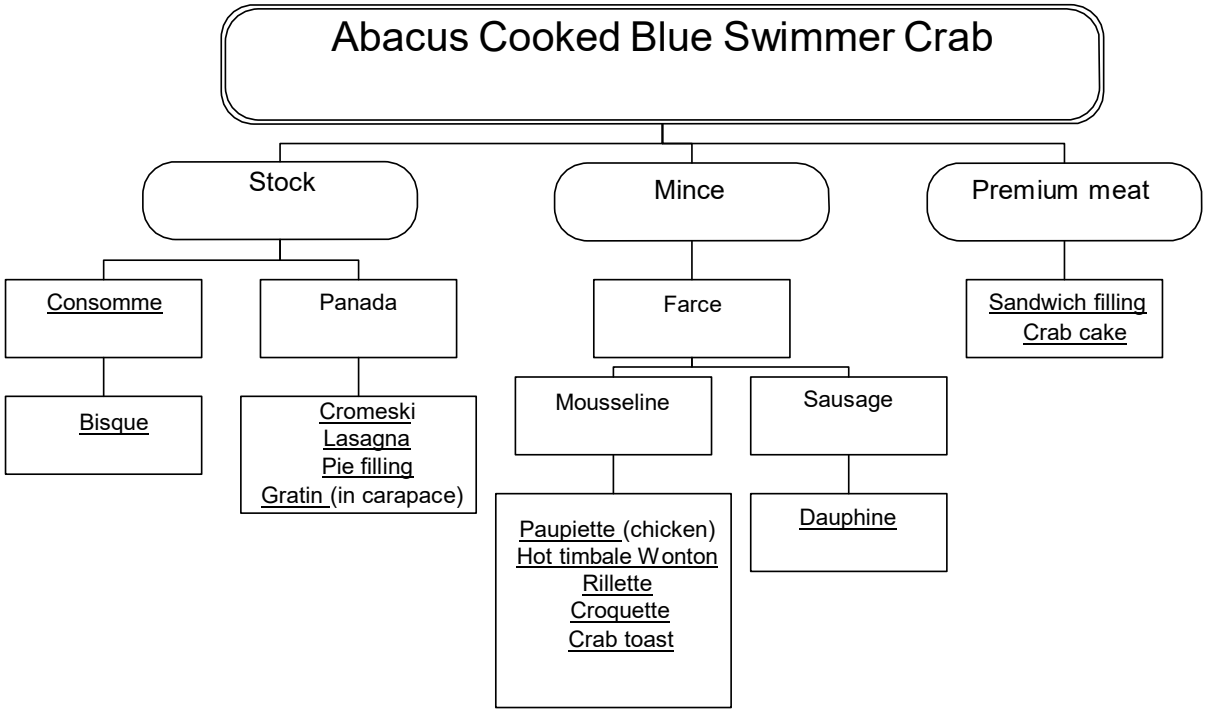

Figure 6 Fifteen concepts chosen for culinary assessment

Day three saw the concepts from the day two ideation, rendered into products produced by a professional chef, in line with the flavour, texture and commercial parameters developed by the ideation panel in day 2.

Whilst the chefs prepared the working samples, the technical team concurrently undertook a packaging and product benchmarking exercise for each of the 15 concepts.

Agenda for day 3

- Fisheads kitchen team commenced production of concepts
- Technical team reviewed prospective products
- Technical team reviewed competitive benchmarking product
    - By product
    - By price
    - By packaging
    - By channel to market

3.2.2. Day Four - Tasting Review And Summary Session

Day four included the full creative and technical teams tasting the range of 15 concepts which had been filtered from the initial 92 concepts developed from the ideation. Assessment of the products was conducted using a hedonic testing system, whereby the samples were considered by the individual panellists, based on their individual preference and liking. Further, the products were assessed to define pricing commercial characteristics. Examples of the forms used for the assessment are shown in Figure 2.
As the panellists were chosen for their breadth of skills and knowledge from across various market sectors, it was considered the outcome of the assessment process was reflective of the target commercial market.

Agenda for day 4

- Prospect dishes presented individually – recipe, production methodology explained
- Prospect dishes reviewed against commercial and culinary benchmarks
- Prospect dishes eliminated and range reduced to seven for further development

Discussion in regards to successful prospect dish form, packaging and target pricing
The 15 products assessed were Consumme, Bisque, Crab and Corn Soup, Bisque (Market Pride),Chowder (Market Pride), Cromeski, Croquette, Dauphine, Crab Cake, Rodger‟s Crab Cake, Lasagne, Gratin, Crab Pie, Riuette, Sandwich Filling, Crab Toast, Wonton, Filled Chicken, Hot Timbale. In addition assessments were also completed for four commercially available crab products (bisque, chowder, crab and corn soup, crab cake). Each product concept was assessed by 11 panellists.

The results of the assessments are show in Table 1. It is noteworthy that the commercially available products scored lower than the „new‟ products. Of the “new” products the crab wonton obtained the highest mean score for the attribute of aroma (77.45), followed by the US-style crab cake (76.91), and the crab toast (71.55). In terms of flavour, the bisque obtained the highest score (79.09), followed by the hot timbale (76.73) and the rillette (75.18). The consommé scored highest in texture (79.18), and was followed by the bisque (72.91) and the toast and hot timbale (71.82). The bisque was ranked first in terms of overall acceptability (79.00), while the hot timbale was ranked second (74.09) and the wonton third (73.09). Finally, bisque and hot timbale were ranked first in terms of value (72.82), and were followed by the wonton (67.18) and the consommé (65.55).

Table 1 Sensory and value assessment of 19 concept products

Product concept	Sensory attributes				Value
	Aroma (mean(SD))	Flavour (mean(SD))	Texture (mean(SD))	Overall acceptability (mean(SD))	
Bisque	70.82 (17.79)	**79.09** (10.25)	**72.91** (14.92)	**79.00** (10.05)	**72.82** (17.78)
Bisque (Market pride)*	50.00 (28.90)	43.36 (27.78)	40.36 (23.38)	41.91 (26.35)	34.00 (27.19)
Chowder (Market pride)*	60.91 (26.77)	56.27 (25.90)	52.27 (31.19)	54.91 (28.93)	47.82 (31.62)
Consommé	62.64 (12.93)	70.73 (15.17)	**79.18** (13.66)	70.60 (13.16)	**65.55** (20.31)
Crab and corn soup*	64.18 (28.62)	48.64 (29.33)	52.36 (25.80)	52.64 (27.88)	45.18 (28.16)
Crab pie	63.36 (13.98)	51.55 (16.81)	59.82 (19.19)	61.55 (15.26)	51.27 (14.62)
Crab toast	**71.55** (14.07)	65.36 (20.58)	**71.82** (12.91)	68.55 (16.71)	60.82 (23.65)
Cromeski	57.09 (17.03)	59.55 (20.93)	57.27 (23.28)	58.73 (20.44)	46.18 (21.51)
Croquette	58.36 (19.51)	36.73 (24.57)	49.45 (17.63)	41.73 (20.88)	29.73 (23.59)
Dauphine	62.00 (12.43)	53.73 (22.43)	55.73 (15.96)	57.27 (16.46)	51.73 (26.18)
Filled chicken (paupiette)	57.82 (19.84)	44.55 (20.22)	45.82 (20.36)	49.27 (21.79)	54.45 (26.48)
Gratin (in carapace)	60.64 (22.51)	54.00 (13.48)	40.55 (20.22)	53.73 (11.69)	40.55 (10.29)
Hot timbale	70.36 (17.71)	**76.73** (12.35)	**71.82** (12.86)	**74.09** (13.05)	**72.82** (16.67)
Lasagne	67.27 (19.42)	62.27 (24.72)	64.27 (22.42)	64.73 (20.41)	53.45 (21.82)
Rillette	69.64 (8.03)	**75.18** (8.13)	71.55 (10.27)	71.45 (4.87)	64.18 (23.67)
Rodger"s crab cake*	64.36 (15.49)	61.45 (14.40)	66.82 (16.02)	67.00 (14.03)	54.00 (22.18)
Sandwich filling	68.18 (17.87)	69.27 (18.19)	67.45 (21.28)	67.91 (18.49)	55.55 (25.20)
US crab cake	**76.91** (9.52)	66.36 (20.73)	71.00 (18.59)	67.91 (17.62)	50.73 (15.53)
Wonton	**77.45** (10.37)	73.82 (9.88)	71.27 (17.38)	**73.09** (10.91)	**67.18** (8.67)

* Commercially available products included for comparison. Bold: highest scoring products. Full results including photos of products and summary of general comments can be seen in Appendix 9: Creative Team Assessment of Product Concepts Assessment Staff.

The seven products selected to progress through to the next stage were: bisque; consommé; hot timbale; rillettes; sandwich filling; US-style crab cake; and wonton. The crab toast, despite ranking highly in the sensory assessment, was not progressed as this product was not considered to be suitable for production and packaging at the Abacus facility.

3.3. Phase 3: Development/Feasibility for Commercial Production

In Phase Three the seven chosen concepts were produced in four days of commercial production trials at Creative Cuisine in Brisbane. The recipe formulations, as appropriate are shown in Appendix 10: Product Formulations.

3.3.1. Trials at Processing Facility

Preparations for the Phase Three trials included

- Determine production order
- Determine yield expectations
- Develop (with small volume) the initial commercial production products. Review these products for potential improvement in the areas of cost, structure, texture, flavour.
- Consider packaging options for use in trials and the optimal storage conditions for the products.
- Technical team to gain familiarity with factory protocols etc, equipment and ingredients.

Once production trials commenced products were assessed by the technical team for sensory and physical attributes when compared to the benchmark product (saved from Ideation trials). Any unresolved issues were noted. These included changes to the processing steps and addition of additives, adding or removing certain ingredients, replacing ingredients, different packaging types. Once changes had been made and noted, the next trial commenced. This process continued until the product produced satisfied the desired product criteria. Each product from each trial was packaged appropriately and labelled. They were all stored in the appropriate conditions and kept for future reference.

On Day Three the full technical team assembled to assess each of the seven final products according to sensory and physical attributes. At the conclusion of the tasting session, a frank discussion regarding the culinary and commercial aspects of all products was made. The feedback from the tasting session was taken into account and retrials were conducted on the products that had outstanding culinary/commercial issues. Successful products were packaged and labelled appropriately, ready for shelf life and other testing. The shelf life testing protocol for each product was then devised. Costings for each product including ingredients, overhead and packaging were entered into CALCMENU to determine how much it would cost to produce each product.

Finally the technical team critically assessed each of the products based on costings, viability, ingredient sourcing, marketability and usage. The products to be taken forward to

Stage four were bisque, consommé, mousseline (presented as timbale and boudin), crab cake and rillettes.

3.3.2. Testing Of Product for Secondary Consultation Phase

The products to be taken forward: crab bisque, crab consommé, mousseline (presented as timbale and boudin), crab cake and crab rillette were subject to shelf-life testing. The results are summarised in Table 2 (with detailed results in Appendix 11: Product Shelf Life Testing results). Nutritional composition was also completed based on compositional analyses of the meat, mince and cooking liquor and use of NUTTAB[22]. These analyses are shown in Appendix 12: Nutritional Composition.

Table 2 Predicted microbiological and organoleptic product shelf life

Product	Estimated Microbiological Shelf Life		Estimated Organoleptic Shelf Life	
	Trial 1	Trial 2	Trial 1- products stored in fridge	Trial 2
Crab Bisque	60 Days	Not Tested (NT)	60 Days	NT
Crab Consommé	30 Days	NT	45 Days	NT
US Crab Cake	3 Days	NT	7 Days	NT
Crab Rillette	60 Days	NT	30-45 Days	NT
Crab Mousseline (timbale and boudin)	3 Days	NT	10 Days	NT

Products had short microbiological shelf-life due to *Listeria*, not present in later samples and removed by heating.

The volume of product required for the secondary consultations was determined by the technical team. The products for the consultations were produced over several days in Brisbane at the Creative Cuisines factory. The end products were assessed by the recipe developer and other members of the technical team to ensure the sensory attributes of each product met the high quality benchmarks set at the previous trials and complied with food safety standards. Products were stored at the factory under optimal storage conditions and agreed packaging formats (Table 3) until it was required for the consultations and trade show.

Table 3 Product storage conditions and packaging format for Phase Four products

Product	Storage conditions	Packaging Format
Crab Bisque	Freezer (<-18 °C)	Resealable Doy Pouch
Crab Consommé	Freezer (<-18 °C)	Resealable Doy Pouch
US Crab Cakes	Freezer (<-18 °C)	Thermoform Plastic Tray
Crab Timbale	Freezer (<-18 °C)	Dariole Mould with Lid
Crab Boudin	Freezer (<-18 °C)	Plastic Sausage Casing
Crab Rillette	Fridge (<4°C)	Glass Jar

The products were transported by air freight in foam eskies filled with bags of ice to interview locations in Melbourne (one on one interviews) and Sydney (for Restaurant Show) to arrive within 24 hours of dispatch from the factory.

3.4. Phase 4: Testing and Validation (Secondary End-User Consultation)

3.4.1. One on One Interviews with Melbourne Chefs

Fifteen chefs, owners and managers from pubs, clubs, resorts and catering businesses in Melbourne participated in the one on one interviews over the course of four days. These panellists were categorised into the group „Chef Interview".

3.4.2. Restaurant Show Interviewees

Products were assessed by attendees to a booth at Restaurant Fair 2010 (Figure 7).

Figure 7 Products on display at Restaurant Show

At the Restaurant Show, 129 people were interviewed, with participants coming from different sectors of the food service industry. Participants were grouped into 18 different position categories (Table 4). From the Restaurant Show, 75 of the participants were chefs, managers and/or owners. These panellists were categorized into the group „Rest Show".

Table 4 Restaurant Show participants' positions

	Position	Number of people
1	Executive/ Head Chef	10
2	All other chefs	22
3	Other Managers	15
4	Sales/ Marketing	6
5	Owner	12
6	Owner and Chef	6
7	Functions Manager	3
8	Restaurant Manager	2

9	F & B manager	5
10	Sales Manager	10
11	Media/ Writer	4
12	Wait/ bar staff	1
13	Director	10
14	Students	3
15	Educator/ trainer	5
16	Apprentice	2
17	Other	4
18	Not identified	9

The data was managed as one on one chef interviews, restaurant show participants and Restaurant show segment (chefs, owners and managers).

3.4.3. Sensory Analysis

Sensory analysis using hedonic assessments (Appendix 4: Chef One on One Interview Questionnaires and Appendix 5: Restaurant Show Questionnaires) of the six blue swimmer crab products was conducted to determine the ranking of the product. Each of the products was assessed based on the attributes of appearance, aroma, flavour, texture and overall acceptability. Statistical analysis using one-way ANOVA was conducted separately on the data collected from each of the three groups (chef interview, rest show and segment participants). The mean acceptability ratings for each product and each attribute were used to rank the products in order of highest acceptability rating to lowest acceptability rating for each of the three groups (Table 5).

The overall results clearly indicate the US crab cake was the most acceptable product with the highest mean acceptability rating for the five sensory attributes amongst all groups, followed by the crab bisque, crab timbale, crab consommé, crab rillette and crab boudin.

The results from the chef interview and restaurant show group indicate that all products were rated acceptable by the panellists, but there was a significant difference between the acceptability rankings for each attribute between the six products. The US crab cake was unanimously the most acceptable product for each sensory attribute, followed by the crab bisque, crab timbale, crab consommé, crab rillettes and crab boudin.

The results from the segment group were very similar to the results obtained from the other groups. The US crab cake was ranked the most acceptable product throughout all sensory attributes, followed by the crab bisque, crab timbale, crab consommé, crab boudin and crab rillettes.

A two sample t test was conducted on the acceptability rating scores between the chef network group and the segment group to determine if there was significant difference between the acceptability rating scores for each product. With a p value < 0.05 for each attributes, it was concluded there was a significant difference between the acceptability ratings for the chef network group and the segment group. Although there was a significant difference in mean acceptability ratings, after comparing the acceptability rankings for each

sensory attribute, the results showed the four highest rating products were ranked in the same order in both of the groups. As the putpose of the data analysis was to determine which three products rated the highest in acceptability ratings amongst the groups, the significant differences were not important as the product rankings were the same for the top three products (Appendix 13: STAGE 4 Sensory Analysis Statistics).

Table 5 Sensory analysis results- product rankings and mean acceptability ratings

Attribute		Rankings					
		1st	2nd	3rd	4th	5th	6th
Appearance	All Rest Show (n=129)	Crab cake (81.65)	Bisque (72.56)	Timbale (68.95)	Consommé (67.89)	Rillette (62.41)	Boudin (61.99)
	Segment (n=75)	Crab cake (81.30)	Bisque (71.78)	Consommé (69.51)	Timbale (67.18)	Rillette (62.04)	Boudin (61.59)
	Chef Interview (n=15)	Crab cake (70.57)	Bisque (59.67)	Consommé (52.20)	Timbale (50.20)	Boudin (40.87)	Rillette (38.36)
Aroma	Rest Show	Crab cake (78.99)	Bisque (73.48)	Timbale (69.56)	Consommé (65.55)	Boudin (63.80)	Rillette (59.73)
	Segment	Crab cake (79.19)	Bisque (73.43)	Timbale (68.72)	Consommé (67.07)	Boudin (65.10)	Rillette (60.57)
	Chef Interview	Crab cake (63.50)	Bisque (61.00)	Timbale (59.07)	Consommé (52.20)	Rillette (40.93)	Boudin (39.33)
Flavour	Rest Show	Crab cake (80.03)	Timbale (74.67)	Bisque (70.22)	Rillette (66.90)	Consommé (66.50)	Boudin (66.18)
	Segment	Crab cake (80.08)	Timbale (73.51)	Bisque (69.55)	Rillette (66.42)	Boudin (66.41)	Consommé (66.22)
	Chef Interview	Crab cake (66.64)	Bisque (61.67)	Timbale (59.07)	Consommé (56.13)	Rillette (40.93)	Boudin (39.33)
Texture	Rest Show	Crab cake (81.61)	Bisque (72.76)	Consommé (70.95)	Timbale (70.44)	Rillette (64.26)	Boudin (63.28)
	Segment	Crab cake (82.62)	Bisque (73.12)	Consommé (71.53)	Timbale (68.96)	Boudin (66.25)	Rillette (63.54)
	Chef Interview	Crab cake (69.71)	Bisque (59.87)	Consommé (57.80)	Timbale (52.00)	Boudin (42.60)	Rillette (42.50)
Overall	Rest Show	Crab cake (82.37)	Timbale (73.84)	Bisque (72.85)	Consommé (68.54)	Rillette (67.07)	Boudin (65.99)
	Segment	Crab cake (83.01)	Bisque (73.12)	Timbale (72.32)	Consommé (68.65)	Boudin (67.38)	Rillette (66.80)
	Chef Interview	Crab cake (68.29)	Bisque (62.40)	Timbale (58.00)	Consommé (54.00)	Rillette (43.14)	Boudin (42.53)

In summary the products that rated highest overall in sensory acceptability were the US crab cake, crab bisque, crab timbale and crab consommé.

3.4.4. Market and Product Research

The aim of the market and product research section was to understand the target market demand for the product and the preferred form for presentation.

3.4.5. Costings

The panellists were asked how much they were willing to pay for a portion of each product. For each product there were 5 possible choices with some being more or less than the actual product cost.

The results indicate that at least 50 % of the panellists were willing to pay more than the cost price for the US crab cake (Table 6) and crab bisque (Table 7) making them the most valuable products. Just over 40 % said they would play at least cost price for the crab timbale (Table 8) and with the crab consommé (Table 9) and crab boudin (Table 10) only 36 %. The crab rillette (Table 11) had less than 30 % of the panellists willing to pay at least cost price for the product.

Table 6 Price panellists were willing to pay for US Crab Cakes

Crab cake 2 x 35 g **@ $2.02**	Chef interview	Rest Show	Segment
Total # responses	14	110	69
Less than $1	14.29 %	13.64 %	15.94 %
$1.00-$1.50	21.43 %	16.36 %	17.39 %
$1.50-$2.00	**35.71 %**	19.09 %	15.94 %
$2.00-$2.50	14.29 %	**30.91 %**	**33.33 %**
More than $3	14.29 %	20.00 %	17.39 %
% that would pay price point or above	28 %	50 %	50 %

Table 7 Price panellists were willing to pay for Crab Bisque

Crab Bisque 220 mL @ $4.41	Chef interview	Rest Show	Segment
Total # responses	14	108	68
Less than $3.50	28.57 %	13.89 %	14.71 %
$3.50-$4.00	**57.14 %**	**32.41 %**	**29.41 %**
$4.00-$4.50	7.14 %	25.93 %	27.94 %
$4.50-$5.00	7.14 %	14.81 %	13.24 %
More than $5	-	12.96 %	14.71 %
% that would pay price point or above	14 %	54 %	57 %

Table 8 Prices panellists were willing to pay for Crab Timbale

Crab Timbale 100 g @$3.09	Chef interview	Rest Show	Segment`
Total # responses	13	106	64
Less than $2.00	-	5.66 %	7.81 %
$2.00-$2.50	**46.15 %**	25.47 %	**28.13 %**
$2.50-$3.00	7.69 %	**27.36 %**	21.88 %
$3.00-$3.50	**46.15 %**	23.58 %	26.56 %
More than $3.50	-	17.92 %	15.63 %
% that would pay price point or above	46 %	41 %	42 %

Table 9 Prices panellists were willing to pay for Crab Consommé

Crab Consommé 250 mL @$4.37	Chef interview	Rest Show	Segment
Total # responses	13	102	65
Less than $3.50	38.46 %	27.45 %	**32.31 %**
$3.50-$4.00	**46.15 %**	**36.27 %**	30.77 %
$4.00-$4.50	15.38 %	18.63 %	18.46 %
$4.50-$5.00	-	9.80 %	10.77 %
More than $5	-	7.84 %	7.69 %
% that would pay price point or above	15.38 %	36 %	36 %

Table 10 Prices panellists were willing to pay for Crab Boudin

Crab Boudin 100 g @ $3.04	Chef interview	Rest Show	Segment
Total # responses	13	107	66
Less than $2.00	23.08 %	14.95 %	16.67 %
$2.00-$2.50	**46.15 %**	23.36 %	**24.24 %**
$2.50-$3.00	15.38 %	**24.30 %**	22.73 %
$3.00-$3.50	7.69 %	17.76 %	13.64 %
More than $3.50	7.69 %	19.63 %	22.73 %
% that would pay price point or above	15 %	37 %	36 %

Table 11 Price panellists were willing to pay for Crab Rillette

Crab Rillettes 100 g @ $3.16	Chef interview	Rest Show	Segment
Total # responses	11	110	67
Less than $2.00	-	10.91 %	10.45 %
$2.00-$2.50	**54.55 %**	**33.64 %**	**37.31 %**
$2.50-$3.00	45.45 %	29.09 %	28.36 %
$3.00-$3.50	-	15.45 %	13.43 %
More than $3.50	-	10.91 %	10.45 %
% that would pay price point or above	-	26 %	23 %

3.4.6. Likelihood to Purchase, Applicability and Usage

The usage questions related to how likely the panellists were to purchase the product and if it was applicable to their business.

