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OUTSTANDING SCHOLARSHIP EXEMPLAR



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Scholarship 2022
Technology



OH DEERY ME

High Protein
Deer Milk
Frozen Yoghurt

PĀMU™



Introducing my project/ exploring the context.

Having enough protein in your diet is essential, especially for women over the age of 65. Protein aids in fending off infections, repairing muscles and tissues, and distributing oxygen throughout the body. Even if a woman is fit and active, older women need more protein to maintain their health, as their bodies utilise it less effectively as they age.

A new and exciting way of getting more protein into your diet is through *deer milk*. Of all the animal species whose milk has been utilised for human nourishment, deer milk has the greatest total fat protein and casein protein concentration.

Pāmu, pioneers in organic farming of deer, sheep, goats and cows, have worked to create a “super milk” from deer, which is full of protein, minerals, calcium and fat. A concentrated source of nourishment, Pāmu's Deer Milk is a rich and creamy super-milk. The milk has a naturally high level of fat and protein, is low in lactose, and contains significant amounts of calcium, phosphorus, and vitamin A. A clear, rich, creamy, and delectable flavour characterises deer milk.

Pāmu, have spent 130 years getting to know nature. They are Kaitiaki – guardians – of nature. The care and respect of nature’s lands, animals and people comes first in everything they do. As creators of the finest natural food since 1886, they are transforming the way food is produced, naturally, with passion, curiosity and innovative fresh thinking.

“Natural” means that their animals thrive on a grass-fed diet and are free roaming. They never feed imported ingredients like palm kernel expeller (PKE) synthetic or artificial feed, GMO or antibiotics. Natural means there is no need for artificial flavours or additives to their products – they produce them just as nature intended, with the least amount of processing possible. Their fortified products give a naturally nutritious boost to your diet, and are packed with natural goodness derived from nature, like DHA from algae and lutein from marigolds.

I have been privileged to work in conjunction with Pāmu as part of their New Product Design using Deer milk. It is an extremely versatile ingredient with application in food, personal care, supplement and nutritional categories.

Currently, Pāmu sell Deer milk in an air-dried state in 420 gram pouches, which reconstitutes to 2 litres, and have a new range of “Doe” Nutrition products.



DEER MILK DOE NUTRITION REVIVE

Pāmu have selected natural ingredients to pair with our beautiful deer milk. Our Doe Nutrition Revive product is supported with DHA a type of omega 3 fat that is shown to be beneficial for brain development during pregnancy and early childhood and Mānuka Honey. Doe Nutrition is available in convenient powder format, which is simply added to warm water and enjoyed as a delicious beverage. Each box of Doe Nutrition contains 15 sachets which can be consumed on their own or added to your favourite smoothie or breakfast cereal.

In 2022, Pāmu deer milk won a prestigious global award in the World Dairy Innovation Awards – Best dairy ingredient. This was very significant in the placement of Deer milk on the local and global market.

“Our deer milk product has been steadily growing in popularity among high end chefs and as a unique new ingredient in cosmetics. But that’s not where it ends. This win recognises the extensive application and unique properties of deer milk, and the growing recognition of deer milk as a specialty dairy product”.

To date, deer milk has made its way into a very limited number of New Zealand restaurants, and as a limited-edition ice cream and gelato -with companies Wooden Spoon and Little Lato.

In my first meeting with **H** **M** -**Business Lead Deer milk with Landcorp**, I learned that the raw product is extremely pricey, because the deer only produce around 3 litres of milk per day. This meant that there were immediate constraints that needed to be carefully managed in the developing a prototype. The development of new food products is a constant pursuit for businesses. Ideas can emerge from a variety of sources, but they are usually motivated by an opportunity or a need.

New Product Design manager K **N** had some initial ideas for product development, including a frozen yoghurt – aimed specifically at a market of women over 65. One of the company’s areas of research and future development is the health benefits of the high protein “super milk” for older women.

Dietician and Nutritionist and researcher at Massey University, S **T** has been working in hospitals with women over 65 researching the health benefits of deer milk.