For the US crab cakes, crab timbale and consommé the predominant response for the likelihood to purchase was probably (Table 12, Table 13 and Table 14). Combining the responses in the probably and definitely category, 70 % of the rest show group indicated they were likely to purchase the US crab cake. However the response in this category for the crab timbale and crab consommé was only 50 % for the rest show group. The responses from the one on one interviews were not as high as the Restaurant Show results, with only 56 % of the panellists that would „probably- definitely" buy the US crab cake and for the crab timbale and crab consommé 38 % and 30 % respectively.

For the crab bisque, crab rillettes and crab boudin, the majority of the respondents indicated that they may or may not not purchase the product (Table 15, Table 16 and Table 17). Although the majority of the panellists had chosen the may/may not category, around 50 % of the panellists from the rest show group indicated they would probably – definitely purchase the crab bisque and just

over 40 % would probably- definitely purchase the crab rillette and boudin if the product was available for purchase.

The responses to the question regarding product applicability to business indicate that the majority of panellists think the US crab cake, crab timbale, crab rillettes and crab boudin are „probably" applicable to their business. The percentage of responses in the „probably- definitely" category was only 50 % for the crab timbale, and 45 % for the crab rillettes and boudin. However for the US crab cake over 70 % of respondents thought the product was probably to definitely applicable to their business.

The predominant response for the products applicability to business for the crab consommé and bisque was may/ may not, meaning the respondents were unsure if the product had a use in their business. An average of 45 % of the respondents amongst the three categories indicated the crab bisque and crab consommé were „probably- definitely" applicable to their business.

Table 12 US Crab Cake - Likelihood to purchase and application to business responses

Crab Cake	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	-	21.43 %	**35.71 %**	**35.71 %**	7.14 %	14	42 %
	Rest Show	3.64 %	4.55 %	20.91 %	**40.91 %**	29.09 %	110	70 %
	Segment	5.80 %	4.35 %	18.84 %	**42.03 %**	28.99 %	69	70 %
Application to business	Chef interview	-	7.14 %	35.71 %	**42.86 %**	14.29 %	14	56 %
	Rest Show	5.45 %	4.55 %	17.27 %	**42.73 %**	30 %	110	72 %
	Segment	5.80 %	5.80 %	15.94 %	**42.03 %**	30.43 %	69	72 %

Table 13 Crab Timbale- Likelihood to purchase and application to business responses

Timbale	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	7.69 %	30.77 %	23.08 %	**38.46 %**		13	38 %
	Rest Show	5.66 %	8.49 %	**36.79 %**	33.02 %	16.04 %	106	49 %
	Segment	6.25 %	9.38 %	32.81 %	**37.50 %**	14.06 %	64	51 %
Application to business	Chef interview	7.69 %	30.77 %	23.08 %	**38.46 %**		13	38 %
	Rest Show	7.55 %	9.43 %	33.02 %	**35.85 %**	14.15 %	106	50 %
	Segment	6.25 %	10.94 %	29.69 %	**36.06 %**	14.06 %	64	53 %

Table 14 Crab Consommé- Likelihood to purchase and application to business responses

Consommé	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	15.38 %	23.08 %	**30.77 %**	**30.77 %**	-	13	30 %
	Rest Show	6.86 %	10.78 %	34.31 %	**36.27 %**	11.76 %	102	47 %
	Segment	6.15 %	12.31 %	30.77 %	**35.38 %**	15.38 %	65	50 %
Application to business	Chef interview	7.69 %	7.69 %	30.77 %	**38.46 %**	15.38 %	13	53 %
	Rest Show	5.88 %	12.75 %	**36.27 %**	33.33 %	11.76 %	102	45 %
	Segment	4.62 %	10.77 %	**35.38 %**	33.85 %	15.38 %	65	48 %

Table 15 Crab Bisque- Likelihood to purchase and application to business responses

Bisque	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	14.29 %	28.57 %	**35.71 %**	21.43 %	0	14	21 %
	Rest Show	5.56 %	9.26 %	**37.04 %**	34.26 %	13.89 %	108	48 %
	Segment	5.88 %	10.29 %	**35.29 %**	**35.29 %**	13.24 %	68	47 %
Application to business	Chef interview	14.29 %	14.29 %	**42.86 %**	28.57 %	0	14	28 %
	Rest Show	5.56 %	9.26 %	**36.11 %**	34.26 %	14.81 %	108	48 %
	Segment	5.88 %	8.82 %	32.35 %	**35.29 %**	17.65 %	68	52 %

Table 16 Crab Rillette- Likelihood to purchase and application to business responses

Rillette	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	18.18 %	18.18 %	**36.36 %**	27.27 %	-	11	27 %
	Rest Show	3.64 %	11.82 %	**41.82 %**	36.36 %	6.36 %	110	42 %
	Segment	5.97 %	14.93 %	**37.31 %**	35.82 %	5.97 %	67	41 %
Application to business	Chef network	-	**45.45 %**	9.09 %	**45.45 %**	-	11	45 %
	Rest Show	4.55 %	11.82 %	**41.82 %**	31.82 %	10 %	110	41 %
	Segment	4.48 %	16.42 %	31.34 %	**35.82 %**	11.94 %	67	46 %

Table 17 Crab Boudin- Likelihood to purchase and application to business responses

Boudin	Group	Definitely Not	Probably Not	May/May Not	Probably	Definitely		% in prob-def
Likelihood to purchase	Chef interview	15.38 %	30.77 %	15.35 %	**38.46 %**	-	13	38 %
	Rest Show	10.28 %	17.76 %	**31.78 %**	30.84 %	9.35 %	107	40 %
	Segment	10.61 %	16.67 %	**34.85 %**	28.79 %	9.09 %	66	37 %
Application to business	Chef interview	7.69 %	**38.46 %**	30.77 %	23.08 %	-	13	23 %
	Rest Show	14.02 %	13.08 %	28.97 %	**36.45 %**	7.48 %	107	43 %
	Segment	13.64 %	12.12 %	27.27 %	**39.39 %**	7.58 %	66	47 %

For each product, the panellists were asked how they would use the product. The question was on the Restaurant Show survey as a multiple choice question with the two choices being: ingredient or stand alone dish. Although this question was on the chef one-on-one surveys, it was an open ended question and we found that most of those panellists did not answer the question.

The results show that the panellists would use the bisque, consommé and rillette as an ingredient (Table 18). Soups are quite often used as base ingredients in most kitchens and seeing as chefs like to add their own touch to their products, the results were as expected. For the US crab cake, timbale and boudin, the majority of the panellists would use these products as a standalone dish.

Table 18 Responses to how panellists would use the product

Product	Group	Ingredient	Stand Alone Dish	Both	Total number of Responses
Bisque	Rest Show	**47.22 %**	31.48 %	21.30 %	108
	Segment	**50 %**	23.53 %	26.47 %	65
Consommé	Rest Show	**68.63 %**	16.67 %	14.71 %	102

	Segment	**70.15 %**	13.43 %	16.42 %	65
US Crab Cake	Rest Show	13.64 %	**78.18 %**	8.18 %	110
	Segment	10.45 %	**82.09 %**	7.46 %	68
Timbale	Rest Show	37.74 %	**52.83 %**	9.43 %	106
	Segment	35.94 %	**53.12 %**	10.94 %	64
Boudin	Rest Show	**52.34 %**	34.58 %	13.08 %	107
	Segment	**55.22 %**	31.34 %	13.43 %	67
Rillette	Rest Show	**52.73 %**	38.18 %	9.09 %	110
	Segment	**53.73 %**	37.31 %	8.96 %	67

3.4.7. Optimised Packaging

Not unexpectedly the results for the preferred packaging formats for the crab bisque and crab consommé were quite similar (Table 19 and Table 20).The preferred portion size amongst the panellists was 200 mL. The preferred packaging volume and type was a resealable doy pouch containing 1 L of product.

Table 19 Most preferred packaging format for crab bisque

Bisque	Answer	Chef interview	Rest Show	Segment
# responses		14	108	65
Reasonable Portion	100 mL	28.57 %	**37.04 %**	**40.00 %**
size	200 mL	**42.86 %**	**37.04 %**	35.38 %
	250 mL	21.43 %	21.30 %	20.00 %
	300 mL	7.14 %	4.63 %	4.62 %
Preferred Volume	500 mL	-	17.59 %	16.92 %
	1 L	**42.86 %**	**41.67 %**	**40.00 %**
	2 L	**42.86 %**	24.07 %	23.08 %
	5 L	14.29 %	16.67 %	20.00 %
Packaging Type	Plastic Tub	42.86 %	41.67 %	38.46 %
	Resealable Doy Pouch	**50.00 %**	**45.37 %**	**52.31 %**
	Cardboard Carton	7.14 %	12.96 %	9.23 %

Table 20 Most preferred packaging format for crab consommé

Consomme	Answer	Chef interview	Rest Show	Segment
# responses		12	106	65
Reasonable Portion	100 mL	**33.33 %**	37.74 %	38.46 %
size	200 mL	25.00 %	**40.57 %**	**41.54 %**
	250 mL	**33.33 %**	15.09 %	15.38 %
	300 mL	8.33 %	6.60 %	4.62 %
Preferred Volume	500 mL	-	16.04 %	12.31 %
	1 L	33.33 %	**39.62 %**	**40.00 %**
	2 L	**50.00 %**	29.25 %	29.23 %
	5 L	16.67 %	15.09 %	18.46 %
Packaging Type	Plastic Tub	33.33 %	41.51 %	38.46 %
	Resealable Doy Pouch	**58.33 %**	**44.34 %**	**49.23 %**
	Cardboard Carton	8.33 %	14.15 %	12.31 %

With the US Crab Cakes, the preferred packaging type, and number of pieces per package were the same across all three groups (Table 21). The plastic tray was chosen as the packaging of choice with over 50 % from each group picking it. The number of pieces preferred per package was 50. With the portion size of one US Crab Cake, the preferred size varied between the groups. The results

from chef interview group indicate the 20 g and 30 g portion as equally preferred sizes. The rest show and segment group preferred portion size was 35 g.

Table 21 Most preferred packaging format for US crab cake results

US Crab Cake	Answer	Chef interview	Rest Show	Segment
# responses		14	112	68
Reasonable Portion size	20 g	**42.86 %**	19.64 %	22.06 %
	30 g	**42.86 %**	28.57 %	22.06 %
	35 g	14.29 %	**29.46 %**	**30.88 %**
	40 g	-	22.32 %	25.00 %
Preferred # pieces	25 pieces	28.57 %	30.36 %	27.94 %
	50 pieces	**50.00 %**	**42.86 %**	**39.71 %**
	100 pieces	7.14 %	19.64 %	23.53 %
	200 pieces	14.29 %	7.14 %	8.82 %
Packaging Type	Cardboard Package	42.86 %	33.04 %	36.76 %
	Plastic Tray	**50.00 %**	**58.93 %**	**51.47 %**
	Plastic Pouch	7.14 %	8.04 %	11.76 %

The packaging type for the crab timbale had already been determined before the interviews took place so the question was not required. When the panellists were asked what they thought was a reasonable portion size, the most common answer was 75 g amongst all the groups. ten was the preferred number of timbales the panellists would like per package. Over 55 % of the panellists from rest show and segment group said they would prefer the sauce packaged separately from the mousse (Table 22).

Table 22 Most preferred packaging format for crab timbale

Timbale	Answer	Chef interview	Rest Show	Segment
# responses		13	106	63
Reasonable Portion size	50 g	30.77 %	37.74 %	41.27 %
	75 g	**69.23 %**	**39.62 %**	**39.68 %**
	100 g	-	17.92 %	15.87 %
	150 g	-	4.72 %	3.17 %
Preferred # per package	10	**69.23 %**	**41.51 %**	**41.27 %**
	25	23.08 %	**41.51 %**	36.51 %
	50	7.69 %	14.15 %	19.05 %
	100	-	2.83 %	3.17 %
Sauce separate	Yes		**58.49 %**	**55.56 %**
	No		41.51 %	44.44 %

The results indicate the chef interview and rest show group preferred the plastic pouch as the packaging type for the crab boudin and the most preferred packaging type for the segment group was the plastic tray (Table 23). When the panellists were asked what they thought was a reasonable portion size, the most common answer was 50 g amongst all the groups. ten was the preferred number of boudins the panellists would like per package.

Table 23 Most preferred packaging format for crab boudin

Boudin	Answer	Chef interview	Rest Show	Segment
# responses		12	113	67
Reasonable Portion size	50 g	**58.33 %**	**50.44 %**	**56.72 %**
	75 g	33.33 %	27.43 %	23.88 %
	100 g	8.33 %	19.47 %	14.93 %
	150 g	-	2.65 %	4.48 %
Preferred # per package	10	**83.33 %**	**53.10 %**	**50.75 %**
	25	16.67 %	35.40 %	34.33 %

	50	-	7.96 %	10.45 %
	100	-	3.54 %	4.48 %
Packaging Type	Cardboard Box	-	18.58 %	26.87 %
	Plastic Tray	41.67 %	39.82 %	**40.30 %**
	Plastic Pouch	**58.33 %**	**41.59 %**	32.84 %

With the crab rillettes, the preferred packaging type, usage of the product and number of pieces per package were the same across all three groups (Table 24).The plastic tub was chosen as the packaging of choice with over 50 % from each group picking it. The preferred volume the panellists wanted the product to come in was 500 g. The most reasonable portion size for the grab rillettes was 25 g.

Table 24 Most preferred packaging format for crab rillette results

Rillette	Answer	Chef interview	Rest Show	Segment
# responses		11	116	68
Reasonable Portion size	25 g	**45.45 %**	**46.55 %**	**51.47 %**
	50 g	36.36 %	40.52 %	35.29 %
	75 g	9.09 %	6.90 %	8.82 %
	100 g	9.09 %	6.03 %	4.41 %
Preferred Volume	100 g	18.18 %	20.69 %	20.59 %
	500 g	**54.55 %**	**52.59 %**	**50.00 %**
	1 kg	27.27 %	21.55 %	23.53 %
	2 kg	-	5.17 %	5.88 %
Packaging Type	Plastic Tub	**90.91 %**	**51.72 %**	**50.00 %**
	Resealable Doy Pouch	9.09 %	28.45 %	30.88 %
	Glass Jar	-	19.83 %	19.12 %

3.4.8. Other Comments

In the „additional comments" section, there were some recurring points made for each of the products.

- Five panellists mentioned that the US crab cakes should not be named „US crab cakes". The „US" is misleading for the purchaser as the raw materials are sourced locally from Western Australia.
- Some respondents commented the crab bisque was too salty. Salt content of the crab bisque was therefore needed to be reassessed/ evaluated.
- Several panellists commented on the clarity of the crab consommé suggesting it was not clear enough to be labelled a consommé. There are two possible solutions that can be looked at if the product is commercialised. The product could remain the same and be renamed as a „crab broth" or the product could undergo different methods of clarification to produce a product clear enough to be labelled a consommé.
- The feedback on the crab rillettes was related to product texture. Four panellists found the crab rillette too wet and another four panellists thought it was too creamy.
- The feedback from the panellists for the crab boudin suggested that the product was bland, grainy and lacked texture.
- Although the crab timbale was developed using the same base mousseline as the crab boudin there was no similar feedback on this product. Other comments regarding the crab timbale addressed the need for more sauce to be added to the product.

3.4.9. Perth Crab Cake Consultation

The consultation process for crab cakes was repeated at a chef event held in Perth on May 5th 2011. Results are summarised below.

Table 25 Results from Perth crab cake consultation

Sensory

Attribute	Average
Appearance	68.15
Aroma	69.85
Flavour	73.20
Texture	74.80
Overall	75.80

Use

	Frequency	Percent
Ingredient/Basis of a dish	3	16.67
Stand alone dish	13	72.22
Both	2	11.11

Size

	Frequency	Percent
20 g	1	5.56
20 g and 30 g	2	11.11
30 g	10	55.56
35 g	3	16.67
40 g	2	5.56
20 g and 40 g	1	5.56

Price

	Frequency	Percent
< $ 1	1	5.56
$ 1 – 1.50	6	33.33
$ 1.50 – 2.00	4	22.22
$ 2.00 – 2.50	4	22.22
>$ 2.50	3	16.67

Purchase

	Frequency	Percent
Probably not	1	5.56
May/May not	5	27.78
Probably	12	66.67

Applicability

	Frequency	Percent
Definitely not	2	11.76
Probably not	2	11.76
May/May Not	3	17.65
Probably	10	58.87

These results matched the results from the larger consultation.

3.4.10. Summary and Next Steps

From the results of the Phase Four consultation the top four products were the US crab cake, crab bisque, crab timbale and crab consommé.

Production considerations were subsequently assessed by the technical team. The production of the US Crab cake at the Abacus Factory was feasible. The installed Rion machine would be able to produce the crab cakes and the thermoform packager would be able to package the product as desired in the plastic trays. It was decided to go ahead with commercial crab cake production.

The Abacus Factory had the capacity and equipment to produce the crab bisque and consommé, but it did not have the infrastructure to package the end product into the resealable doy pouches. After doing the costings it was concluded that purchasing the packaging infrastructure at this stage would be too costly for the company. If the product was to go ahead, it would have to be contracted to another factory which had the capability to produce the soups as well as package them.

The crab timbale had problems associated with limited life due to constant changeover in menus. There were also problems associated with quality based on cooking times. This was tested in some additional trials.

Crab timbale samples remaining from the Restaurant 2010 Show were tested using commercial equipment to establish clear cooking times and temperatures under commercial conditions. Cooking trials were conducted using a „self cooking centre" fully automated steam oven. For the timbale to be cooked to a core temperature of 50 °C, the steam setting was 65 °C and cooked for 28 mins (Table 26). However, when the cooking temperature was increased to 70 °C, the product was overcooked. Although the optimum internal temperature to produce a cooked and high quality product is 50 °C, this is unsatisfactory in terms of food safety. The product would have to be cooked to an internal temperature of at least 65 °C to destroy pathogens potentially present in the food.

Table 26 Comcater Crab Timbale cooking trial parameters and results

Trial		Steam setting (°C)	Timbale core temperature (°C)	Time cooked (mins)	Result
Trial 1	Restaurant Show	65	50	28	Internal temp and texture (smooth) even throughout product.
	Restaurant Show	70	55	28	Uneven texture and internal temp. Edges overcooked and mushy
Trial 2	Batch 1	65	50	28	All were perfectly cooked
	Batch 2	65	50	28	
	Batch 3	65	50	28	
	Batch 1	75	55	28	Cooked
	Batch 2	75	55	28	Overcooked. White liquid oozing out and not structurally sound
	Batch 3	75	55	28	Cooked

A protein expert was consulted to determine what modifications could be made to the crab timbale formulation to increase the cooking temperature to kill off any pathogens whilst maintaining the desired product quality. Following the consultation three new batches of crab timbale were developed using three different methods for further testing. Batches were tested in triplicate at different cooking temperatures. The first batch of timbales was cooked in the optimum conditions outlined from the first trial and all were perfectly cooked. When the steam setting was increased to 75 °C, batch one and three were satisfactory however batch two was overcooked.

The results indicate that with slight modifications made to the crab timbale formulation, it is possible to increase the internal cooking temperature of the timbale without compromising product

quality. The other outcome from the testing indicated that despite variability in cooking equipment the timbale could still be cooked to the optimal product quality. However, as an internal temperature of only 55 °C was reached, it was advised that during any Carnarvon factory trials a food microbiologist should follow the technical team. Therefore on site microbiological testing could be conducted to ensure that the product meets food safety standards.

3.5. Stage 5 Final Production Trials and Launch

Following successful completion of the trials and factory modification to facilitate production, 16 pallets of crab cakes (approximately 288,000 cakes) were produced (Figure 8); the product reached the market in September 2011 and all the product was sold by December 2011. A user guide to accompany the product was developed (Appendix 14: Crab Cake User Guide). Further production runs have now been scheduled. As of December 2011, the crab bisque had undergone market test and was undergoing further production and marketing development subject to a commercial partnership between Abacus and a soup company. The timbale is undergoing further product development work to optimise consistency of quality.

Figure 8 First load of Abacus crab cakes

The final part of the project focused on designing some measurable promotional strategies for the crab cakes which could be evaluated for effectiveness. This part of the project will be evaluated past the project completion date in 12-18 months but the strategy design is summarised in Appendix 15: Promotional Strategies For Crab Cakes Project Plan. The results will be summarised in a separate report.

4. Discussion

Although there have been numerous references to modelling new and modified approaches to new product development in the food industry there have been few published case studies such as these detailing implementation of a process to produce a new product and indication of market success. This case study was based on the stage gate approach but the modifications were around integration of the different stages and repeated evaluation throughout the process. This change from a predominately linear approach to a feedback model has been previously discussed in relation to the stage gate model.

This study has demonstrated that as previously reported, there are several factors which will increase the success of new product development [23].

Firstly it has been shown that understanding market consumer knowledge is an important factor. This has been discussed previously for seafood product development but more in regard to consumer knowledge whereas in this case we focussed on food service sector expertise. The market knowledge, as provided by the ideation panel, was used in the initial ideation process but was then again repeated in a secondary market consultation (Restaurant Fair consultation) which further informed the market feasibility of the new products.

Another success factor that has been described is the necessity for a high quality, unique product, preferably defined in the early stages of the product development process. The quality aspect here was demonstrated by the use of sensory analyses[24], an approach also used in the QFD (quality function deployment)[25]. Here the sensory assessment not only enabled prioritisation of the new product concepts but also enabled an early sensory comparison with commercial products already on the market.

A third product development success factor is the use of a range of expertise, with not necessarily all participants being from within the parent company, and including the retailer, suppliers and food technologists [26]. The formation of an interaction between the ideation and technical teams in this project resulted in both market demand, technological and feasibility issues being raised during the initial four day ideation process and then further tested during the commercial processing trials. The importance of such cross functional teams and their communication has been previously discussed. The importance of the involvement of senior management for product success has been contrary in the literature[23] but in this case facilitated rapid and informed decision making.

In summary this project has successfully used an accelerated new product development process to both decrease time for new product and increase success. This notes that the reordering of the product in the next six to 18 months may be the true indicator of success.

5. Benefits and Adoption

The project has successfully trialled, implemented and evaluated a new accelerated seafood product development methodology.

This methodology is now being applied to other Seafood CRC product development projects including the development of value added products from extracted school prawn meat (CRC).

A user guide for industry on the process and describing the results of the Abacus case study has been developed (Appendix 16: Accelerated Product Development User Guide). The summary of the project has also been reported in trade magazines and at relevant industry conferences.

6. Further Development

The timbale is still considered a commercially viable opportunity and further product development work will be continued.

The results of the promotional strategy assessment (Appendix 15) will be reported in twelve to eighteen months.

7. Planned Outcomes

Public benefit outcomes

Accelerated product Development Methodology adopted successfully by CRC participants.

Private benefit outcomes
Additional crab product extension via value-added product trials and development.

Linkages with CRC Milestone Outcomes
The project linked with the following CRC Milestone Outcomes.
Outcome 2 - Increased access to premium markets through fulfilment of consumer demands for safe, highquality, nutritious Australian seafood
Output 2.8 - Smart processing technologies and practices

8. Conclusion

The accelerated product development methodology described in this report and based on a modification to the stage gate model has been shown to be an alternative and feasible approach for the seafood industry. Using market expertise (focussed on food service market) and technical expertise there were a number of iterations which allowed the original number of 92 product concepts to be narrowed down to the final two commercially available and market acceptable products in less than 14 months. The multiple assessments both from a sensory and market acceptability perspective enabled renewed confidence in market attractiveness. The assessment also ensured that form, portion size and packaging were based on expert market opinion. Cost was also minimised by the four day ideation process. The process implemented also allowed for a comparison with currently available products early on in the development process.

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10. Appendices

10.1. Appendix 1: Staff

Dr Janet Howieson, Curtin University Principle Investigator.
Peter Jecks, Abacus Fisheries
John Susman, Fisheads Strategy
Rodger Graf, Creative Cuisine
Diana Thompson, Diana Thompson Consulting
Kerry Choo, Curtin University
Assoc Prof Hannah Williams, Curtin University

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b. The staff of Abacus Fisheries and particularly Sandy Jecks.
c. Seafood CRC and FRDC for funding.

10.2. Appendix 2: Instruments for data collection – Informed Consent Form

Blue Swimmer Crab Products sensory evaluation
Informed consent

The aim of this project is to determine the sensory and market acceptability of value added products from blue swimmer crabs.

Please note that as you are going to be eating seafood there is the potential for allergic reactions. Therefore in order to participate in this study you must be over 18 years of age and have NO KNOWN ALLERGIES. By signing this form you declare you meet these conditions.

You will be given up to six samples of different blue swimmer crab products to taste and assess on a score-card based on your liking of the sample. Then you will asked some general questions about yourself and the products. The total time for the assessment of each product should be no longer than 5-10 minutes.

The completed sensory form will not contain any of your personal data. Any of your personal information that is recorded will be used solely for administrative purposes and will not be included in any report or written communications arising from this project.

You are free to withdraw from the research at any point in time with no penalty.

This project will be submitted to the Curtin University Human Research Ethics Committee, If you have any queries or complaints please contact the Secretary of the Human Research Ethics Committee (phone: 9266 2784 or hrec@curtin.edu.au or in writing C/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth WA 6845).

The Principal Investigator is Dr Janet Howieson. For further information she may be contacted by ph (08) 9266 2034 or email j.howieson@curtin.edu.au.

I have read and understood this Informed Consent document and conditions of this project. I have had all my questions answered. I agree to participate in the blue swimmer crab product sensory evaluation and to abide by the conditions requested.

Number	Name	Signature	Date

10.3. Appendix 3: Panellist Information Form

Name:
Date:
Email:
Contact Number:
Position in Establishment:
Type of Establishment:
Who and how do you procure your products, in particular seafood?

What are your price points for an entrée?
What are your price points for a main?

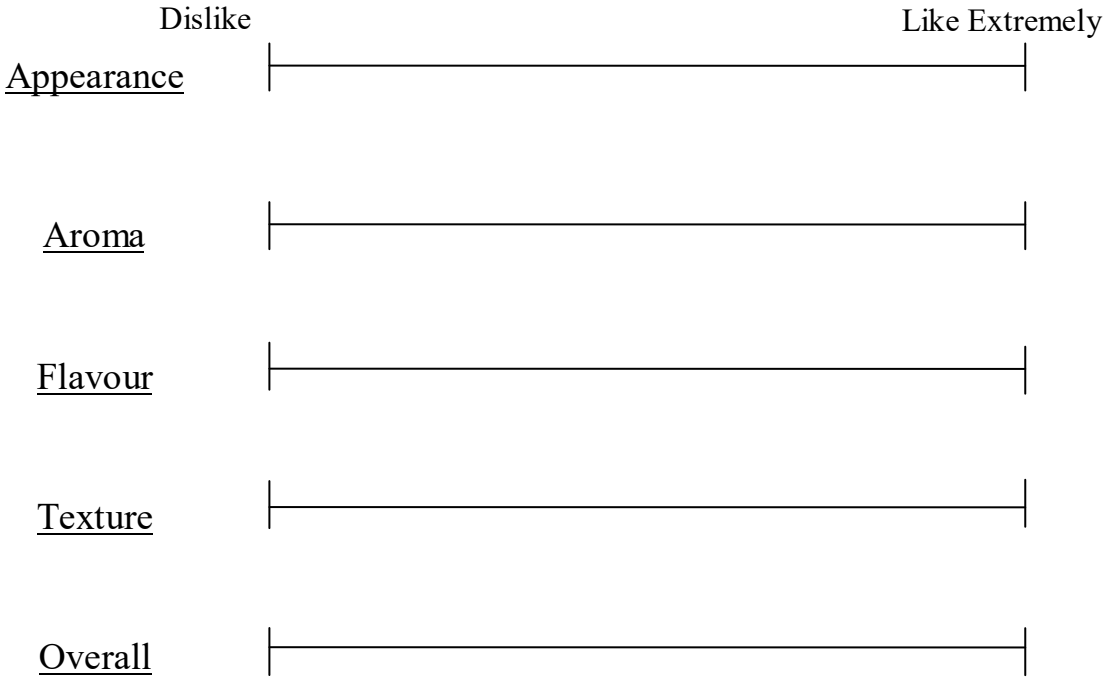
10.4. Appendix 4: Chef One on One Interview Questionnaires

10.4.1. Crab Bisque Chef One on One Interview Questionnaire

PRODUCT: BISQUE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

Please mark the horizontal scale with a vertical dash (|) to correspond with your preference on the scale



How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 100 mL ☐ 200 mL ☐ 250 mL ☐ 300 mL

What volume would you prefer the product to come in?

☐ 500 mL ☐ 1 L ☐ 2 L ☐ 5 L

What type of packaging would you prefer the product to come in?

☐ Plastic tub ☐ Resealable Doy Pouch ☐ Cardboard carton

How much are you willing to pay for a 250 mL portion?

Less than $3.50 $3.50 -$4.00 $4.00 - $4.50 $4.50 -$5.00 More than $5.00

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

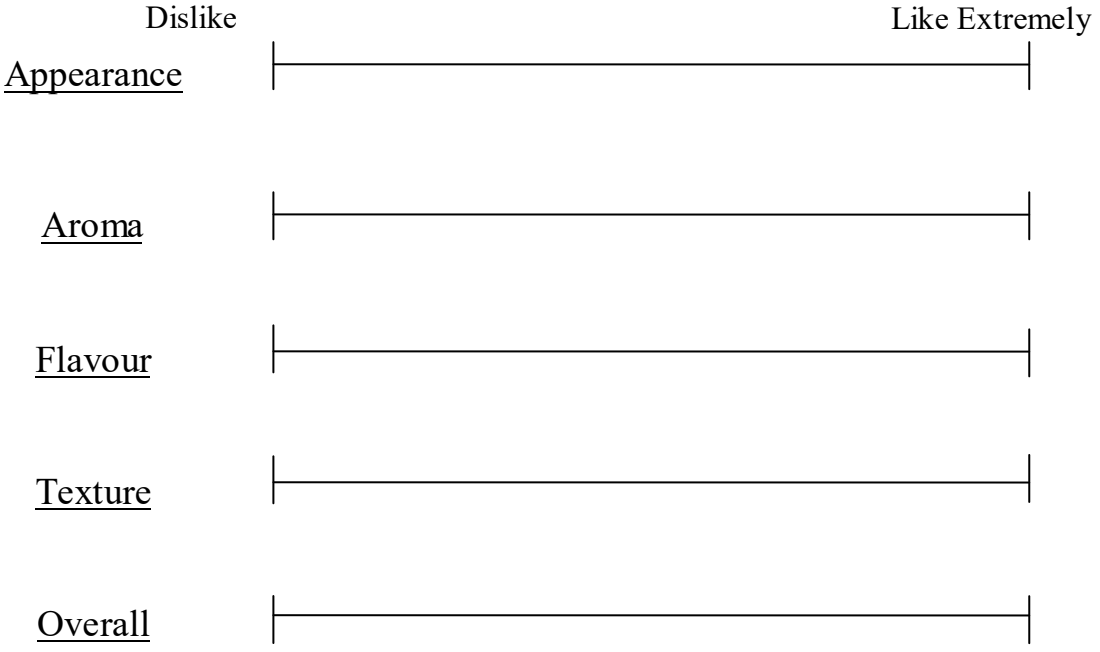
Additional Comments:

10.4.2. Crab Consommé Chef One on One Interview Questionnaire

PRODUCT: CONSOMMÉ

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

Please mark the horizontal scale with a vertical dash (|) to correspond with your preference on the scale



How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 100 mL ☐ 200 mL ☐ 250 mL ☐ 300 mL

What volume would you prefer the product to come in?

☐ 500 mL ☐ 1 L ☐ 2 L ☐ 5 L

What type of packaging would you prefer the product to come in?

☐ Plastic tub ☐ Resealable Doy Pouch ☐ Cardboard carton

How much are you willing to pay for a 250 mL portion?

Less than $3.50 $3.50 -$4.00 $4.00 - $4.50 $4.50 -$5.00 More than $5.00

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

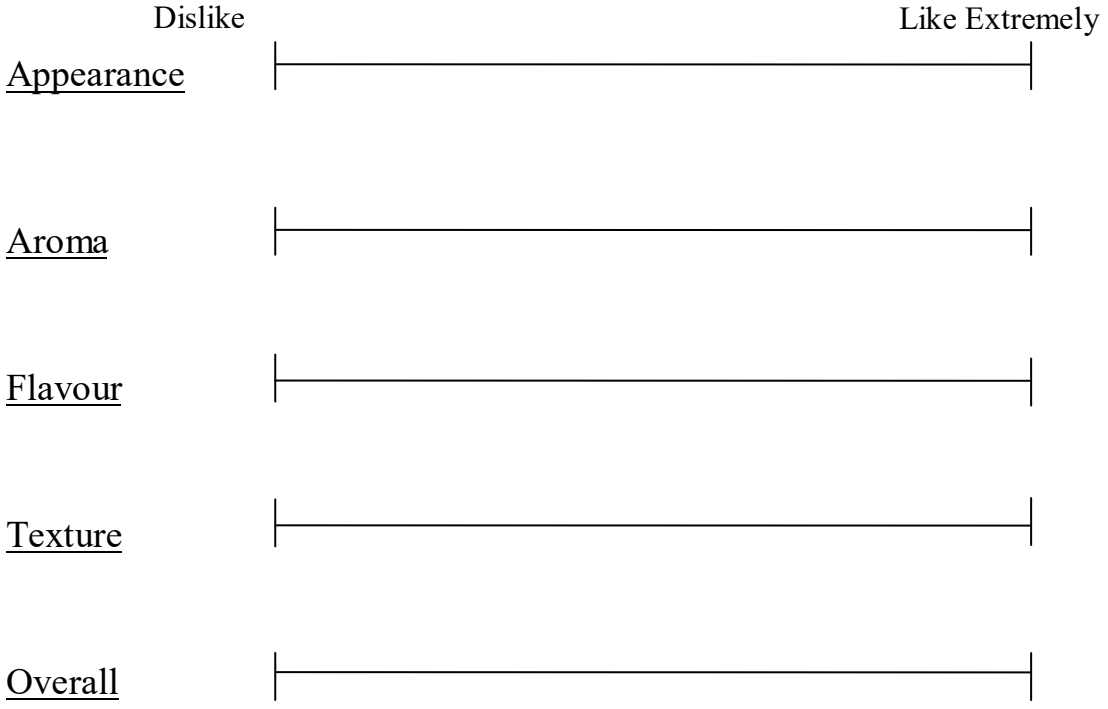
Additional Comments:

10.4.3. US Crab Cake Chef One on One Interview Questionnaire

PRODUCT: US CRAB CAKE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

Please mark the horizontal scale with a vertical dash (|) to correspond with your preference on the scale.



How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable size for one crab cake?

☐ 20 g ☐ 30 g ☐ 35 g ☐ 40 g

How many crab cakes in a package would you prefer the product to come in?

☐ 25 pieces ☐ 50 pieces ☐ 100 pieces ☐ 200 pieces

What type of packaging would you prefer the product to come in?

☐ Cardboard Package ☐ Plastic Tray ☐ Plastic Pouch

How much are you willing to pay for a serving of 2 crab cakes at 35 g a piece?

Less than $1.00 $1.00 -$1.50 $1.50 - $2.00 $2.00 -$2.50 More than $2.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

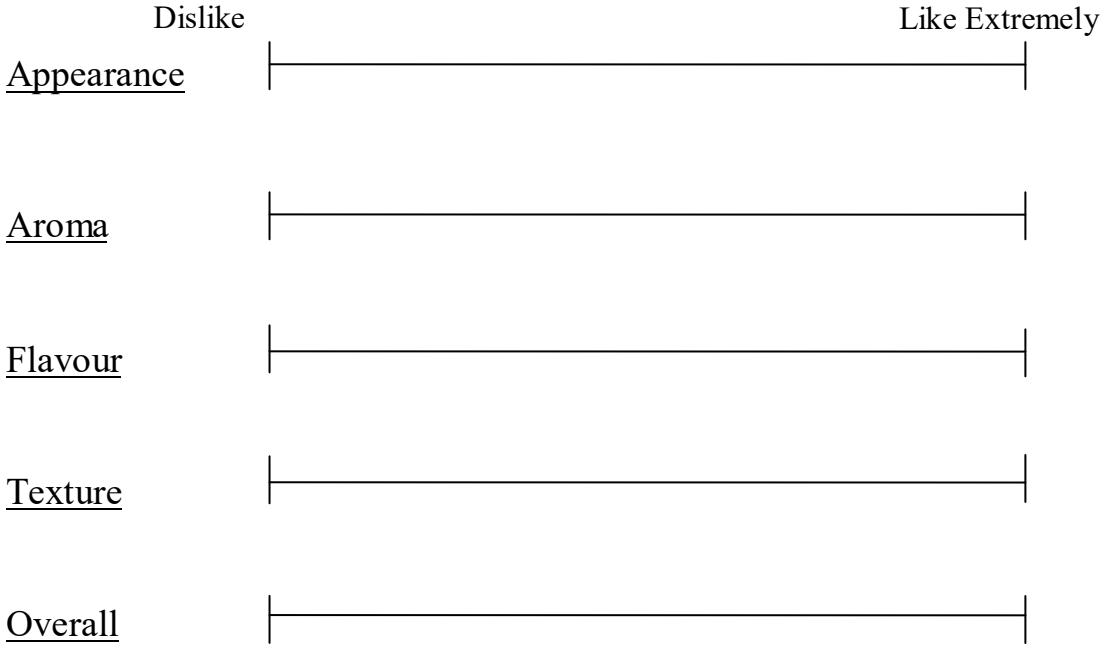
Additional Comments:

10.4.4. Crab Timbale Chef One on One Interview Questionnaire

PRODUCT: TIMBALE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

Please mark the horizontal scale with a vertical dash (|) to correspond with your preference on the scale.



How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 50 g ☐ 75 g ☐ 100 g ☐ 150 g

The timbale will be packaged individually in plastic tubs with lids containing the recommended serving size.

How many timbales in a package would you prefer to the product to come in?

☐ 10 ☐ 25 ☐ 50 ☐ 100

How much are you willing to pay for a 100 g portion?

Less than $2.00 $2.00 -$2.50 $2.50 - $3.00 $3.00 -$3.50 More than $3.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.4.5. Crab Boudin Chef One on One Interview Questionnaire

PRODUCT: BOUDIN

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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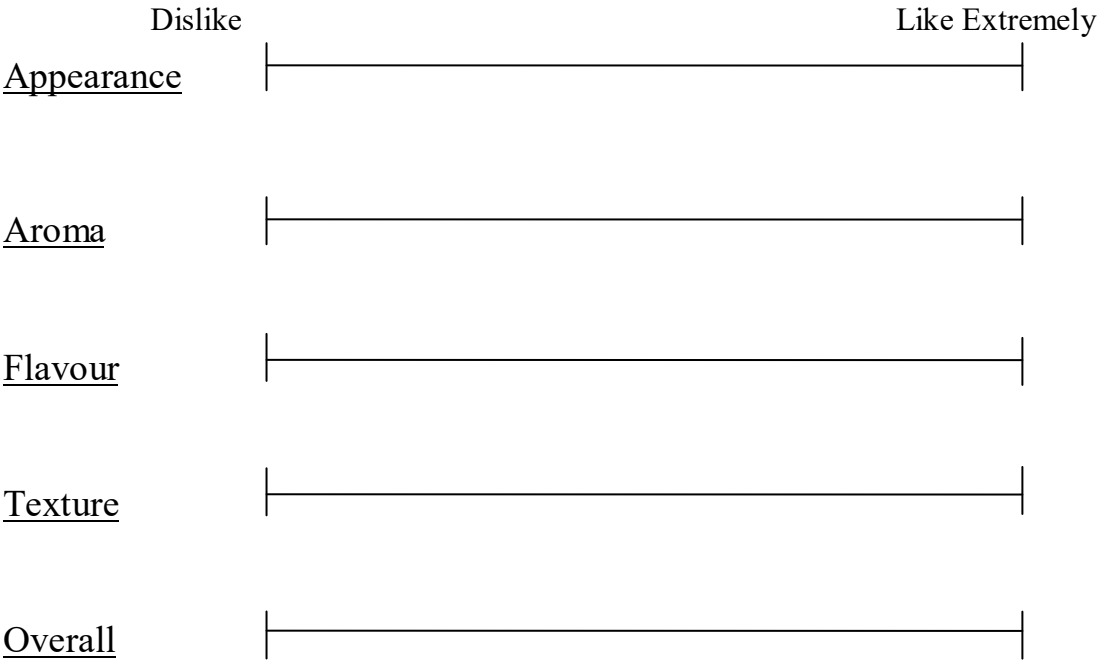

How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 50 g ☐ 75 g ☐ 100 g ☐ 150 g

The boudin will be packaged individually in plastic casings with the recommended serving size.
How many boudins in a package would you prefer the product to come in?

☐ 10 ☐ 25 ☐ 50 ☐ 100

What type of packaging would you prefer the product to come in?

☐ Cardboard box ☐ Plastic Pouch ☐ Plastic Tray

How much are you willing to pay for a 100 g portion?

Less than $2.00 $2.00 -$2.50 $2.50 - $3.00 $3.00 -$3.50 More than $3.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.4.6. Crab Rillette Chef One on One Interview Questionnaire

PRODUCT: RILLETTE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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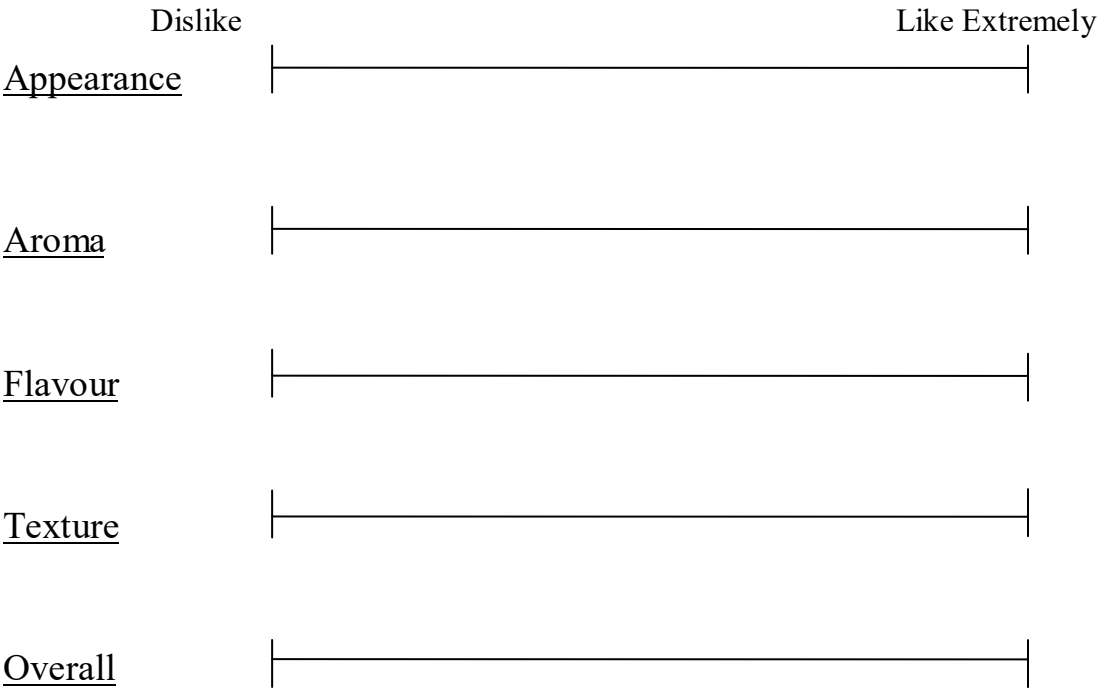

How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 25 g ☐ 50 g ☐ 75 g ☐ 100 g

What volume would you prefer the product to come in?