Consulting with each of these key stakeholders throughout my project, along with my wider stakeholders – a group of older women from the Pakuranga Park Retirement Village has been essential to the success of my product!

*I was a little daunted at the beginning of the project as I had so much to learn, not only about the deer milk itself, but how it performed, the needs of my stakeholders, the technical processes to make a frozen yoghurt, the cost of the raw material, the relatively short time frame, project management, and meeting one of the key specifications of a **clean product**, - remembering, that at Pāmu “natural means there is no need for artificial flavours or additives to their products – they produce them just as nature intended, with the least amount of processing possible”.*

I therefore set out on the journey to make Pāmu proud and develop a premium “High Protein Deer Milk Frozen Yoghurt” aimed at women over the age of 65 in order to provide them with a larger quantity of protein in their diets. It was important that this product, while aimed at a specific target market, could equally be enjoyed by the general public.

The initial task was to create a prototype for a high-protein frozen yoghurt made from deer milk that was targeted towards women over 65. It should provide women with an adequate amount of protein to preserve their health, as well as all the qualities that make a premium frozen yoghurt desirable.

Initial specifications indicated by Pāmu for the product were:

- Only natural flavours and colours,
- Vegetarian
- high protein content
- a clean product
- nutritious
- ethically sourced ingredients
- ethical processes

I have used the technological modelling process to create and develop my product. The specifications and brief have evolved as a result of functional modelling and prototyping as I received invaluable input on each stage of the product development.

The process from conception to a prototype that is deemed fit for purpose will be summarised in this report.

Time and Project Management

With time being one of my project's constraints, I was aware that I would need to carefully manage my time in order to finish within the allotted time frame for completing the brief. In order to complete my project in the limited time I had available, I split up the project into sections. These sections were:

- Exploring the context and issue
- Market research
- Existing product research
- Key ingredients research
- Consumer market research
- Stakeholder focus groups
- Ideas for inspiration
- Concept designs
- Functional modelling
- Stakeholder evaluation / Sensory analysis
- Prototyping
- Production
- Packaging
- Post analysis
- Final evaluation and analysis

GANNT Chart



I used a variety of planning tools such as a calendar and GANNT chart, SWOT analysis, PMI's, brainstorm, "to do lists", food orders, planning templates and critical reviews to plan out each step. The development of my product was an *iterative process*. Using a variety of tools meant the project was forward thinking and organised, which prevented excess stress and worry when it came down to how much I had to do. I had my schedule for each week planned out so that I knew what the week held and what needed to be completed by the end. This planning was essential for the success of the completed project.

Before I start my research, what do I need to know and what do I need to find out?

What do I need to know?

<p>Target focus group - 65+ F</p> <ul style="list-style-type: none"> - How am I going to contact them? - Why do they need protein? - What does protein do for 65+ women? - How much protein should a 65+ woman be consuming? 	<p>Science behind Frozen Yoghurt</p> <ul style="list-style-type: none"> - High Protein - Probiotics - Bacteria - Texture - Lactose - Different attributes - Description of specifications 	<p>Techniques + Processes for FY</p> <ul style="list-style-type: none"> - Churning, for how long? - processing - pasteurizing - culturing - Flavouring - when to get cultures? 	<p>Nutrition + Health benefits for Dew Milk</p> <ul style="list-style-type: none"> - NIP for DM - How much protein does DM contain? - What else is it high in? Make up? - Does it contain calcium, how much? - Is it low in lactose or contain none? - Is it safe for someone with lactose intolerance to consume?
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What do I need to find out?

Flavour Ideas

- Appeals to 65+ women
- Can be done in frozen yoghurt
- Still looks stable, & smells right.
- Extra health benefits e.g. berries for antioxidants
- Find a formulation that works
- Is this been going to be the flavour or is it inclusions?

Existing Products

- Milks
- Yoghurts
- Dairy Drinks
- Frozen Yoghurts
- Frozen Desserts
- Ice creams
- High Protein
- A2 proteins
- Alternative milks eg sheep
- Kefirs

How much will people pay?