☐ 100 g ☐ 500 g ☐ 1 kg ☐ 2 kg

What type of packaging would you prefer the product to come in?

☐ Plastic tub ☐ Resealable Doy Pouch ☐ Glass Jar

How much are you willing to pay for a 100 g portion?

Less than $2.50 $2.50 -$3.00 $3.00 - $3.50 $3.50 -$4.00 More than $4.00

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.5. Appendix 5: Restaurant Show Questionnaires

10.5.1. Crab Bisque Restaurant Show Questionnaire

PRODUCT: BISQUE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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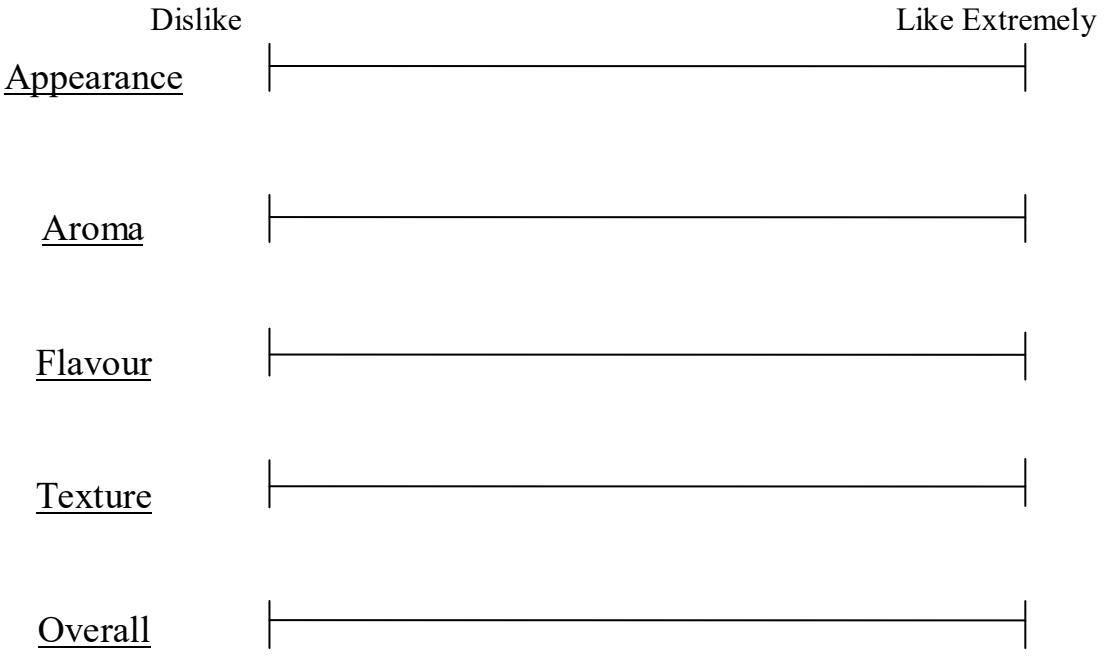

How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 100 mL ☐ 200 mL ☐ 250 mL ☐ 300 mL

What volume would you prefer the product to come in?

☐ 500 mL ☐ 1 L ☐ 2 L ☐ 5 L

What type of packaging would you prefer the product to come in?

☐ Plastic tub ☐ Resealable Doy Pouch ☐ Cardboard carton

How much are you willing to pay for a 250 mL portion?

Less than $3.50 $3.50 -$4.00 $4.00 - $4.50 $4.50 -$5.00 More than $5.00

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.5.2. Crab Consommé Restaurant Show Questionnaire

PRODUCT: CONSOMMÉ

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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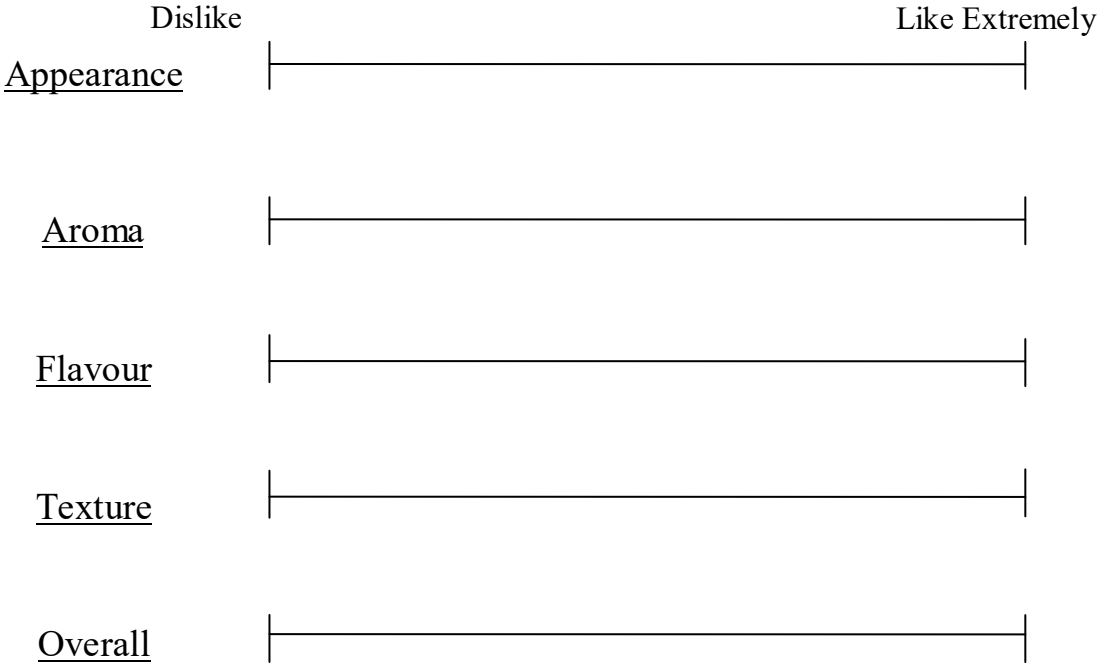

How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

100 mL ☐ 200 mL ☐ 250 mL ☐ 300 mL ☐

What volume would you prefer the product to come in?

500 mL ☐ 1 L ☐ 2 L ☐ 5 L ☐

What type of packaging would you prefer the product to come in?

Plastic tub ☐ Resealable Doy Pouch ☐ Cardboard carton ☐

How much are you willing to pay for a 250 mL portion?

Less than $3.50 ☐ $3.50 -$4.00 ☐ $4.00 - $4.50 ☐ $4.50 -$5.00 ☐ More than $5.00 ☐

How likely are you to purchase this product?

Definitely Not ☐ Probably Not ☐ May/May Not ☐ Probably ☐ Definitely ☐

How applicable is this product to your business?

Definitely Not ☐ Probably Not ☐ May/May Not ☐ Probably ☐ Definitely ☐

Additional Comments:

10.5.3. US Crab Cake Restaurant Show Questionnaire

PRODUCT: US CRAB CAKE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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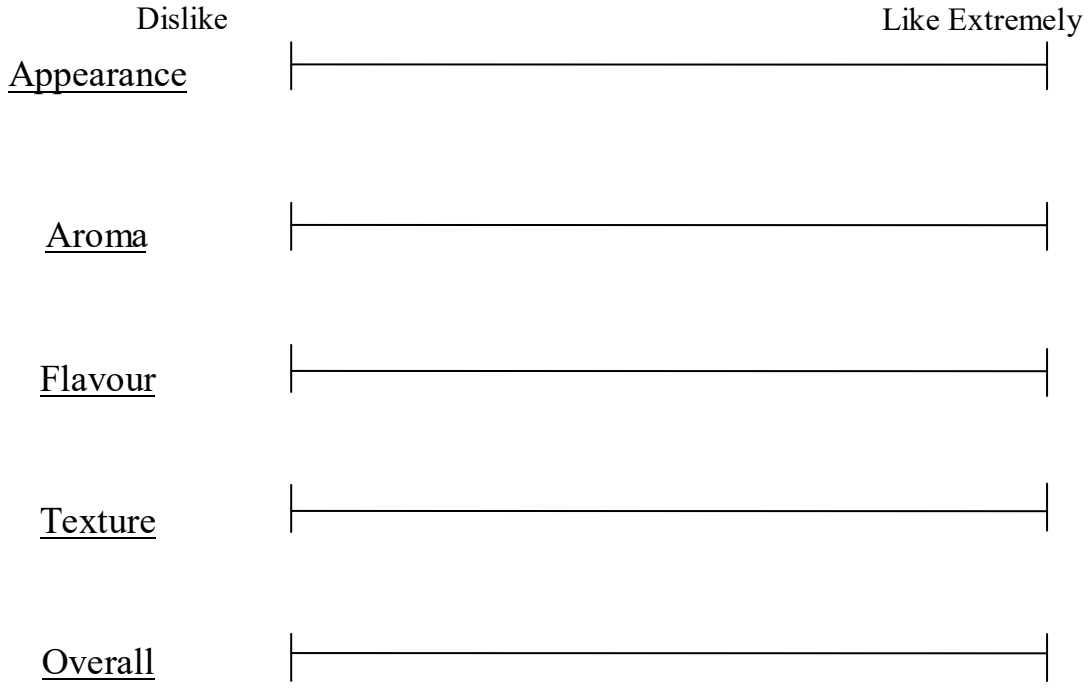

How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable size for one crab cake?

☐ 20 g ☐ 30 g ☐ 35 g ☐ 40 g

How many crab cakes in a package would you prefer the product to come in?

☐ 25 pieces ☐ 50 pieces ☐ 100 pieces ☐ 200 pieces

What type of packaging would you prefer the product to come in?

☐ Cardboard Package ☐ Plastic Tray ☐ Plastic Pouch

How much are you willing to pay for a serving of 2 crab cakes at 35 g a piece?

Less than $1.00 $1.00 -$1.50 $1.50 - $2.00 $2.00 -$2.50 More than $2.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.5.4. Crab Timbale Restaurant Show Questionnaire

PRODUCT: TIMBALE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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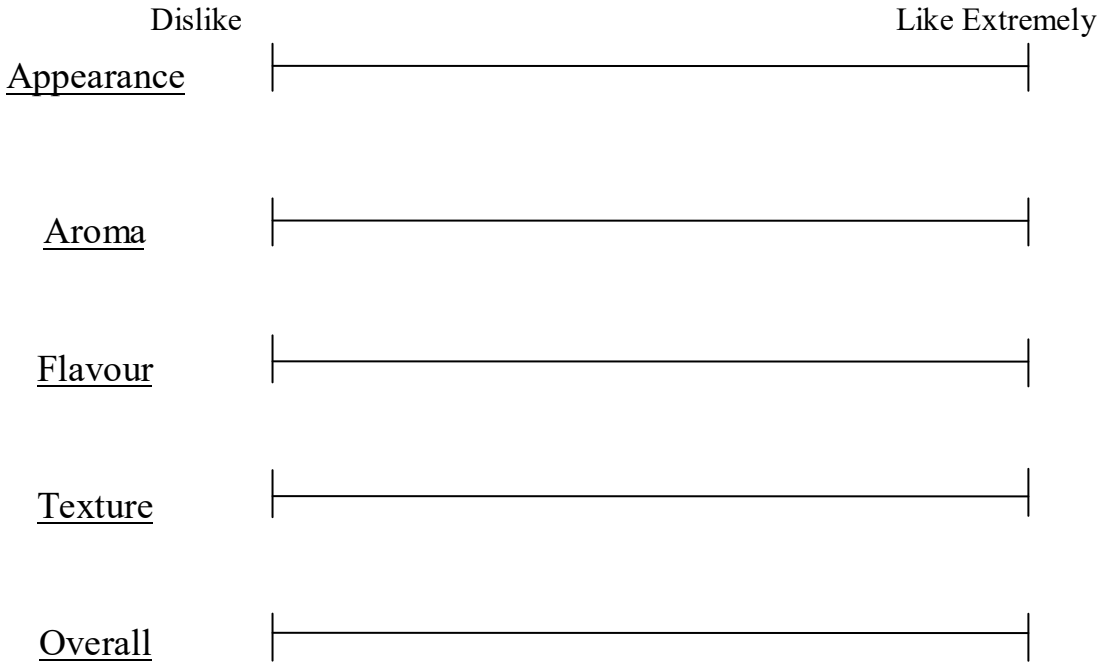


How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 50 g ☐ 75 g ☐ 100 g ☐ 150 g

Would you prefer the sauce packaged separately?

☐ Yes ☐ No

The timbale will be packaged individually in plastic tubs with lids containing the recommended serving size.

How many timbales in a package would you prefer to the product to come in?

☐ 10 ☐ 25 ☐ 50 ☐ 100

How much are you willing to pay for a 100 g portion?

Less than $2.00 $2.00 -$2.50 $2.50 - $3.00 $3.00 -$3.50 More than $3.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

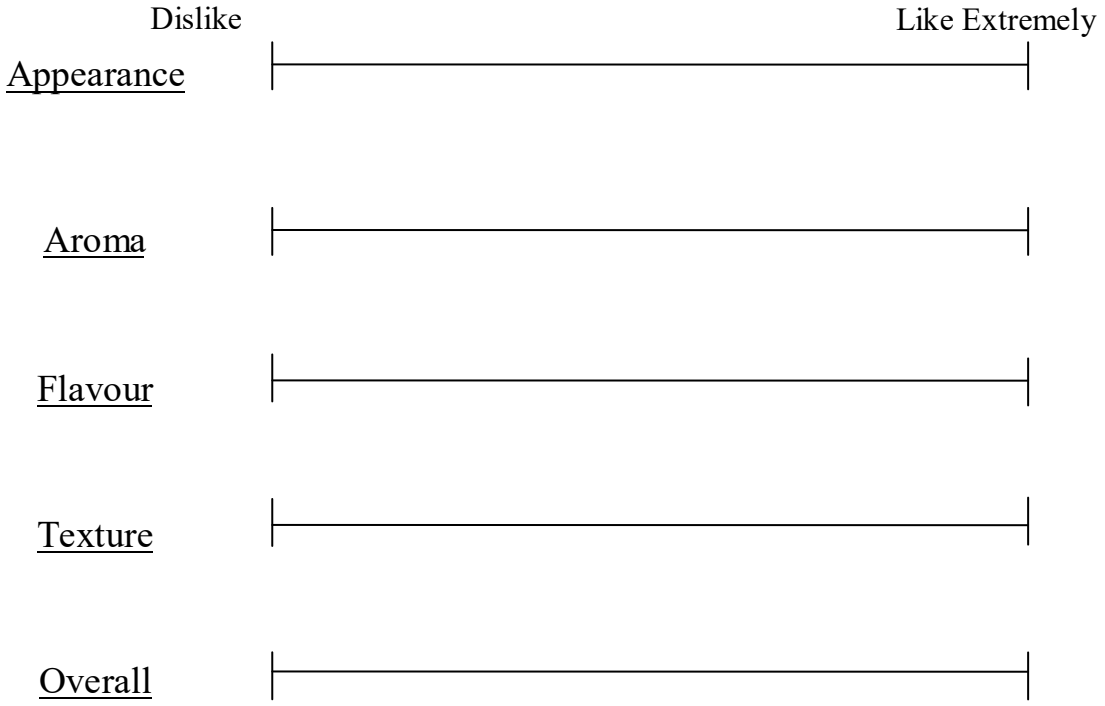
Additional Comments:

10.5.5. Crab Boudin Restaurant Show Questionnaire

PRODUCT: BOUDIN

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

Please mark the horizontal scale with a vertical dash (|) to correspond with your preference on the scale.



How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 50 g ☐ 75 g ☐ 100 g ☐ 150 g

The boudin will be packaged individually in plastic casings with the recommended serving size. How many boudins in a package would you prefer to the product to come in?

☐ 10 ☐ 25 ☐ 50 ☐ 100

What type of packaging would you prefer the product to come in?

☐ Cardboard box ☐ Plastic Pouch ☐ Plastic Tray

How much are you willing to pay for a 100 g portion?

Less than $2.00 $2.00 -$2.50 $2.50 - $3.00 $3.00 -$3.50 More than $3.50

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.5.6. Crab Rillette Restaurant Show Questionnaire

PRODUCT: RILLETTE

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC. The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferrable to other sectors.

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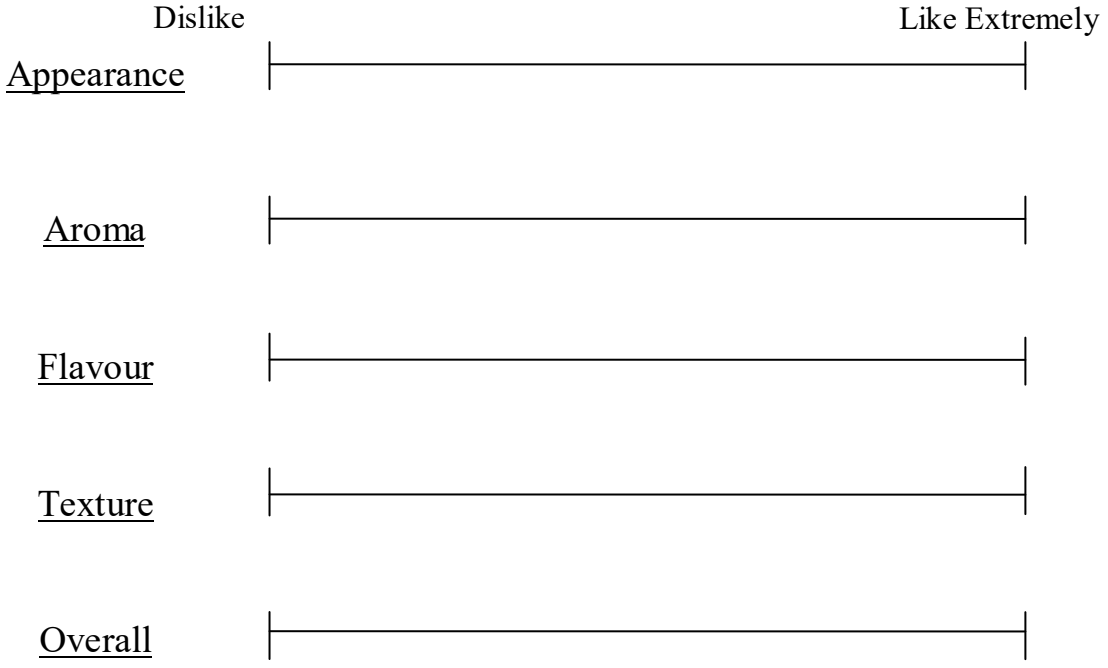


How would you use this product?

☐ Ingredient/ Basis of a dish ☐ Stand alone dish

What do you think is a reasonable portion size/serving size for this product?

☐ 25 g ☐ 50 g ☐ 75 g ☐ 100 g

What volume would you prefer the product to come in?

☐ 100 g ☐ 500 g ☐ 1 kg ☐ 2 kg

What type of packaging would you prefer the product to come in?

☐ Plastic tub ☐ Resealable Doy Pouch ☐ Glass Jar

How much are you willing to pay for a 100 g portion?

Less than $2.50 $2.50 -$3.25 $3.25 - $4.00 $4.00 -$4.75 More than $4.75

☐ ☐ ☐ ☐ ☐

How likely are you to purchase this product?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

How applicable is this product to your business?

Definitely Not Probably Not May/May Not Probably Definitely

☐ ☐ ☐ ☐ ☐

Additional Comments:

10.6. Appendix 6: Draft Product User Guides

10.6.1. Crab Bisque Product User Guide

Product Description
Abacus Bisque is a classical French style bisque base.

The base of the bisque is a crab stock, which is produced from the cooking of the live blue swimmer crabs. The crabs, which are caught by Abacus day boats fishing in Shark Bay, North West, Western Australia, arrive back at the Abacus factory live and are boiled in fresh water

The bisque also includes a crab meat which is extracted from the body and legs of the fresh cooked crabs.

The design of the bisque allows for further enhancement or creative input at point of service.

The purity and sweetness of this base makes it an elegant soup or sauce base.

The bisque can be utilized with the *Crab Mousseline and Crab Boudin* to present a premium crab entrée or main course.

Serving suggestion
- Canapé soup shot
- Soup starter
- Reduction bisque sauce
- Sauce base

Menu ideas
Crab boudin with crab coulis and crab meat
Crab Bisque
Crisp skinned snapper with crab bisque

Details:
Cost to end user: $17.20 / L base
Finished portion cost: End user adds 8 % cream
- 30 ml soup shot: $0.50 / serve
- 200 mL soup starter: $3.20 / serve

Packaging: 1 L, 2 L, 5 L resealable doy pouch
Storage: frozen -18 °C
Shelf life: expected 12 months, best before date
Handling: Thaw in pouch in refrigerator overnight, use within 30 days
Cooking:
Soup: Simmer 500 mL pouch for 10 min or pour into a stainless steel pot and bring to simmer, whisk in approximately 8 % cream.
Sauce: pour into stainless steel pot and bring to a simmer, add 8 % cream and continue to simmer until the volume is reduced by 1/3, if desired whisk in diced cold butter.