- 2kg of UHT milk costs \$150
- Will be a luxury product?
- Is there a way of making it more affordable?

Sensory Attributes

- smooth?
- more firm?
- crystalline?
- sweet, sour, bitter, tangy?
- Flavour intensity
- Viscosity

How much do people want to eat + buy?

- packs of 2, 4 etc
- 1 litre tub, can choose how much to have

Extra Ingredients added

- Sugar or substitutes?
- Flavours?
- Anything else 65+ women need?

Researching Existing Products

This phase of my product development was incredibly important as it laid the building blocks for initial specifications – in terms of the desired attributes of a frozen yoghurt. Sampling and exploring the products, where possible, along with sensory analysis enabled me to establish initial specifications around the texture of the product.

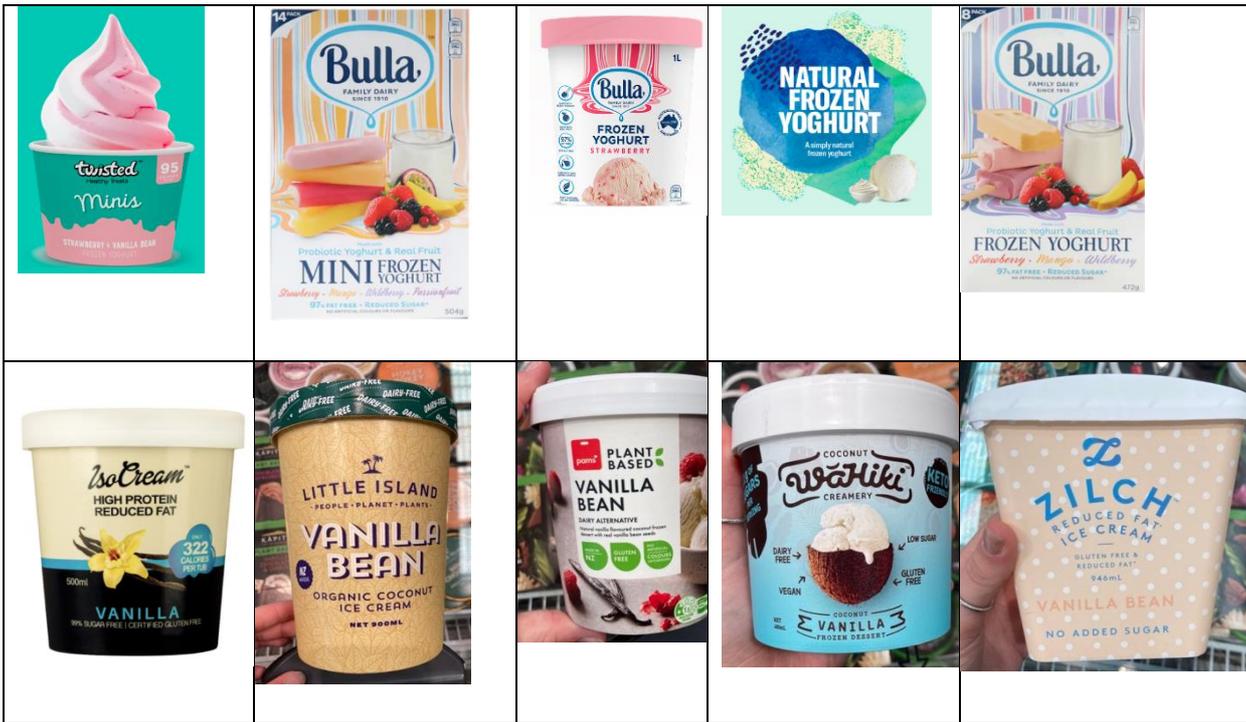
This research established the key attributes for texture as:

- Smooth, creamy, and chewy texture
- Not gritty
- Non-crystalline and scoopable
- Clean mouth feel

Research of existing of existing products revealed very few frozen yoghurt products on the market, most of which are not available in New Zealand or have been discontinued. I used the research of the few products I could find including existing yoghurts, frozen desserts, and milks, specifically to look at the protein, sugar, and energy content in these products. I discovered that *Ben and Jerry's had a chocolate chip cookie dough frozen Yoghurt which was discontinued as the flavours were not received well as being suitable for a frozen yoghurt – consumer feedback was that this was an ice-cream flavour. Flavour profiles will therefore need to be at the forefront of my thinking.*

Interestingly, the NZ Natural and Twisted frozen yoghurts were from "snow freeze" type machines, so churned and sold directly to the consumer as opposed to being stored in a vessel in the freezer. This was a key observation as producing the yoghurt in that way lead to a light, fluffy, smooth texture. Another observation was that most frozen yoghurt products were on sticks. From my own trialing and testing, at the initial stages, yoghurt was scoopable and smooth (like the snow free type products) when consumed from the churn before freezing. Once frozen it was rock solid and crumbled when trying to scoop directly from the freezer. Another key area of development will be making the yoghurt scoopable from a frozen state.

Existing Frozen Yoghurts and Frozen Desserts



Analysis of Nutrition

Rank is 1 being highest in protein and energy amount, and lowest in sugar amount

Product	Protein	Rank	Sugar	Rank	Energy	Rank	No. of Ingredients
Twisted Strawberry and Vanilla Bean Frozen Yoghurt	2.1g	5 th =	10.9g	8 th	382kJ	4 th	18
Bulla Fruit N Frozen Yoghurt Minis	1.5g	7 th	7.7g	6 th	181kJ	10 th	30
Bulla Strawberry Frozen Yogurt	2.1g	5 th =	9.9g	7 th	282kJ	9 th	25
New Zealand Natural Frozen Yoghurt	2.6g	3 rd =	12.3g	10 th	380kJ	5 th	14
Bulla Fruit N Frozen Yoghurt blocks	2.6g	3 rd =	11.4g	9 th	315kJ	7 th	22
Isocream Vanilla Premium Protein Frozen Dessert	20.1g	1 st	1.0g	1 st	669kJ	1 st	10
Little Island Vanilla Bean Organic Coconut Ice Cream	0.6g	9 th	7.6g	5 th	464kJ	2 nd	10
Pams Plant Based Vanilla Bean Dairy Alternative Frozen Dessert	0.5g	10 th	7.1g	4 th	411kJ	3 rd	13
Wahiki Coconut Vanilla Dairy Free Low Sugar Vegan Gluten Free Frozen Dessert	0.9g	8 th	1.1g	2 nd	295kJ	8 th	20
Zilch Reduced Fat Vanilla Bean Ice Cream	3.7g	2 nd	2.3g	3 rd	352kJ	6 th	16

Existing Milks and Drinks



Analysis of Nutrition

Rank is 1 being highest in protein and energy amount, and lowest in sugar amount

Product	Protein	Rank	Sugar	Rank	Energy	Rank	No. of Ingredients
Anchor A2 Blue Milk	9.6g	5 th	12.0g	7 th	683kJ	6 th	1
Anchor A2 Lite Milk	9.8g	3 rd =	12.3g	8 th	515kJ	10 th	1
Anchor Protein+ Lite Milk	15.0g	1 st	12.8g	10 th	612kJ	8 th	5
Anchor Zero Lacto Milk	8.3g	7 th	11.9g	6 th	662kJ	7 th	2
Fernglen Sheep Milk	14.8g	2 nd	11.0g	4 th	1060kJ	2 nd	1
Gopala Mango Lassi Drinking Yoghurt	9.1g	6 th	37.0g	12 th	1376kJ	1 st	10
Lewis Road Creamery A2 Milk	9.8g	3 rd =	12.6g	9 th	687kJ	5 th	1
Little Island Enriched Organic Dairy Free Calcium Milk	0.7g	12 th	3.8g	2 nd	539kJ	9 th	8
Meadow Fresh Mango Tango Yoghurt Smoothie	8.1g	8 th	30.0g	11 th	840kJ	3 rd	19
Raglan Food Co Kefir Yoghurt Smoothie	1.6g	10 th	1.6g	1 st	807kJ	4 th	9
The Collective Probiotic Yoghurt Kefir	6.2g	9 th	6.7g	3 rd	353kJ	11 th	4
Yakult Probiotic Drink	0.8g	11 th	11.2g	5 th	210kJ	12 th	6