Product labelling
Ingredient List

Crab cook liquor, Crab mince, white wine, leek, carrot, unsalted butter, tomato paste, cream, onion, celery, brandy, maize, parsley, thyme, black pepper, bay leaf

Allergens
Contains: Shellfish, milk

10.6.2. Crab Consommé Product User Guide

Product description
The base of the consomme is a crab stock, which is produced from the cooking of the live blue swimmer crabs. The crabs, which are caught by Abacus day boats fishing in Shark Bay, North West, Western Australia, arrive back at the Abacus factory live and are boiled in fresh water

Abacus Crab Consommé offers clean sweet crab flavour in a pure clear blue swimmer crab broth. This product doubles as a heat and serve soup or a crab stock/fumet to enhance seafood soups and sauces

Serving suggestions:
Soup shot canapé
Consommé garnished with premium meat
Jellied consommé
Stock/fumet for cooking

Menu ideas
Crab consommé
Crab consommé with crab and ricotta ravioli

Details:
Cost to end user: $15.85/ L
$3.17/ 200 ml portion
$0.48 / 30 ml portion
Pack size: 1 L / 2 L/ 5 L resealable plastic pouch
Storage: frozen -18 °C
Shelf life: expected 12 months, best before date
Handling: Thaw in pack in refrigerator overnight, use within 30 days
Cooking: Heat and serve. Product labelling

Ingredient List
Crab cook liquor, crab mince, leek, onion, carrot, celery, white wine, black peppercorns, parsley stalks, bay leaf

Allergens
Contains: Shellfish

10.6.3. US Crab Cake Product User Guide

Product description
Abacus USA crab cake is a representation of the classic New Hampshire style crab fritter.

Produced using the Abacus crab mince – produced from the legs and body *and* Abacus premium crab meat from the jumbo lump and claws, the Abacus USA crab cake also contains fresh local fish.

The crisp crumbs give way to soft filling laden with premium blue swimmer crab meat with fresh herbs, zesty lemon and cayenne.

Serving suggestions:

- Canapés

- Hot savouries
- Seafood buffet
- Mixed plates

Menu Suggestions

Mini crab burger with iceberg lettuce and lemon aioli

Crab cake and marinated cucumber salad

Details:

Cost to end user: $0.85 / cake
Size: average weight 35 g / cake
Pack size: #10/20 pieces / thermo form tray
Storage: frozen -18 °C
Shelf life: expected 12 months, best before date
Handling: Thaw in container refrigerator overnight, use within three days
Cooking: Shallow fry over a medium heat in a quality vegetable oil until golden brown

Ingredient List:

Abacus crab mince, white fish, mayonnaise, white panko breadcrumbs, Abacus premium crab meat, shallots, lemon juice, butter, mint, coriander, soy isolate, lemon zest, cayenne pepper

Allergens:

Contains: shellfish, fish, wheat, milk, egg, soy

10.6.4. Crab Mousseline Product User Guide

Product description

Abacus Crab Mousseline has a light silky texture and sweet crab flavour. It is made with Blue swimmer crab meat and is snap frozen as a bulk mousseline that can be enhanced by folding through more crab meat, scallop or fresh herbs, then moulded and cooked.
The signature Abacus crab mousseline products are ready to cook;

Abacus Crab Boudin Blanc - an 80g sausage
Abacus crab mousseline with bisque sauce – an 80g timbale mould with bisque sauce and crab meat

Serving suggestions:

- Crab Boudin blanc with crab sauce and wilted spinach
- Crab timbale with micro herbs
- Crab Boudin in crisp crumbs
- Crab ravioli

Details:

Cost to end user: $28.00/kg
$2.24 / 80g boudin portion
$2.50/ 80g timbale with sauce
Pack size: 1kg resealable pouch
1kg plastic piping bag

80g Boudin x 12 / tray x 4 / carton
80 timbale x 12 / tray x 4 /per carton

Storage: frozen -18 °C
Shelf life: expected 12 months, best before date
Handling: Thaw in pack in refrigerator overnight, use within 2 days, serve hot immediately after cooking.
Cooking:

Equipment: Combi steam oven
Temp: 50-55 °C
Time: Boudin 8 - 10 min
Timbale 20- 5 min
Internal temp: 50 – 55 °C

Product labelling

Ingredient List
Crab Mince (28 %), White fish, cream, Abacus Premium Crab meat (11 %), prawn, milk powder, soy isolate, phosphate (mineral salt), sea salt, white pepper, mineral salt (451)- include % of coulis and in brackets the ingredients for timbale (Crab cook liquor, Crab mince, white wine, leek, carrot, unsalted butter, tomato paste, cream, onion, celery, brandy, maize, parsley, thyme, black pepper, bay leaf) as well as keltrol

Allergens
Contains: shellfish, fish, milk, soy

10.6.5. Crab Rillette Product User Guide

Product Description

Abacus Crab Rillette is a classical French style rough cut pate. It is produced utilising the minced blue swimmer crab from the legs and body *and* premium crab meat picked from the jumbo lump and claw meat.
Abacus Blue Swimmer crab meat is handpicked within hours of harvest.

The rillette is produced using all fresh, natural ingredients to a traditional recipe, and then pasteurised to ensure product quality and safety.

The long fibres of Blue Swimmer Crab produce a luxurious dip, spread or sandwich filling that can be piped or spooned for service.

Serving suggestion

- Canapé topping
- Cold tartlette filling
- Sandwich filling
- Mixed seafood plate dip
- Picnic pack

Menu suggestions
Crab rillette on croute
Crab tartlette or mille feuille with watercress
Crab finger sandwich
Crab rillettes with crackers and crudités

Details:

Cost to end user: $30.00 / kg pack
$4.00 / 100g tub
.40 cents per finger sandwich
Packaging: 1 kg resealable pouch
1 kg tub
200g tub
Storage: chilled fresh 0-4 °C
Shelf life: expected 30 days
Handling: Ready to use. Store covered use within seven days of opening.

Product labelling
Ingredient List
Mayodaise (Grape seed oil, clarified butter, egg yolk, apple cider vinegar, dijon mustard, mineral salt (451)), crab mince (29 %), Abacus Premium crab meat (17 %), lemon juice, lemon zest, parsley, chervil, tarragon, chives, sea salt, black pepper

Allergens
Contains: shellfish, egg, milk

10.7. Appendix 7: Interview Protocols

Presentation Protocols
Abacus Fisheries
Value Added Crab Investigation

10.7.1. Background

The purpose of the field testing programme is to get direct feedback from a select audience of food and beverage operations re the suitability of the products developed by the project to their operation.

The opportunity is to extend the product definition by means of assessing the culinary and commercial, in real operations, with real end-users.

It is important in this process that there is a level of interpretation at each venue – comparing products that are currently being used by the chefs and venues is vital to filter the direct feedback

Whilst the programme intends to also provide end-users with background to Abacus, the crabs and the existing products, by way of background to the project, it should be remembered that the products to be presented are NOT currently in production, thus, the audience should be shown genuine appreciation for their involvement in the development process.

Prior to the presentations, the audience will be recruited and notified about the scope of the project, this should be re-iterated at time of interview.

10.7.2. Step 1 Provide audience with a background to Abacus and the project

Background

Abacus Crab is produced by Abacus Fisheries, a vertically integrated crab catching, processing and marketing business, based in Carnarvon, North-West Western Australia.

They operate a fleet of day-boats, which fish the World Heritage listed waters of Shark Bay. As the largest blue swimmer crab fishery in Australia, the Shark Bay region is renowned for the quality and consistency of the crabs that are caught. The fishing practices of the Abacus fleet are “best in class” - they return to port with the blue swimmer crabs alive.

Being nearly 1,500km North of Perth, they are a long way from the market. As a result, the quality of the crabs are compromised if they are sent “fresh”, taking up to 5 days in transit to reach the East Coast of Australia.

Some years ago it was determined that processing the crabs as soon as they arrive at the wharf in Carnarvon, could assist in preserving their culinary quality and consistency. Historically, the processing has been to cook and freeze the crabs whole, however, this sector of the market remains commodity based with significant fluctuations in the return to the fishermen.

This project seeks to understand what opportunities exist for the further processing of the crabs in Carnarvon, to maximise their quality, consistency and provenance, whilst delivering an increased yield and providing a marketing based business model to the business.

To this end, today's tasting is the result of several months of research and development – commencing with a group of chefs, restaurateurs and caterers developing a suite of ideas and concepts for dishes which could be made using the *Abacus Premium Crab*, *Crab Stock* produced from the cooking liquor retained after cooking the live blue swimmer crabs; and crab mince,

produced from the mechanical extraction of meat from the legs and claws of the cooked crabs.

10.7.3. Protocol Abacus On-site Sensory Evaluation

1. Checklists

KEY POINTS

- Confirm timing with the chef, day before and or on the day
- Investigate parking
- Check kit before every visit.
- Appointments should take 30 min - Be conscious of time
- Use run sheet as reference for workflow and service details
- Work clean – tidy as you go
- Wash up hand tools from kit by hand, check off back into kit
- Record any verbal feedback for PJ

CHEF ASKED TO PROVIDE

- Combi Steamer plus trays
- 2 burners
- 2x 1 or 2 L pot
- 2 x soup bowls
- 2 x expresso cups
- 3 x entree plates

BYO KIT

PRODUCT TO PACK

- 2 boudin
- 2 timbale
- Bulk pack mousseline
- 1 rillette jar
- 4 pack crab cakes
- 2 pack consommé
- 2 pack bisque

TOOLS

- Pens / pencils
- Questionnaires
- Tasting spoons – plastic
- Napkins
- Tea towel
- Oil - rice bran or grape seed
- Cream approx 100 mL > decant into squeeze bottle
- Paper towel
- Fish slice/ palette knife
- Digital thermometer
- Scissors
- Measuring jug
- 20 cm non stick pan
- Timer
- Chux cloths
- Freezer brick
- Chill bag

2. Run sheet

Before		Timing		Key Points
	3 days prior		Defrost products	
	One day prior		Pack kit	
			Phone chefs to re-confirm appt.	Check equipment needs Parking Meeting place
During	**Introduction**	5 min	Lay out questionnaire and pens Wash hands	
			Set up equipment and tools	Combi oven – steam 70 °C − 2 Pots for soups − Pan for cakes
			Ingredients	− Oil − Cream
			Serving gear	− Plate plus paper towel − Small bowls/ cups for soups − Plate x timbale − Plate x Boudin − Teaspoons
	Explain products **Use summary sheet as prop**	20 min	Product 1 - Rillettes	− Dip/spread
			Product 2 - Consommé	− Soup starter / soup shot / crab stock
			Product 3 - Bisque	− Soup starter / soup shot / reduction sauce
			Product 4 - Boudin	− Starter
			- Timbale	− Starter
			- bulk mousseline	− Personalise mix – shape fold through ingredient
			Product 5 - Crab cake	− Canapé / starter
	Cook and serve products	5 min	Fill in questionnaires Check and ask questions Cleanup, wash up	
After	**Send thankyou email**			
	Record follow up feedback on database for PJ			

3. Handling/ cooking details

Product	Volume/ session	Prep	Equip - venue	BYO Tools	BYO food	Cook time/temp	Presentation
Rillettes	1 tub			Tasting spoons			Tasting spoons
Consommé	1 x 200 mL Doy Plus 1 spare	Defrost	Stove Pot 1 L Soup Bowl	Scissors		1. Empty pouch into pot. 2. Place on heat, bring to boil. 3. Pour into warm bowl. Serve.	Soup spoons Bowl
Bisque	1 x 200 mL Doy Plus 1 spare	Defrost	Stove Pot 1 L Soup Bowl	Small whisk Measuring jug scissors	Cream	1. Measure soup base into a pot 2. Place on heat, bring to boil. 3. Turn down and add measured cream, bring back to heat. 4. Pour into warm bowl. Serve.	Soup spoons Bowl
Mousseline	2 x Boudin	Defrost	Combi steam oven	-Kitchen Scissors -Meat thermometer -Digital Timer		1. Preheat combi steam oven to 70 °C steam 2. Add 1 timbale cook for 25 min 3. Add boudin cook for 8 min 4. OR until internal temp 51-55 °C 5. Remove with tongs 6. Cut the end of Boudin w scissors slide out onto plate. Serve	Spoon Plate
	2 timbale		Combi steamer			1. As per above internal temp 51-55 °C 2. Remove the lid and turn out onto plate. Serve	Spoon plate
	1 bulk range Piping bag/tub						
Crab cake	4 no. - Thermo tray	Defrost		-Pan - non stick 23 cm -Egg lifter -Paper towel	Grape seed OR rice bran oil	1. Preheat pan on a medium heat. 2. Add oil 2mm depth, heat until wavy or test with skewer, it should bubble. 3. Fry 2 cakes for 2 -3 min/ side or until golden brown 4. Transfer to plate/tray lined with paper towel. Serve	Plate / paper napkin Fork

Appendix 8: Creative Team Assessment of Product Concepts

Assessment Staff

10.8.1. Product Concept 1: CONSUMME

Costing: $11.50 a litre

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	68	77	79	81	75
2	69	79	83	78	93
3	74	73	99	88	80
4	73	89	89	90	88
5	43	57	51	50	45
6	58	77	70	70	41
7	71	96	95	53	80
8	64	57	86	72	66
9	54	57	70	62	54
10	77	46	80	68	68
11	38	70	69	62	31
AVE	**62.64**	**70.73**	**79.18**	**70.36**	**65.55**

Comments:

- Beautiful tasting crab soup
- Descriptives on flavour: clear, sweet, defined, intense and natural crab flavour
- Light broth
- Very versatile
- Flavoursome
- Great base ingredient- good as a basis for more developed soups and sauces
- Saffron notes
- Slightly over salted and a slight ammonia aroma, but tasty overall and good depth
- A little refines for mass retail
- Great for upmarket, high street operations, fish shops
- Good for café, restaurant (Asian noodle soup)
- Easy sell
- Enriched stock and soup base
- Not a product for the masses

10.8.2. Product Concept 2: CRAB BISQUE

Costing: $13.50 a litre

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	61	66	67	72	65
2	93	92	94	95	79
3	78	80	71	83	70
4	86	86	78	91	87
5	75	82	82	78	100
6	26	70	39	69	48
7	61	85	69	70	59
8	77	77	72	74	79
9	72	69	72	71	74
10	82	96	93	94	95
11	68	67	65	72	45
AVE	70.82	79.09	72.91	79.00	72.82

Comments:

- Descriptives on flavour: rich, creamy, clean, aromatic crab soup
- Would used for functions or high end restaurants
- Traditional bisque flavour and texture with a velvet finish
- Flavoursome, traditional
- Great flavour which is not overwhelming
- A little thin on the palate, lacking a bit of depth
- Good crab flavour
- Great as a base
- Hearty seafood bisque
- Very intense and tasty
- Very cost effective, flavourful bisque, which seems very home cooked/natural
- Maybe not for large retail, has possibility in Thomas Dux etc and premium independent retail

10.8.3. Product Concept 3: CRAB AND CORN SOUP

Costing: $16.50 per litre

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	36	36	36	39	41
2	97	77	52	70	66
3	36	37	37	40	34
4	25	15	16	12	25
5	88	3	48	25	0
6	25	11	10	11	2
7	93	85	85	84	83
8	60	73	63	67	53
9	75	72	78	75	73
10	88	63	83	78	47
11	83	63	68	78	73
AVE	64.18	48.64	52.36	52.64	45.18

Comments:

- A slightly softer chowder
- Maybe too bland for true crab lovers, but much more appealing to average consumer
- Certainly has retail potential if packaged well
- Good body- little under seasoned
- Good overall chowder
- Great flavour and colour
- Crab flavour and texture is a bit overpowered by corn flavour
- Could retail as ready to eat
- Fresh and textured hearty and rustic chowder
- Retail: very affordable (in tub fresh on cool room shelves)
- Would not buy in this format for work
- Lacking any crab flavour
- Unpleasant texture
- Woody, bald sweet corn, ruins the taste, not sweet enough
- Stale aftertaste
- Did not want to retaste
- Too expensive- does not deliver, would be a difficult sell
- Corn undercooked
- Expect a finished product for this price

10.8.4. Product Concept 6: CROMESKI

Costing: $0.58 a piece

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	62	59	62	70	61
2	58	57	58	59	59
3	41	31	32	35	52
4	62	71	81	82	31
5	39	39	24	31	12
6	23	19	14	21	17
7	63	78	63	73	64
8	70	75	78	70	80
9	81	79	70	68	59
10	75	76	78	77	28
11	54	71	70	60	45
AVE	**57.09**	**59.55**	**57.27**	**58.73**	**46.18**

Comments:

- Light crab filling, but needs more crab flavour
- Excellent crumb mix, firm
- Smooth and creamy bite- contrast crunch and smoothness
- Good size
- Very moist
- Well seasoned
- Good mouth feel
- Needs something else- herbs, lemon, corn?
- Will work in a medium function market price point
- Good for large canapé functions
- Oil fryer smell
- Pasty, uncooked flour taste
- Would not work for in-flight as a finished product, but perhaps the concept to make in house
- Lingering aftertaste could be improved- from possibly celery?
- Finger food marker, functions
- Retail: with a mix of other products frozen
- Not good value for size
- Pleasant product suited more towards food service and catering
- Difficult to see the price working in retail- does not taste expensive

10.8.5. Product Concept 7: CROQUETTE

Costing: $0.58 a piece

Panellist	Sensory Attributes				
	Aroma	Flavour	Texture	Overall Acceptability	Value
1	53	47	49	51	41
2	63	63	50	59	52
3	73	24	75	52	28
4	21	21	33	20	13
5	41	27	31	30	12
6	50	5	18	19	3
7	94	70	69	80	81
8	61	56	47	53	33
9	79	68	51	55	39
10	50	12	50	24	25
11	57	11	71	16	0
AVE	**58.36**	**36.73**	**49.45**	**41.73**	**29.73**

Comments:

- Very bland, can see crab but can‟t taste it
- No real redeeming features
- More work needed
- Good concept
- Would pay $2 for 3 times size if better flavours
- Potato very dry- add butter or drop % potato or use binder
- Need more intensity of crab
- Overpowering taste from crumb and potato
- Visually look great
- More likely to make in house from base
- Nice crisp outer coating
- Too much nutmeg, under seasoned
- Firmer filling
- To try and convince chefs it is a higher end food
- Great accompaniment for meat or fish dish or cocktail food
- Could be marketed at kids- „potato gem‟ style
- Run of the mill potato croquette

10.8.6. Product Concept 8: DAUPHINE

Costing: $0.58 a piece

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	50	48	47	46	41
2	68	61	76	70	47
3	64	65	48	66	58
4	52	55	64	74	82
5	49	55	60	50	68
6	72	73	63	62	81
7	78	77	77	77	81
8	61	60	39	55	20
9	84	73	70	69	57
10	57	10	38	34	30
11	47	14	31	27	4
AVE	**62.00**	**53.73**	**55.73**	**57.27**	**51.73**

Comments:

- Dislike flavour, texture
- Crunch and smoothness-mild flavours
- Asian influence on classic dish
- Fresh tasting, lemon background, point of difference
- Good balance in flavours on pallet
- Different concept
- Good saltiness, a lot of pepper
- Nice combination of crab, lemon and herbs
- Needs more crab flavour
- Good texture and nice crisp outer coasting
- Delicate
- Ideal for large canapé functions
- With improving- sell as part of retail variety packs
- Need to be much cheaper for retail applications- compete with imports

10.8.7. Product Concept 9: US CRAB CAKES

Costing: $1.45 a piece

Panellist	Sensory Attributes				
	Aroma	Flavour	Texture	Overall Acceptability	Value
1	56	54	60	59	60
2	90	90	90	92	67
3	82	80	80	79	49
4	80	80	79	81	65
5	67	42	28	46	26
6	69	65	65	52	60
7	82	96	96	90	49
8	76	76	77	78	61
9	83	57	62	61	60
10	78	27	62	40	39
11	83	63	82	69	22
AVE	**76.91**	**66.36**	**71.00**	**67.91**	**50.73**

Comments:

- Fresh spice flavour, but need more crab flavour
- Overpowered by herbs
- Too soft
- Good for catering functions
- Very tasty, moorish
- Spicy, textured
- Home style feel, BBQ food
- Over seasoned
- Outer shell too soft, crumb presentation lets it down
- Too expensive for size- look at larger size
- Would use with light salad
- Flavour would appeal to retail customers in frozen or MAP area
- Good concept- will work
- Would use it if available- high end functions

10.8.8. Product Concept 11: LASAGNE

Costing: $4.50 for 180 g

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	60	56	59	65	52
2	73	30	82	47	26
3	86	65	30	53	57
4	46	67	68	72	49
5	45	82	71	70	71
6	31	7	16	16	4
7	93	92	84	92	65
8	74	79	79	80	80
9	71	56	59	64	50
10	81	75	76	75	68
11	80	76	83	78	66
AVE	**67.27**	**62.27**	**64.27**	**64.73**	**53.45**

Comments:

- Nice delicate flavour
- Tomato compliments the crab
- Good balance ratio with crab
- Good flavours
- Needs salt, less ricotta
- Need more intense flavours
- Requires a little more seasoning
- Requires slightly more texture
- Too much like a „TV" dinner- needs something to take it to the next level
- Can see a market for it
- Retail: frozen, ready to eat at high end grocers
- Too expensive for mass retail

10.8.9. Product Concept 12: GRATIN

Costing: $4.50 for 180 g

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	54	55	57	54	52
2	71	48	48	49	35
3	67	67	9	37	50
4	48	48	34	47	57
5	55	61	20	45	32
6	5	54	30	47	32
7	72	20	20	50	33
8	85	58	75	73	50
9	85	70	44	70	45
10	51	50	64	50	31
11	74	63	45	69	29
AVE	**60.64**	**54.00**	**40.55**	**53.73**	**40.55**

Comments:

- Slightly lacking in flavour
- Strong crust
- Custard like
- Creamy and light
- Needs more crab flavour
- Well seasoned
- Cheese overpowering
- Too soft in consistency- requires another ingredient eg firm fish
- Need more texture, bite
- Can feel crab shell
- Work as a side to a main dish
- Could work well as a base concept for food service
- Questionable on how it would actually be accepted at price point
- Would buy retail if the texture was firmer
- A little bland for high end retail