Existing Yoghurts



Analysis of Nutrition

Rank is 1 being highest in protein and energy amount, and lowest in sugar amount

Product	Protein	Rank	Sugar	Rank	Energy	Rank	No. of Ingredients
Anchor Protein+ Yoghurt	14.8g	2 nd	4.4g	3 rd	453kJ	4 th	5
Dairyworks Protein Fit Delicious Whipped Boysenberry Yoghurt	13.3g	3 rd	5.4g	5 th	581kJ	3 rd	13
Raglan Food Co Plant Based Yoghurt	0.7g	5 th	0.6g	1 st	338kJ	5 th	4
The Collective Dairy Free Yoghurt	1.5g	4 th	2.2g	2 nd	833kJ	1 st	10
Yoplait Max Protein Yoghurt	18g	1 st	5.0g	4 th	600kJ	2 nd	4

This is important as it indicates the protein levels in existing products. This shows me where my frozen yoghurt would stand against other products on the market.

A1 Milk vs A2 Milk vs Deer Milk

Northern European cow breeds are the primary source of A1 milk. They all share the A1 beta-casein protein that is present in milk. Southern France and the Channel Islands are the origins of A2 milk cows. They have a lot of A2 beta-casein protein in their milk.

Both milk varieties' health advantages have been vigorously contested during the past ten years. Producers assert that A2 milk is the healthier choice for you in a variety of health-related areas. For A2 milk producers, digestive health, and more especially lactose intolerance, has been the key priority.

A2 milk is marketed as a dairy product that is easier on your digestive system. It is thought that some persons have trouble digesting A1 milk and that A2 is a better option for them. This is due to the A2 amino acid strand's distinct structure from the A1 strand. This structural variation makes it simpler for the A2 protein to degrade in the human stomach.

A few research teams have also connected type 1 diabetes, heart disease, and autism to A1 milk's BCM-7. BCM-7 has not been detected in the blood of healthy persons who consume cow's milk in other research. It has been discovered that infants do, in fact, have it. When it comes to deciding between A1 and A2 milk for health reasons, there are still a lot of diverse studies, conflicting findings, and varying perspectives.

Deer milk and A2 milk are both worth a try if you have trouble digesting ordinary milk.

Questions to help guide my project

I'll encounter ingredients, terminologies, and techniques as I go about my project that I'm unfamiliar with. I will need to learn what these new terms represent and put them to use during the product development process in order to expand my knowledge, better comprehend my brief and the product I'm making. To do this I have some questions to help grow my knowledge about Frozen Yoghurts and Deer Milk.

- Will the high protein and fattiness affect the yoghurt formulation?
- What will I use as yoghurt cultures?
- How do different sugars e.g. granulated sugar/glucose/corn syrup/agave perform in frozen yoghurt?

Key Ingredients and their purpose in Frozen Yoghurt

According to my investigation and examination of the ingredients used in frozen yoghurt recipes and formulations, milk (fat), sugar, cultures, air, and ice crystals are the main components of frozen yoghurt.

In order to know what ingredients to use and how varying amounts will alter the product's sensory attributes to satisfy the requirements of the brief, I needed to learn about the performance properties of each ingredient in the context of a frozen yoghurt before creating the formulation for my product.

Milk (fat): Milk is the main component of frozen yoghurt. It is the main/base ingredient for making the yoghurt which is then further used to create a frozen yoghurt. The milk makes up most of the product. Yoghurt is made with milk because it contains lactose sugars. The lactose sugars in the milk are converted by the bacteria during fermentation into lactic acid, which causes the milk to thicken and acquire a tart flavour. Milk contains fat, and this fat traps air bubbles in the mixture, helping to stabilise the frozen yoghurt. As a result, the frozen yoghurt gains volume and has a light, creamy consistency. Additionally, the fat makes the frozen yoghurt mixture thicker, which slows down the melting process. Since fat is what gives frozen yoghurt its creamy, smooth texture, the creamier the outcome, the more fat there is in the frozen yoghurt. The fat in the frozen yoghurt also controls how much air is in the yoghurt (discussed further below)

Sugar: Sugar's role in frozen yoghurt includes sweetness addition. Sugar is used to help generate a sweet taste. Additionally, the flavour of the frozen yoghurt is enhanced by the various flavours of the sugars. The frozen yoghurt will be less solid since the sugar reduces the freezing stage, which means the water won't freeze as solidly. Large ice crystals are avoided by adding sugar to the yoghurt before freezing. The sugar will make sure that the frozen yoghurt maintains its creamy consistency.

Cultures: Cultures in Frozen Yoghurt are used in the process of making the yoghurt. The culture ferment the lactose, turning the sugars into lactic acid. The lactic acid then decrease the pH level of the milk causing it to clot and curdle. Then it turns into a soft gel-like texture turning it into yoghurt.

Air: About 40% of the volume of frozen yoghurt is made up of air. Overrun is the term for the volume of air that is added to the frozen yoghurt during the churning process. The amount of air in frozen yoghurt is important because too little air makes the yoghurt overly dense and difficult to scoop whilst too much air causes it to melt more quickly. More fat in the frozen yoghurt means that it can absorb more air, making it smoother and creamier. The frozen yoghurt is sufficiently filled with air during churning, which causes it to freeze quickly and prevents the growth of big ice crystals.

Ice Crystals: Ice crystals provide the firmness of frozen yoghurt. They give it weight and substance. As the water in the mixture freezes, ice crystals are created. The ice crystals' size is important. The frozen yoghurt will be smoother and less icy in the mouth if there are few ice crystals present. The frozen yoghurt will have a gritty texture and an icy feeling in the mouth if there are large ice crystals present. The flavour of the frozen yoghurt is also slightly muted by the ice crystals in it.

Consumer Market:

My consumer market will be women over the age of 65 as my brief specifies for me to create a product to help enhance their diets. Therefore, my stakeholder will be a range of many different woman in a spectrum of ages from 65 upwards. This way I can ensure that my product meets the need of the brief. If I received feedback from a different demographic I would not be getting accurate feedback and it would not be helping me meet the need of my project. Therefore, I can say that my consumer market, which consists primarily of women over 65, is accurately represented by this demographic and has an appeal to that age bracket.

Physical environment: The physical environment for my product will be aimed at places like rest homes, retirement villages and hospitals so it is easily accessible for women over 65, as well as specialty supermarkets such as Farro and Huckleberry Farms, for the general public. It could potentially also be at supermarkets and dairies as a dessert option, however with the price of the deer milk it will most certainly be more of a high-end product. The frozen yoghurt will be sold in packs of 4 in individual -----g pottles. This makes it easy for the consumer to get the appropriate serving size without too much effort.

Social environment: The social environment for my product is targeted at women over the age of 65 due to the lack of, or potential lack of protein in their diets. Although the product is aimed at women over 65, it can still be consumed by men or people in the age bracket as an efficient way to get protein into their diets. *My product will be sold with the objective to give elderly women the needed protein into their diets whilst giving them an enjoyable way to intake it. This means that it can replace flavourless and boring oral supplement drinks such as Ensure and Fortisip which are unexciting to have. Therefore my new product makes the process of the elderly people getting their added protein into their diet more stimulating and pleasant.*

Ensure is a protein powder drink which is used to help muscle health. Fortisip is protein drink which is high in protein and other health supplements. Although these products add protein to the older generation's diets, they are not pleasurable to have. To make something that is enjoyable for them but also has health benefits I will create my product.