10.8.10. Product Concept 13: CRAB PIE

Costing: $4.50 for 180 g

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	58	56	56	58	56
2	67	81	83	77	66
3	60	37	68	61	51
4	32	24	30	30	26
5	70	46	45	52	57
6	50	35	24	41	46
7	80	67	67	75	65
8	65	71	76	73	66
9	60	55	74	74	64
10	79	47	63	65	34
11	76	48	72	71	33
AVE	**63.36**	**51.55**	**59.82**	**61.55**	**51.27**

Comments:

- Nice top with potato, but may need to cut down amount of potato
- Good flavours. Seasoning
- Great for summer, light
- Need a little more salt
- Lovely balance of flavour
- Very delicate, needs a little more seasoning
- Crab flavour is lost amongst potato
- Good product concept
- Too expensive for end result
- Benefit from adding a firm fish and vegetables

10.8.11. Product Concept 14: RILLETTE

Costing: $16 a kg

Panellist	Sensory Attributes				
	Aroma	Flavour	Texture	Overall Acceptability	Value
1	63	67	69	69	62
2	54	85	87	76	72
3	78	81	79	77	95
4	80	80	79	80	77
5	76	75	57	65	70
6	71	76	55	68	64
7	78	90	65	73	62
8	70	70	67	73	80
9	64	71	80	71	61
10	68	68	69	69	63
11	64	64	80	65	0
AVE	**69.64**	**75.18**	**71.55**	**71.45**	**64.18**

Comments:

- Well seasoned
- Well balanced
- More crab flavour- but with the premium meat
- Nice balance of flavours
- Creamy, zesty buttery paste
- Definitely work in food service
- Some shell appeared
- High end branded retail
- Work well as a canapé, dip, spread
- Versatile into marker
- Could see this being used in large scale functions

10.8.12. Product Concept 15: SANDWICH FILLING

Costing: $16 a kg

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	49	53	55	57	49
2	71	46	45	46	44
3	96	96	95	96	93
4	90	90	90	90	85
5	62	64	31	50	45
6	65	61	78	59	72
7	95	95	94	94	67
8	59	71	69	70	65
9	64	69	65	66	43
10	50	45	47	47	48
11	49	72	73	72	0
AVE	**68.18**	**69.27**	**67.45**	**67.91**	**55.55**

Comments:

- Flavour a little fat
- Clean mixture
- Good crab flavour, colour
- Great flavour, texture and mouth feel
- Not fishy like most crab sandwich mixes
- Also suitable for pate and dip
- Great in summer
- Point of difference
- Easy to sell
- Definitely has a market for this

10.8.13. Product Concept 16: CRAB TOAST

Costing: $18 ($0.35 a piece)

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	55	50	61	55	56
2	83	82	82	83	76
3	49	54	58	58	41
4	57	58	57	58	74
5	66	45	52	57	38
6	64	25	73	39	46
7	90	83	83	89	76
8	85	90	90	90	95
9	84	85	84	83	82
10	81	79	78	77	70
11	73	68	72	65	15
AVE	**71.55**	**65.36**	**71.82**	**68.55**	**60.82**

Comments:

- Strong prawn flavour
- An interesting twist on an old fragrant
- Nice crunchy base
- Sesame seeds work well
- Oily aftertaste
- Needs more topping
- Would only buy product depending on its ability to freeze and come back- especially the bread component
- Good value
- Will work in high volume function work
- Easy sell
- Nothing like it around
- Will work well as canapé
- Great concept
- Sell in piping bag too for application on toast at venue?
- Could try the topping as the filler in the dauphine, cromeski or croquette
- Food service and catering applications
- Limited retail uses

10.8.14. Product Concept 17: WONTON

Costing: $18 ($0.35 a piece)

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	57	59	59	60	61
2	85	86	93	85	80
3	87	90	91	87	77
4	80	80	80	80	83
5	68	68	68	67	64
6	71	62	63	55	61
7	83	65	31	61	67
8	66	72	67	71	61
9	82	74	69	79	62
10	83	81	81	81	65
11	90	75	82	78	58
AVE	**77.45**	**73.82**	**71.27**	**73.09**	**67.18**

Comments:

- Great texture and flavour
- Descriptives on flavour: aromatic, fresh, delicate
- Wonton pastry was not rubbery
- Nice ginger notes
- Needs water chestnuts
- Needs salt
- winner
- Could use as ravioli style as well
- Very versatile
- Ideal for food service- see it served on spoons in catering
- Tastes expensive compared to others
- Sell with Asian style broth

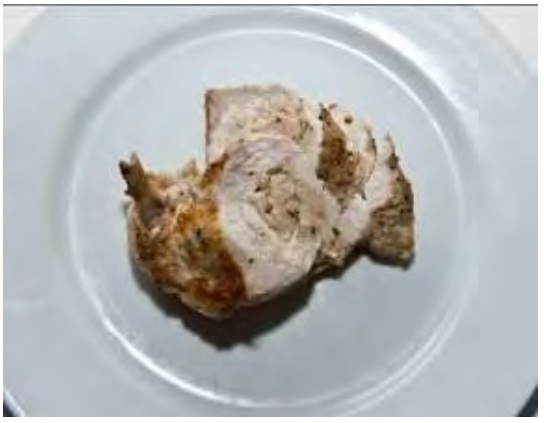
10.8.15. Product Concept 18: FILLED CHICKEN

Costing: $3.50 a piece

Panellist	Sensory Attributes				
	Aroma	Flavour	Texture	Overall Acceptability	Value
1	66	63	60	64	65
2	77	65	83	74	81
3	47	38	48	40	69
4	59	50	59	62	72
5	16	5	5	5	0
6	47	10	28	28	35
7	37	45	35	39	73
8	80	58	61	65	31
9	81	58	41	46	32
10	62	42	42	41	56
11	64	56	42	78	85
AVE	**57.82**	**44.55**	**45.82**	**49.27**	**54.45**

Comments:

- Too pasty/floury
- Bland
- Lacking crab flavour
- Need more filling
- More flavour required
- Could stuff the filling under the skin instead?
- Good concept- product has various applications as long as the filling is visual and tasty
- When developed, would be a good high end product
- Potential in retail if stuffed in seafood (squid, cuttlefish)



10.8.16. Product Concept 19: HOT TIMBALE

Costing: $20 ($2.40 for one)

Panellist	Sensory Attributes				Value
	Aroma	Flavour	Texture	Overall Acceptability	
1	60	65	70	66	53
2	77	83	62	73	68
3	68	66	68	67	50
4	90	90	90	90	90
5	33	60	46	49	47
6	67	81	82	81	83
7	64	62	62	62	68
8	78	80	86	95	82
9	90	90	73	82	79
10	92	95	68	77	89
11	55	72	83	73	92
AVE	**70.36**	**76.73**	**71.82**	**74.09**	**72.82**

Comments:

- Great flavour
- Very versatile
- Great for retail, production and functions
- Need slightly more sauce
- Light texture
- Good crab flavour
- Creamy interior
- Slightly gritty
- WOW factor
- Great presentation
- Great value high volume entrée
- Would sell itself as an entrée or canapé style
- Could work in retail at this price
- Great solid concept

10.9. Appendix 9: Nutritional Composition

10.9.1. Raw materials for nutritional composition

	Premium Crab Meat (per 100 g)	Crab Mince (per 100 g)	Crab stock (per 100 g)
Energy (kJ)	350	300	10
Protein(g)	20.9	16.7	0.7
Fat-total (g)	< 0.1	0.5	< 0.2
Saturated Fat (g)	< 0.1	0.2	-
Carbohydrates (g)	< 1	< 1	< 1
Sugars (g)	< 1	< 1	< 1
Sodium(mg)	375	480	240

10.9.2. Crab Bisque nutritional composition

NUTRITION INFORMATION

Servings per package: 5.00
Serving size: 200.00 **mL**

	Average Quantity per Serving	Average Quantity per 100 mL
Energy	708 **kJ**	354 **kJ**
Protein	7.6 **g**	3.8 **g**
Fat, total	12.7 **g**	6.4 **g**
- saturated	8.0 **g**	4.0 **g**
Carbohydrate	4.5 **g**	2.2 **g**
- sugars	1.8 **g**	0.9 **g**
Sodium	594 **mg**	297 **mg**

10.9.3. Crab Consommé Nutritional composition

NUTRITION INFORMATION

Servings per package: 4.00
Serving size: 200.00 **mL**

	Average Quantity per Serving	Average Quantity per 100 mL
Energy	247 **kJ**	123 **kJ**
Protein	9.1 **g**	4.5 **g**
Fat, total	0.7 **g**	0.3 **g**
- saturated	0.1 **g**	0.0 **g**
Carbohydrate	5.0 **g**	2.5 **g**
- sugars	2.5 **g**	1.3 **g**
Sodium	629 **mg**	314 **mg**

10.9.4. US Crab Cakes Nutritional composition

NUTRITION INFORMATION

Servings per package: 20.00
Serving size: 35.00 **g**

	Average Quantity per Serving	Average Quantity per 100 g
Energy	229 **kJ**	655 **kJ**
Protein	4.3 **g**	12.3 **g**
Fat, total	2.7 **g**	7.8 **g**
- saturated	0.8 **g**	2.2 **g**
Carbohydrate	3.5 **g**	10.0 **g**
- sugars	0.8 **g**	2.3 **g**
Sodium	135 **mg**	385 **mg**

10.9.5. Crab Timbale Nutritional composition

NUTRITION INFORMATION

Servings per package: 1.00
Serving size: 80.00 **g**

	Average Quantity per Serving	Average Quantity per 100 g
Energy	538 **kJ**	672 **kJ**
Protein	9.9 **g**	12.3 **g**
Fat, total	9.5 **g**	11.9 **g**
- saturated	6.1 **g**	7.7 **g**
Carbohydrate	1.2 **g**	1.6 **g**
- sugars	0.8 **g**	1.0 **g**
Sodium	203 **mg**	254 **mg**

10.9.6. Crab Boudin Nutritional Composition

NUTRITION INFORMATION

Servings per package: 1.00
Serving size: 50.00 **g**

	Average Quantity per Serving	Average Quantity per 100 g
Energy	373 **kJ**	746 **kJ**
Protein	7.2 **g**	14.3 **g**
Fat, total	6.6 **g**	13.2 **g**
- saturated	4.2 **g**	8.5 **g**
Carbohydrate	0.7 **g**	1.4 **g**
- sugars	0.5 **g**	1.0 **g**
Sodium	122 **mg**	244 **mg**

10.9.7. Crab Rillette Nutritional composition

NUTRITION INFORMATION

Servings per package: 4.00
Serving size: 25.00 g

	Average Qu<ntity per Serving	Average Quantity per 100 g
Energy	410 **kJ**	1640 **kJ**
Protein	26 **g**	10.3 g
Fat, total	99 g	39.6 g
• saturated	32 **g**	12.9 **g**
Carbohydrate	02 **g**	1.0 g
- **sugars**	00 g	0.2 g
Sodium	E2 **mg**	326 **mg**

10.10. Appendix 10: STAGE 4 Sensory Analysis Statistics

10.10.1. Two sample t test- significance between chef interview group and segment group

Rillettes

		Levene's Test for Equality of Variances F	Sig.	t	df	Sig. (2-tailed)
Appearance	Equal variances assumed	1.306	0.254	6.482	522	0.000
	Equal variances not assumed			6.246	120.463	0.000
Aroma	Equal variances assumed	0.000	0.997	6.599	520	0.000
	Equal variances not assumed			6.539	123.745	0.000
Flavour	Equal variances assumed	0.217	0.642	5.583	522	0.000
	Equal variances not assumed			5.547	123.876	0.000
Texture	Equal variances assumed	1.306	0.254	6.482	522	0.000
	Equal variances not assumed			6.246	120.463	0.000
Overall acceptability	Equal variances assumed	0.000	0.997	6.599	520	0.000
	Equal variances not assumed			6.539	123.745	0.000

Consomme

		Levene's Test for Equality of Variances F	Sig.	t	df	Sig. (2-tailed)
Appearance	Equal variances assumed	1.595	0.210	2.764	85	0.007
	Equal variances not assumed			2.436	18.184	0.025
Aroma	Equal variances assumed	0.581	0.448	2.372	85	0.020
	Equal variances not assumed			2.123	18.402	0.048
Flavour	Equal variances assumed	0.266	0.607	1.367	85	0.175
	Equal variances not assumed			1.415	21.000	0.172

Texture	Equal variances assumed	0.299	0.586	2.133	83	0.036
	Equal variances not assumed			2.284	22.065	0.032
Overall acceptability	Equal variances assumed	0.885	0.350	2.059	84	0.043
	Equal variances not assumed			1.861	18.599	0.079

Crab bisque

		Levene's Test for Equality of Variances		**t**	**df**	**Sig. (2-tailed)**
		F	**Sig.**			
Appearance	Equal variances assumed	0.173	0.678	2.110	87	0.038
	Equal variances not assumed			2.277	21.766	0.033
Aroma	Equal variances assumed	0.922	0.340	2.383	87	0.019
	Equal variances not assumed			2.219	18.867	0.039
Flavour	Equal variances assumed	0.099	0.754	1.083	87	0.282
	Equal variances not assumed			1.075	19.959	0.295
Texture	Equal variances assumed	1.593	0.210	2.194	87	0.031
	Equal variances not assumed			1.933	18.086	0.069
Overall acceptability	Equal variances assumed	0.091	0.763	1.705	87	0.092
	Equal variances not assumed			1.549	18.495	0.138

Crab boudin

		Levene's Test for Equality of Variances		**t**	**df**	**Sig. (2-tailed)**
		F	**Sig.**			
Appearance	Equal variances assumed	4.831	0.031	3.282	86	0.001
	Equal variances not assumed			4.495	31.880	0.000

Aroma	Equal variances assumed	1.039	0.311	4.189	86	0.000
	Equal variances not assumed			4.525	21.912	0.000
Flavour	Equal variances assumed	0.717	0.399	3.637	86	0.000
	Equal variances not assumed			4.013	22.477	0.001
Texture	Equal variances assumed	3.215	0.076	3.468	86	0.001
	Equal variances not assumed			4.228	25.818	0.000
Overall acceptability	Equal variances assumed	0.773	0.382	3.847	86	0.000
	Equal variances not assumed			4.145	21.842	0.000

Crab timbale

		Levene's Test for Equality of Variances		**t**	**df**	**Sig. (2-tailed)**
		F	**Sig.**			
Appearance	Equal variances assumed	0.090	0.765	2.478	85	0.015
	Equal variances not assumed			2.327	19.131	0.031
Aroma	Equal variances assumed	2.021	0.159	1.569	85	0.120
	Equal variances not assumed			1.896	25.678	0.069
Flavour	Equal variances assumed	0.011	0.917	2.244	85	0.027
	Equal variances not assumed			2.303	20.807	0.032
Texture	Equal variances assumed	0.371	0.544	2.435	85	0.017
	Equal variances not assumed			2.226	18.706	0.039
Overall acceptability	Equal variances assumed	0.629	0.430	2.233	85	0.028

	Equal variances not assumed			2.075	18.958	0.052

US crab cake

		Levene's Test for Equality of Variances		t	df	Sig. (2-tailed)
		F	Sig.			
Appearance	Equal variances assumed	0.033	0.857	2.084	85	0.040
	Equal variances not assumed			1.930	17.218	0.070
Aroma	Equal variances assumed	0.156	0.694	2.799	85	0.006
	Equal variances not assumed			2.752	18.070	0.013
Flavour	Equal variances assumed	0.023	0.879	2.137	85	0.035
	Equal variances not assumed			2.248	19.252	0.036
Texture	Equal variances assumed	0.103	0.749	2.346	85	0.021
	Equal variances not assumed			2.117	16.891	0.049
Overall acceptability	Equal variances assumed	1.479	0.227	2.586	85	0.011
	Equal variances not assumed			2.310	16.777	0.034

10.10.2. One way ANOVA- chef interview group

		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	10223.934	5	2044.787	4.430	0.001
	Within Groups	37846.510	82	461.543		
	Total	48070.443	87			
Aroma	Between Groups	7897.996	5	1579.599	4.004	0.003
	Within Groups	32351.095	82	394.526		
	Total	40249.091	87			

Flavour	Between Groups	8053.678	5	1610.736	2.992	0.016
	Within Groups	44146.276	82	538.369		
	Total	52199.955	87			
Texture	Between Groups	8050.807	5	1610.161	3.116	0.013
	Within Groups	42378.090	82	516.806		
	Total	50428.898	87			
Overall	Between Groups	7734.413	5	1546.883	2.618	0.030
	Within Groups	48445.905	82	590.804		
	Total	56180.318	87			

10.10.3. One way ANOVA- rest show group

		Sum of Squares	df	Mean Square	F	Sig.
Appearance	Between Groups	17545.370	5	3509.074	9.494	0.000
	Within Groups	120862.522	327	369.610		
	Total	138407.892	332			
Aroma	Between Groups	18759.368	5	3751.874	10.458	0.000
	Within Groups	116593.297	325	358.749		
	Total	135352.665	330			
Flavour	Between Groups	16809.586	5	3361.917	7.398	0.000
	Within Groups	148606.059	327	454.453		
	Total	165415.646	332			
Texture	Between Groups	14780.007	5	2956.001	6.949	0.000
	Within Groups	137815.084	324	425.355		
	Total	152595.091	329			
Overall	Between Groups	16344.328	5	3268.866	8.302	0.000
	Within Groups	127961.019	325	393.726		
	Total	144305.347	330			

10.10.4. One way ANOVA- segment group

		Sum of	df	Mean Square	Sig.

		Squares			
Appearance	Between Groups	19370.556	5	3874.111	0.000
	Within Groups	195617.096	430	454.923	
	Total	214987.651	435		
Aroma	Between Groups	15392.627	5	3078.525	0.000
	Within Groups	179510.046	428	419.416	
	Total	194902.673	433		
Flavour	Between Groups	11154.920	5	2230.984	0.002
	Within Groups	244787.392	430	569.273	
	Total	255942.312	435		
Texture	Between Groups	16108.545	5	3221.709	0.000
	Within Groups	221324.707	427	518.325	
	Total	237433.252	432		
Overall	Between Groups	13224.095	5	2644.819	0.000
	Within Groups	203159.241	428	474.671	
	Total	216383.336	433		

10.11. Appendix 11: Crab Cake User Guide

Abacus Blue Swimmer Crab Cakes

The muftiaward winning Abacus Fisheries processing facility is located in the World Heritage listed Shark Bay of Western Australia.

Abacus Crab Cakes are produced at our Western Austra ian processing facility using only tll9 freshest and highest quality Blue Swimmer Crab Meat that is processed daily from our crab catch ensuring we capture the freshness and rich flavour of the Blue SWimmer Crab in our unique Australan Style Crab cake.

The crab meat is comb lled with Australfin grown fre-sh herbs. *zesty* lemon, mayonnaise, with a hint of cayenne before the cakes are lightty coated in a Japanese style Panko crumb.

The crispy crumbs give way to a soft centre laden with rich fresh flavours which enhance the tender Blue Swimmer Crab meat that will delight the most discern ng palate.

Abarus Frsheries are proud to be a member of the Australian fi sh ng Industry produc ng a Wild caught Australian Blue Swimmer Crab Cske for the Foodservice Industry. We thank you for your support.

We practiSE! and support sustainable fishing to ensure Australian Seafood for future generations.

Storage

Storage: Frozen -18C

Handling: KeepFtmen untilready touse.

We strongly recommend defro5ting *the* crab cake fla refrigerator ot prior to use.

The product is best used once it is defrosted to maintain the qualitv of the delicate Panko Crumb coeting.

11 can kep4 refrigerated for up to 3 days once defrosted if required but please note the aboYe point..

What's in !he Carton

The master carton contains 5 imer canons x 3 IntiW:IJalPacks:
06 x 30g Crab C<8:esl

t8 Abecus Crab Cakes per innet canon
Z40 Abacus Q<lb Cakes per ma er canon

=>erfectfor

Canapes. Tapas. cel salad staner. Entrees. Seafood Planers. Seafood buffet.. HSa'l000es 01' *any* other e1100t !hat Mil be enhanced by the rich ftavour of Ausuaian Blue Swimmer Crab.

Menu tioos f0f single enuee serving

3 X Blue swimmer crab cakes with lemon aioi

3 X Blue swiftwne.f crab cakes tomato salsa

1 X Blue swirrwnef crab minb rioche burger

3 X Blue swimmer crab cake and mannated cuc:urbet salad

::Ooking Instructions

Uote:For best results the Crab Cakes need to be defrosted before cooking.

"PrENerredMethod" – Shallow fly defrosted Abecus Oab CaJ:es ewer a medium bw·medium heat for 2minutes on each side or unt1 golden brown.

lips: U-se a heavy based pan Cook in Grape Seed Oil Rice Bran Oibr *othei* qualitv Vegetable Oi.

Oreep Fry.ng -Cook defrosted Abacus Oab Cakes at 160C until gotico in colour.

To maximise the delicate ftavour of the aab it is reconwnended the Abacus Crab Cake stand for 3 to 6 minutes before serving.

Important Notice

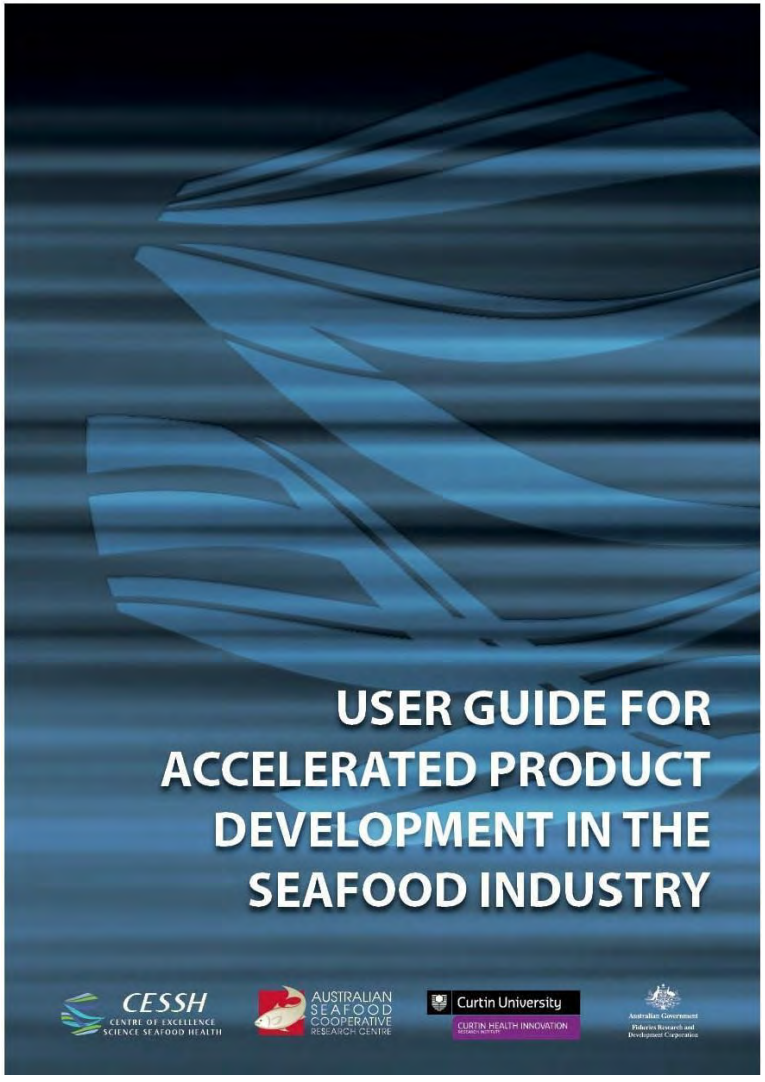
React,o to Cook • Ptodlct must be cooked above 70C beforese .

fAade with Fresh Aosualian Blue Swimmer Crab Meat may contain shell.

Net Weight 1.44 Kg per inner carton – 7.2kg per master carton

Abacus Fisheries Co. Pty. Ltd.
Po Box 626 Camarvon,
Western Australia 6701
peter@abacusfisheries.com.au
www.abacusfisheries.com.au

10.12. Appendix 12: Accelerated Product Development User Guide



INTRODUCTION

Commonly, the success of new product development for the seafood industry has been hindered by the seafood business needing to commit significant financial outlay for production despite uncertainties of the marketability of the product

This document describes an innovative seafood product development and marketing methodology, based on the stage-gate idea to launch process'.The method involves a short, intense period of product "ideation" and development before assessing the production and market feasibility of the agreed product concept following small scale production. Cost is minimised by this approach, which can be conducted in a commercial kitchen, and encompasses conceptualization, desktop development (both culinary and commercial) and the audit for evaluation (both culinary and commercial) in a few days.Additionally all of the stakeholders in the product development process input in early stages, hence fast tracking the process.

The results is a series of value added products that have been researched, developed, casted, branded and trialled in the marketplace prior to large financial commitment to facilitate production. This new methodology, building the products from desk-top to cook-top, and improving the likelihood of market success prior to large scale production, represents an innovative approach to seafood product development in **smaller businesses.**

This process has been piloted on a range of blue swimmer crab value added products produced by Abacus Fisheries. This case study is described in Section 3 of the document.

"Cooper RG. The Stage-Gate idea-to-launch process: Update, what's new and NexGen systems. Journal of Product Innovation Management. 2008;25(3):213-232.

METHODOLOGY

ACCELERATED PRODUCT DEVELOPMENT

Phase 1: Discovery/ideation/scoping.

Phase 1A: Preparation

1. Choose facilitator: The facilitator should have the ability and capital to bring together the group of stakeholders that form the ideation team and the group of stakeholders that form the technical team.
2. Develop technical team: The technical team will assess the product concepts from the view of commercial and production feasibility. It is suggested that the **technical team contains the following elements/expertise:**
   - industry partner(s)
   - **Facilitator**
   - Executive chef to prepare products
   - Seafood Processor(s) to provide advice on commercial feasibility
   - Food Scientist(s) to provide technical advice
   - Administrative Support.
3. Develop the ideation team: The ideation team will be responsible for developing the new product concepts based on the raw materials. The ideation team should include chefs, food service operators, retailers, market and product development **specialists and a food manufacturer**
4. Organise venue: Ideally the venue will provide facilities for the discussion and assessment of the ingredients and the developed products. One option is a full commercial restaurant, therefore enabling development, production and **testing of the concepts.**
5. Develop background summary which should include background on the **primary production operation, summary of products currently available and** base ingredients to form basis for any further product development.

Phase 1b. Ideation (0.5 to 1 day)

1. **Convene ideation group.**
2. Provide brief background to project and fishery operation. Include discussion on the initial ingredients/raw materials to be assessed and facilitate an open forum **discussion to allow for idea development, between sectors and stakeholders in** the industry.
3. **Develop small focus groups comprising team members from different disciplines.** Present these smaller groups with the same ingredients and request them to develop 10 ideas per ingredient and 10 ideas combining the ingredients.
4. Ask each focus group to report back, combine ideas and summarise results.

Phase 2: Commence building business case

1. Product concepts/ideas are captured and then assessed for their technical production and commercial opportunities/viability by the technical team. This should include an assessment of the potential production costs of the product. Following this assessment select a number of the product concepts/ideas for **their potential commercial, culinary and production capabilities.**
2. Ask an executive chef to prepare the concepts and re-present these dishes to the ideation team for sensory, culinary and commercial assessment (see Figure 1 for example of assessment form).
3. Analyse the results of the sensory, culinary and commercial assessments and identify up to 6 products to be taken to Phase 3.

Figure 1: Example of ideation team product assessment form

Product Number:

Please mark the scale with a vertical dash (|) to correspond with your preference on the scale.

Dislike extremely — *Like extremely*

Aroma

Flavour

Texture

Overall

How would you describe this product:

Value

This product will cost . How likely are you to purchase this product?

Definitely not — *Highly likely*

Phase 3: Development/feasibility for commercial production

Small scale commercial production trials should be undertaken with the chosen products. These trials should include the following:

1. Determine the processing steps including developing the draft formulation, sourcing ingredients and ensuring suitable equipment is available.
2. **Determine the viability of producing the product in commercial scale production.**
3. Commence Assessment of the products including examination of the following aspects:

Quality, chemical testing of produced product
Shelf life (micro organisms to test - FSANZ) Salmonella Staphylococci **Determine use by date**
Proximate Composition (for nutritional panel)
Food Safety (HACCP)
Allergens
Packaging (eg. Modified Atmosphere)
Labelling

Plan sensory evaluation
Choose target market
Type of panellists - consumer (untrained)
Type of test (for preference, acceptance?)
If the product is not accepted by the sensory panellists, reformulation of products will need to be conducted and sensory evaluation will have be to conducted again.

Phase 4: Testing and validation (secondary end-user consultation)

A secondary consultation which includes sensory, market and presentation assessments should be undertaken to further define the product list.

This should encompass planning to ensure statistically significant levels of end users are included. The process will include:

Development of product for trials
Development of survey instruments (see example see Figure 2).
Development of consistent consultation/presentation protocols to gain feedback from the end-users.
Recruitment of participants (at statistically significant levels) and including ethical considerations.

The results of the end-user consultation will be used to identify the final products to be taken to launch. Note that the end-users from this phase form the basis for a database of possible customers when the product is launched.

The final products will be subject to further technical testing including:

Final Commercial production trials and development of final formulations, processes, QA and HACCP plans as required.
Final Packaging to be developed and produced.
Labelling (composition and ingredients).
Final trials for food safety, composition and shelf-life.

Phase 5: Launch

The product should be launched ensuring all end-users submitting assessments **through the process are invited/provided with information.**

Figure 2: Example of survey instrument for secondary consultation

Product: US crab cake

We are trialling an innovative new product development process to ensure a successful outcome is reached when the product hits the market. This a project funded by the Seafood CRC The methodology is being trialled using Abacus Crab products. but it is expected the principles applied can be directly transferable to other sectors.

Please mark the scale with a vertical dash (I) to correspond with your preference on the scale.

Dislike extremely *Like extremely*

Appearance

Aroma

Flavour

Overall

Texture

How would you use this product"?

Ingredient/ Basis of a dish Stand alone dish

What do you think is a reasonable size for one crab cake?

20 g 30g 35 g 40g

How many crab cakes in a package would you prefer the product to come in?

25 pieces 50pieces 100 pieces 200

What type of packaging would you prefer the product to come in?

Cardboard package Plastic tray Plastic Pouch

How much are you willing to pay for a serving of 2 crab cakes at 35g a piece?

less than $1.00 $1.00-$1.50 $1.50-$2.00 2.00-$2.50 More than .2.50

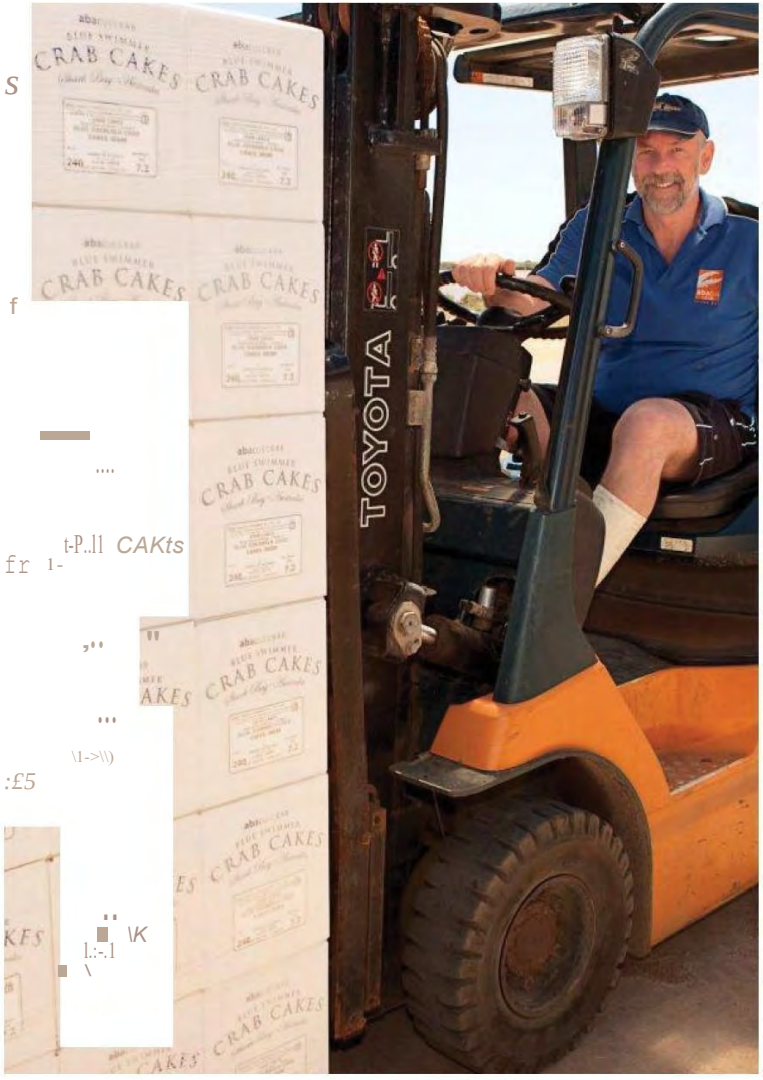
How likely are you to purchase this product?

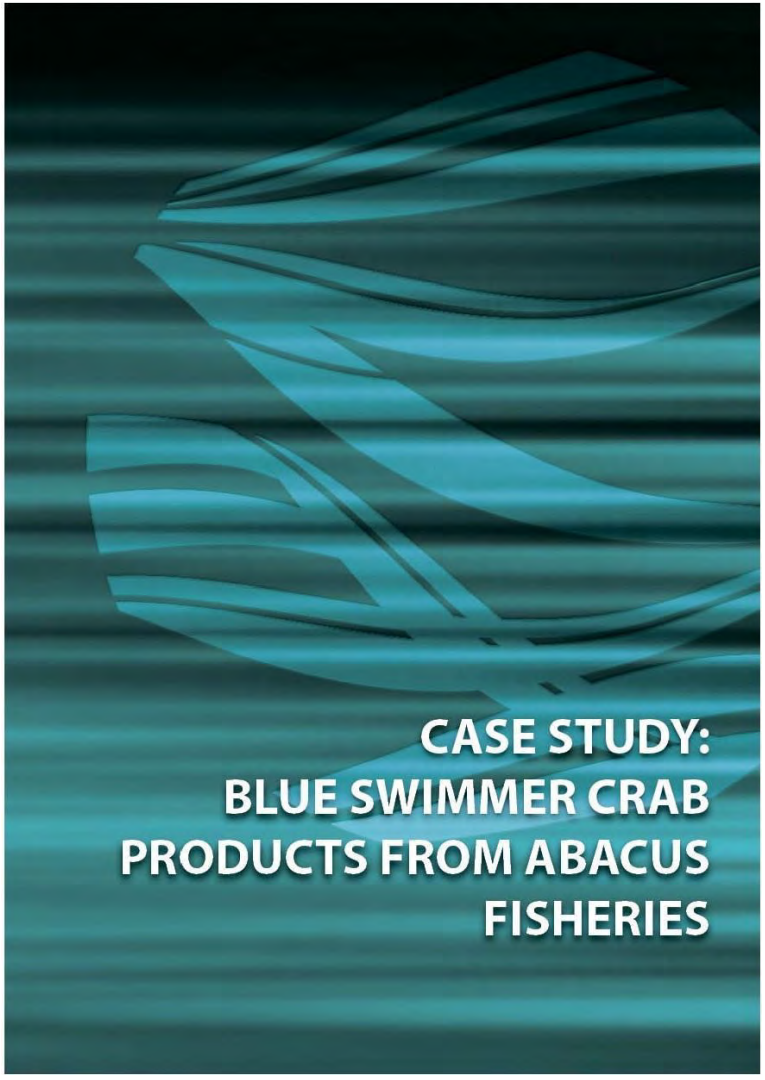
Definitely not Probably not May/may not Probably Definitely

How applicable is this product to your business?

Definitely not Probably not May/may not Probably Definitely

Additional Comments:





BACKGROUND

Abacus Crab is produced by Abacus Fisheries, a vertically integrated crab catching, processing and marketing business, based in Carnarvon, North-West Western Australia.

Abacus operate a fleet of day-boats, which fish the World Heritage listed waters of Shark Bay. As the largest blue swimmer crab fishery in Australia, the Shark Bay region is renowned for the quality and consistency of the crabs that are caught. The fishing practices of the Abacus fleet are "best in class" - they return to port with the blue swimmer crabs alive.

Being nearly 1,500km north of Perth, they are a long way from the market. As a result, the quality of the crabs are compromised if they are sent "fresh" taking up to 5 days in transit to reach the East Coast of Australia.

Some years ago it was determined that processing the crabs as soon as they arrive at the wharf in Carnarvon, could assist in preserving their culinary quality and consistency. Historically, the processing has been to cook and freeze the crabs whole, or to pick the premium meat off the crabs, however, this sector of the market remains commodity based with significant fluctuations in the return to the fishermen.

This accelerated product development project sought to understand what opportunities exist for the further processing of the crabs in Carnarvon, to maximise their quality, consistency and provenance, whilst delivering an increased yield and providing a marketing based business model to the business.

Abacus fisheries has previously undertaken preliminary market and product development research to extend its blue swimmer crab product range. Such work has included utilization of excess product and production waste to produce a crab mornay and a crab stock. However, in committing to these value added products, Abacus has already spent close to $1 million on extended factory space and new equipment and product development and market research. This project was aimed to decrease the risk for the business in further undertaking expensive factory modifications required to produce the new products when marketability is uncertain.

APPLICATION

Application of accelerated product development methodology to Abacus crab products.

Phase 1: Discovery/ideation/scoping

The Ideation process was conducted in Sydney. It involved a panel of food industry professionals from a range of sectors in a series of collaborative creative sessions.The sessions were facilitated by John Susman.

In the first part of the process, raw ingredients produced at Abacus Fisheries were reviewed by the panel and considered for their primary characteristics. The raw ingredients were – Crab Stock (cooking water),Crab Mince (mechanically separated meat), Crab Fat (Sediment from stock production), Crab Shell, Crab Mornay and Premium Crab Meat.

Following an initial assessment of the ingredients, a series of ideation panels were formed and a range of concepts created against a set of commercialand culinary criteria.92 product concepts were produced.Table 1shows the outcomes ofthe first day's ideation, based on the panel reviewing the raw ingredients (Stock, Mince and premium meat) both individuallyand combined.

COMBINATION

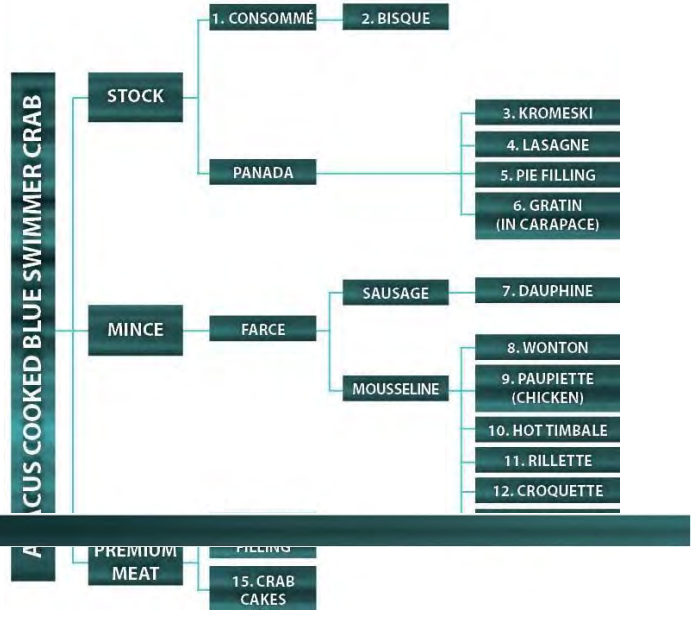
Gunkan

Table 1.Outcomes of the first dayideation

Stock (fume)	Sandwich spread (crab toast)	Sushi	Gratin
Laksa base	Wanton	Smaller retail packs	Salt and pepper
Consomme (with tomato)	Terrine	As is	crab Carapace filled
Saffron bouillon	Spring rolls	Crab oil	crab and bread crumbs
Bisque	Pate	Ravioli	Timbale (hot/cold)
Crab and sweetcorn	Gyoza	Crab salad	Dressed salad
Fisherman miso soup	Sauce	Sandwich filling	Risotto
Terrine	Filled pasta		Salad"ready packs"
Ponzu	Croquette		Fish pie
XO sauce	Two-bite ball		Greenseas retail pouch
Paste	Fritters		Chowder (with meat)
Vinaigrette	Sausage		Bouillabaisse
Salt and pepper	Shoyu rillettes		Pasta sauce base
crab base	Crab cake		Two-pack sauce and meat dressing
Crab essence powder	Mini quiche		Seafood packs
Souffle base	Boudin (with fish)		Lasagne
Pie filling	Mousseline		
Gromeski	Chilli crab in shell		
	Rillettes		
	Omelette base		
	Dauphine		

The technical team convened and reduced the product concepts to 15.Products were eliminated through assessment of their technical production, commercial opportunities and practical and culinary applications. The final 15 products are shown in Figure 2.

Figure 2: Fina/15products for phase 2 assessment.

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Phase 2: Commence building business case

The next <tage of the proce«involved the production of the 1S concept<,by a team of on-site chefs.The technical and stakehdders team advised the chefs on industrial productn practices – although the samples produced were of re<taurant quality and style.

The ideation panel was re-convened on day 4, to assess the 15 products and to interpret the culinary and commercial aspects of each.

There were 1S product concepts tested, including 3 currently available retail products **for benchmarking. These products were consomme, bisque, crab and corn soup,** bisque (commercial),chowder (commercial),kromeski,croquette,dauphine,US crab cake,crab cake (commercial) ,lasagne,gratin, crab pie,ril ettes,sandwich filling,crab toast,wanton, filled chicken and hot timbale.

Each product concept was assessed by 11 panellists using the form shown In Fg ure 1. Analysis of the results was conducted using the one way ANOVA test.

Table 2 shows the top seven ranking crab product concepts in each of the following attributes:flavour, texture,overall acceptability and value.

Table2: Top seven ranking crab product concepts

FLAVOUR	TEXTURE	OVERALL ACCEPTABILITY	VALUE
Bisque	**Consomme**	**Bisque**	**Hot timbale**
Hot timbale	**Bisque**	**Hot timbale**	**Bisque**
Rillettes	Crab toast	**Wonton**	**Wonton**
Wonton	**Hot timbale**	Rillettes	**Consomme**
Consomme	Rillettes	**Consomme**	Rillettes
Sandwich filling	**Wonton**	Crab toast	Crab toast
US crab cake	US crab cake	**US crab cake**	Sandwich filling

Based on the results the bisque,consomme,hot timbale,rillettes and wonton, US **crab cake, and sandwich filling were selected for commercial production trails.**

Phase 3: Development/feasibility for commercial production

Following a commercial production trial for the 7 products at a seafood processing **facility (Creative cuisine) in Brisbane, product concepts were further reduced to 5** based on ability for cooktop practices to be scaled to commercial production levels without impacting on product quality.The commercial recip es for the S products of **interest, crab consomme, crab bisque, crab mousseline (presented as a boudin and** timbale),crab rillettes and crab cake were finalized in the commercial production trials.The products were subjected to analyses for shelf-life, packaging options, production castings and nutritional composition. HACCP plans development **commenced.**

Following these trials sufficient product was produced for the secondary consultation **with end-users.**

Phase 4: Testing and validation (secondary end-user consultation)

The secondary end-user consultation included a series of one on one interviews with chefs in Melbourne (13 responses) and a stall at Restaurant 2010 (130 responses).

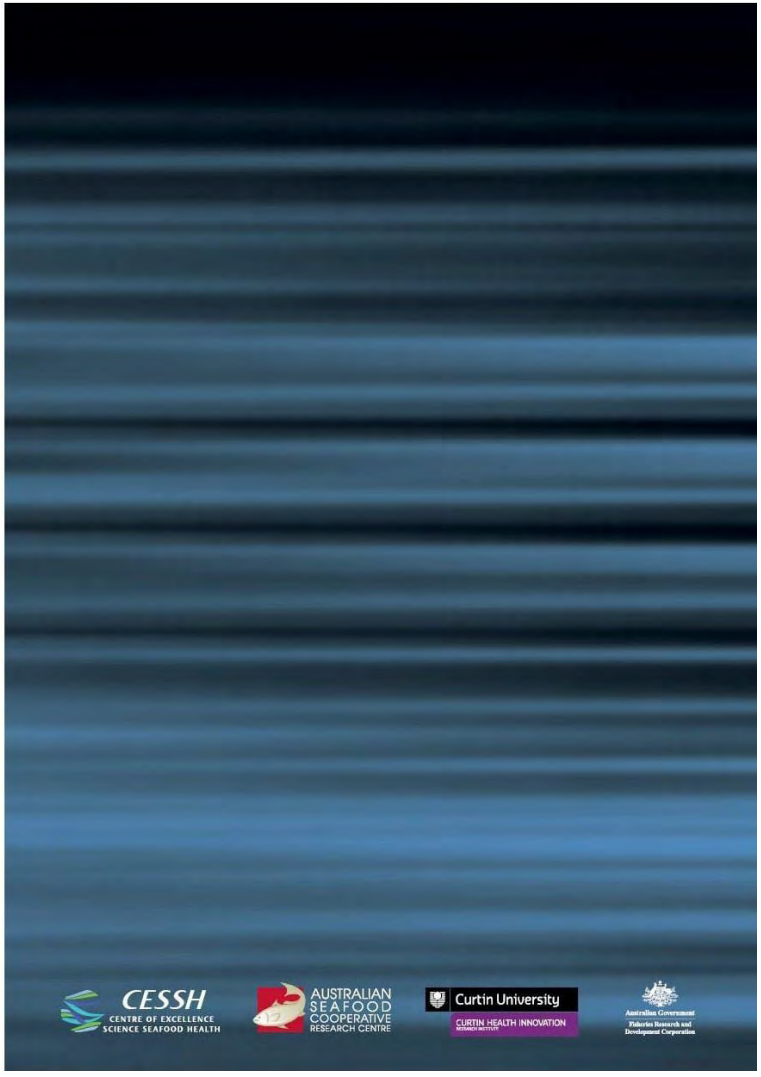
The chefs were asked to answer both sensory, usage,packaging and cost questions **similar to those shown in Figure 3 for each product.**

Taking into consideration the results from the sensory and market analysis and commercial production limitations and cost, the products chosen to undergo further commercialisation were the US crab cake, crab timbale and crab bisque.

Further production trials were completed at the Abacus facility in Carnarvon.

Phase 5: launch

Following successful completion of the trials and factory modification to facilitate production, 16 pallets of crab cakes (approximatelly 288,000 cakes) were produced. The product reached the market in September 2011 and all product was sold by December 2011. Further production runs have now been scheduled.As of December 2011, the crab bisque had undergone market test and was undergoing further production and marketing development subject to a commercial partnership between Abacus and a soup company. The timbale is undergoing further product development work to optimise consistency of quality.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VOLUME 1

ACCELERATED PRODUCT DEVELOPMENT

seafood industry

FACT SHEET

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
disCovery/ ideation/ sCoPing	CommenCe building business Case	develoPment/feasibility for CommerCial ProduCtion	testing and validation	launCh

CASE STUDY:

BLUE SWIMMER CRAB PRODUCTS

Contents

Introduction

Commonly, the success of new product development for the seafood industry has been hindered by the seafood business needing to commit significant financial outlay for production despite uncertainties of the marketability of the product

This document describes an innovative seafood product development and marketing methodology, based on the stage-gate idea to launch process*. The method involves a short, intense period of product "ideation" and development before assessing the production and market feasibility of the agreed product concept following small scale production. Cost is minimised by this approach, which can be conducted in a commercial kitchen, and encompasses conceptualisation, desktop development (both culinary and commercial) and the audit for evaluation (both culinary and commercial) in a few days. Additionally all of the stakeholders in the product development process input in early stages, hence fast tracking the process.

The results is a series of value added products that have been researched, developed, costed, branded and trialled in the marketplace prior to large financial commitment to facilitate production. This new methodology, building the products from desktop to cook-top, and improving the likelihood of market success prior to large scale production, represents an innovative approach to seafood product development in smaller businesses.

This process has been piloted on a range of Blue Swimmer Crab value added products produced by Abacus Fisheries. This case study is described in Section 3 of the document.

The Australian Seafood CRC is established and supported under the Australian Government's Cooperative Research Centres Programme. Other investors in the CRC are the Fisheries Research and Development Corporation, Seafood CRC company members, and supporting participants.

DISCOVERY/ IDEATION/ SCOPING | COMMENCE BUILDING BUSINESS CASE | DEVELOPMENT/FEASIBILITY FOR COMMERCIAL PRODUCTION | TESTING AND VALIDATION | LAUNCH

100%

PREPARATION IDEATION

ACCELERATED PRODUCT DEVELOPMENT PHASING METHODOLOGY

PREPARATION I PHASE 1A

Choose a facilitator with the ab1l1ty and cap1tal to bnng together the stakeholders that will form the ideation team and those that form the technical team.

2 Develop the technica l team wh1ch will assess produc t concept s from the v1ew of commercial and production feasibilit y. It is suggested that the tec hnical team conta1ns the follow1ng element s/expert ise:

- Industry partner(s)
- Executi ve chef to prepare products
- Food scient ist(s) to provide technical advice
- Administrat ive support
- Seafood proc essor(s) to provide ad vice on commerc ial feasibility
- Fac ilitator

3 Develop the 1deat 1on team, responsible for developing new product concept s based on raw mater ials. The team shou ld inc lude chef s, food service operators, retailers, market and produc t development specialists and a food manuf acturer.

4 Organ1se a venue that will provide fac1l1t1es for discussion and assessment oft he ingredient s and the developed products. One opt ion is a full commerc 1al restaurant, theref ore enabli ng develop ment, produc t1on and testing of concepts.

5 Develop a background summary inc luding bac kground on the pnmar y produc t1on opera tion, summar y of produc ts c urrent ly availabl e and base mgred1ents to form the bas1s of any further product development.

IDEATION (0.5 TO 1 DAY) I PHASE 1B

Convene ideation group and prov 1de brief background to project and fishery operation. Include discussion on the initial 1ngred 1ents and raw mater ials to be assessed and facilitate an open forum discussion to allow for idea development between sectors and stakeholders in the Industry.

2 Develop small focus groups compr isi ng team members from diff erent d1sc1plines. Present these smaller groups with the same 1ngred1ents and ask them to develop ten 1deas per ingredient and ten 1deas combining the mgred1ents.

3 Ask each group to repor t back. Combine 1deas and summarise resu lts.

((Choose a facilitator with the ability and capital to bring together the stakeholders that will form the ideation team and those that form the technical team."

1. Product concepts/ideas are captured and then assessed for their technical production and commercial opportunities/viability by the technical team. This should include an assessment of the potential production costs of the product. Following this assessment select a number of the product concepts/ideas for their potential commercial, culinary and production capabilities.

2. Ask an executive chef to prepare the concepts and re-present these dishes to the ideation team for sensory, culinary and commercial assessment (see Figure 1 for example of assessment form).

3. Analyse the results of the sensory, culinary and commercial assessments and identify up to 6 products to be taken to Phase 3.

FIGURE 1: EXAMPLE OF IDEATION TEAM PRODUCT ASSESSMENT FORM

Product number:

Please mark the scale with a vertical dash (|) to correspond with your preference on the scale.

aroma	dislike extremely	like extremely
flavour	dislike extremely	like extremely
texture	dislike extremely	like extremely
overall	dislike extremely	like extremely

how would you describe this product:

value: this product will cost

how likely are you to purchase this product? definitely not ○ ○ ○ ○ ○ highly likely

Small scale commercial production trials should be undertaken with the chosen products. These trials should include the following :

1. Determine the processing steps including developing the draft formulation, sourcing ingredients and ensuring suitable equipment is available.
2. Determine the viability of producing the product in commercial scale production.
3. Commence Assessment of the products including examination of the following aspects:

Quality, Chemical testing of Produced Product
• Shelf life (micro organisms to test - FSANZ)
• Salmonella
• Staphylococci
Determine best before/use by date
Proximate Composition (for nutritional panel)
Food Safety (HACCP)
Allergens
Packaging (eg. Modified Atmosphere)
Labelling

Plan sensory evaluation
Choose target market
Type of panellists- consumer (untrained)
Type of test (for preference, acceptance?)
If the product is not accepted by the sensory panellists, reformulation of products will need to be conducted and sensory evaluation will have be to conducted again.

TESTING AND VALIDATION (SECONDARY END-USER CONSULTATION) PHASE 4

A secondary consultation which includes sensory, market and presentation assessments should be undertaken to further define the product list.

This should encompass planning to ensure statistically significant levels of end users are included. The process will include:

- Development of product for trials
- Development of survey instruments (see example see Figure 2).
- Development of consistent consultation/presentation protocols to gain feedback from the end-users.
- Recruitment of participants (at statistically significant levels) and including ethical considerations.

The results of the end-user consultation will be used to identify the final products to be taken to launch. Note that the end-users from this phase form the basis for a database of possible customers when the product is launched.

The final products will be subject to further technical testing including:

- Final Commercial production trials and development of final formulations, processes, QA and HACCP plans as required.
- Final Packaging to be developed and produced.
- Labelling (composition and ingredients).
- Final trials for food safety, composition and shelf-life.

The product should be launched ensuring all end-users submitting assessments through the process are invited/ provided with information.

FIGURE 2: FINAL 15 PRODUCTS FOR PHASE 2 ASSESSMENT.

We are trialling an innovative new product development process to ensure a successful utcome is reached when the product hits the market. This a project funded by the Seafood CRC.

The methodology is being trialled using Abacus Crab products, but it is expected the principles applied can be directly transferable to other sectors.

Product: us Crab Cake
Please mark the scale with a vertical dash (|) to correspond with your preference on the scale.

appearance	dislike extremely	like extremely
aroma	dislike extremely	like extremely
flavour	dislike extremely	like extremely
texture	dislike extremely	like extremely
overall	dislike extremely	like extremely

how would you use this product? ○ ingredient/ basis of a dish ○ stand alone dish

what do you think is a reasonable size for one Crab Cake? ○ 20g ○ 30g ○ 35g ○ 40g

how many Crab Cakes in a package would you prefer? ○ 25 ○ 50 ○ 100 ○ 200

what packaging would you prefer? ○ Cardboard package ○ Plastic tray ○ Plastic pouch

how much are you willing to pay for a serving of 2x Crab Cakes at 35g a piece? ○ less than $1 ○ $1–$1.50 ○ $1.50–$2.00 ○ $2.00–$2.50 ○ more than $2.50

how likely are you to purchase this product? definitely not ○ ○ ○ ○ ○ definitely

how applicable is this product to your business? definitely not ○ ○ ○ ○ ○ definitely

additional Comments:

Abacus Crab is produced by Abacus Fisheries, a vertically integrated crab catching, processing and marketing business, based in Carnarvon, North-West Western Australia.

Abacus operate a fleet of day-boats, which fish the World Heritage listed waters of Shark Bay. As the largest Blue Swimmer Crab fishery in Australia, the Shark Bay region is renowned for the quality and consistency of the crabs that are caught. The fishing practices of the Abacus fleet are "best in class" - they return to port with the Blue Swimmer Crabs alive.

Being nearly 1,500km north of Perth, they are a long way from the market. As a result, the quality of the crabs are compromised if they are sent "fresh", taking up to 5 days in transit to reach the East Coast of Australia.

Some years ago it was determined that processing the crabs as soon as they arrive at the wharf in Carnarvon, could assist in preserving their culinary quality and consistency. Historically, the processing has been to cook and freeze the crabs whole, or to pick the premium meat off the crabs, however, this sector of the market remains commodity based with significant fluctuations in the return to the fishermen.

This accelerated product development project sought to understand what opportunities exist for the further processing of the crabs in Carnarvon, to maximise their quality, consistency and provenance, whilst delivering an increased yield and providing a marketing based business model to the business.

Abacus fisheries has previously undertaken preliminary market and product development research to extend its Blue Swimmer Crab product range. Such work has included utilization of excess product and production byproducts to produce a crab mornay and a crab stock. However, in committing to these value added products, Abacus has already spent close to $1 million on extended factory space and new equipment and product development and market research. This project was aimed to decrease the risk for the business in undertaking further expensive factory modifications required to produce the new products when marketability is uncertain.

APPLICATION OF ACCELERATED PRODUCT DEVELOPMENT METHODOLOGY TO ABACUS CRAB PRODUCTS.

DISCOVERY/IDEATION/SCOPING | Phase 1

The Ideation process was conducted in Sydney. It involved a panel of food industry professionals from a range of sectors in a series of collaborative creative sessions. The sessions were facilitated by John Susman.

In the first part of the process, raw ingredients produced at Abacus Fisheries were reviewed by the panel and considered for their primary characteristics. The raw ingredients were – Crab Stock (cooking water), Crab Mince (mechanically separated meat), Crab Fat (Sediment from stock production), Crab Shell, Crab Mornay and Premium Crab Meat.

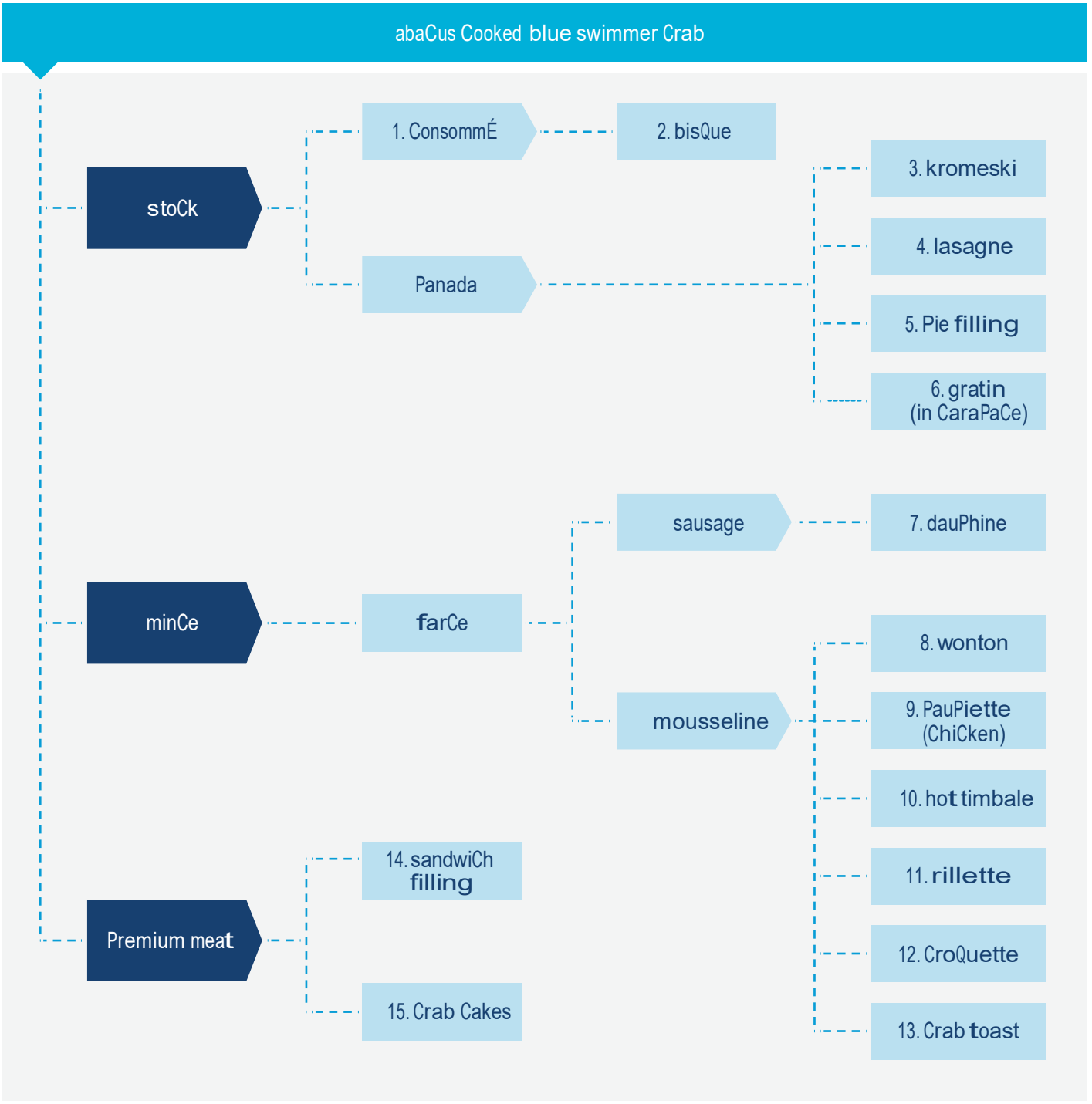
Following an initial assessment of the ingredients, a series of ideation panels were formed and a range of concepts created against a set of commercial and culinary criteria. 92 product concepts were produced. Table 1 shows the outcomes of the first day's ideation, based on the panel reviewing the raw ingredients (Stock, Mince and premium meat) both individually and combined.

TABLE 1. OUTCOMES OF THE FIRST DAY'S IDEATION

Stock	Mince	Meat	Combination
stock (fume) laksa	sandwich spread (crab toast)	sushi	gratin
base Consommé (with	wonton	smaller retail packs	salt and pepper crab
tomato) saffron	terrine	gunkan	Carapace filled crab and bread crumbs
bouillon	spring rolls	as is Crab	timbale (hot/cold)
bisque	Pâté	oil ravioli	dressed salad
Crab and sweetcorn	gyoza	Crab salad	risotto
fisherman miso soup	sauce	sandwich filling	salad "ready packs"
terrine	filled pasta		fish pie greenseas
Ponzu xo	Croquette		retail pouch Chowder
sauce Paste	two-bite ball		(with meat)
vinaigrette	fritters		bouillabaisse
salt and pepper crab base	sausage		Pasta sauce base
Crab essence powder	shoyu rillettes		two-pack sauce and meat dressing
soufflé base	Crab cake mini		seafood packs
Pie filling	quiche		lasagne
gromeski	boudin (with fish)		
	mousseline Chilli		
	crab in shell		
	rillettes		
	omelette base		
	dauphine		

The technical team convened and reduced the product concepts to 15. Products were eliminated through assessment of their technical production, commercial opportunities and practical and culinary applications. The final 15 products are shown in Figure 2.

FIGURE 2: FINAL 15 PRODUCTS FOR PHASE 2 ASSESSMENT.



Commence building business Case | Phase 2

The next stage of the process involved the production of the 15 concepts, by a team of on-site chefs. The technical and stakeholders team advised the chefs on industrial production practices – although the samples produced were of restaurant quality and style.

The ideation panel was re-convened on day 4, to assess the 15 products and to interpret the culinary and commercial aspects of each.

There were 15 product concepts tested, including 3 currently available retail products for benchmarking. These products were consommé, bisque, crab and corn soup, bisque (commercial), chowder (commercial), kromeski, croquette, dauphine, US crab cake, crab cake (commercial), lasagne, gratin, crab pie, rillettes, sandwich filling, crab toast, wonton, filled chicken and hot timbale.

Each product concept was assessed by 11 panellists using the form shown In Figure 1. Analysis of the results was conducted using the one way ANOVA test.

Table 2 shows the top seven ranking crab product concepts in each of the following attributes: flavour, texture, overall acceptability and value.

TABLE 2: Top SEVEN rANking CrAb proDUCT ConCEpTS

flavour	texture	value	overall acceptability
bisque hot	Consommé	hot timbale	bisque hot
timbale	bisque	bisque	timbale
rillettes	Crab toast	wonton	wonton
wonton	hot timbale	Consommé	rillettes
Consommé	rillettes	rillettes	Consommé
sandwich filling	wonton	Crab toast	Crab toast
us crab cake	us crab cake	sandwich fillin	us crab cake

Based on the results the bisque, consommé, hot timbale, rillettes and wonton, US crab cake, and sandwich filling were selected for commercial production trails.

development/feasibility for Commercial Production | Phase 3

Following a commercial production trial for the 7 products at a seafood processing facility (Creative Cuisine) in Brisbane, product concepts were further reduced to 5 based on ability for cooktop practices to be scaled to commercial production levels without impacting on product quality. The commercial recipes for the 5 products of interest, crab consommé, crab bisque, crab mousseline (presented as a boudin and timbale), crab rillettes and crab cake were finalized in the commercial production trials. The products were subjected to analyses for shelf-life, packaging options, production costings and nutritional composition. HACCP plans development commenced.

Following these trials sufficient product was produced for the secondary consultation with end-users.

testing and validation (secondary end-user consultation) | Phase 4

The secondary end-user consultation included a series of one on one interviews with chefs in Melbourne (13 responses) and a stall at Restaurant 2010 (130 responses).

The chefs were asked to answer both sensory, usage, packaging and cost questions similar to those shown in Figure 3 for each product.

Taking into consideration the results from the sensory and market analysis and commercial production limitations and cost, the products chosen to undergo further commercialisation were the US crab cake, crab timbale and crab bisque.

Further production trials were completed at the Abacus facility in Carnarvon.

launch | Phase 5

Following successful completion of the trials and factory modification to facilitate production, 16 pallets of crab cakes (approximately 288,000 cakes) were produced.

The product reached the market in September 2011 and all product was sold by

December 2011. Further production runs have now been scheduled. As of December 2011, the crab bisque had undergone market test and was undergoing further production and marketing development subject to a commercial partnership between Abacus and a soup company. The timbale is undergoing further product development work to optimise consistency of quality

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