Target Focus Group

To offer a greater choice of products and reach a larger portion of the consumer market, companies often target groups of consumers who are similar in one respect. This may be their age, income, taste, lifestyle, health, or beliefs.

Foods are then produced to meet their needs. The product range is designed to meet the needs of the particular types of consumer, such as children or single people or slimmers.

Niche Market

My product is a 'niche' product. Some product lines are not expected to sell in vast amounts, but they fill a special gap or 'niche' in the market. A 'niche market' is usually based on a reaction to a trend in consumer purchasing.

Environmental concern has resulted in consumers developing a greater interest in the way products and packaging is made, so many manufacturers have reacted by producing environmentally friendly products and packaging.

'Premium priced' (luxury products), have been developed with consumers aspiration for status and/or a higher disposable income in mind.

Stakeholders: Key stakeholders – K N and H G from Pamu

I had a group of stakeholders who I worked with very closely to develop my product. These women were excellent stakeholders and were in fact "brutally honest"! They helped me make decisions and plan my course of action. They reflect the target market I am building my product for because they are members of my consumer market. I will therefore be able to build a product that appeals to my market with the support of this group of stakeholders.

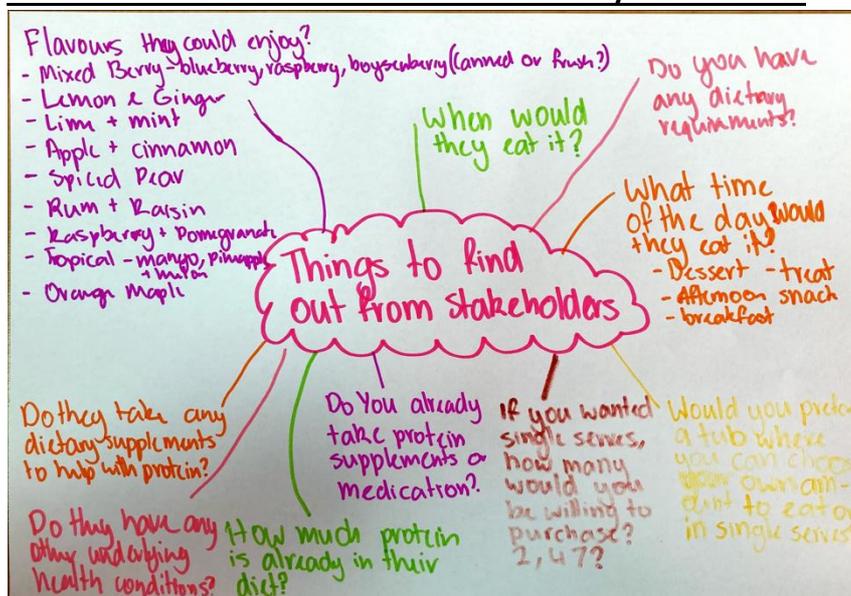
I contacted some residents at Pakuranga Park Village, which is a retirement village in Pakuranga, Auckland. Gathering a group of 20 women over the age of 65 was a little trickier than I thought it would be as there was a little reticence around the deer milk as a base! The group I finally gathered were incredibly enthusiastic and were eager to participate in sensory feedback sessions, as well as responding to surveys. Their feedback was invaluable to receive feedback and test my product on.

This group of women have varying ages, hobbies, health conditions, and level of activity. All live in their own villas and generally prepare their own meals, but also use the many facilities in their village – like roast dinner night and in house takeaway meals. I was interested to find out about their lifestyles to find out ask them about their knowledge of recommended dietary requirements. I also asked what foods they ate to provide the protein in their diet, and if they consume any protein supplements.

A typical day for a Pakuranga Park Village resident is very active with lots of facilities and activities to do in the village and locally with things like swimming, spas, exercise classes, clubs, lawn bowls, pool/snooker, concerts, movies, bars, dining, and other games and activities. Residents can live in apartments, villas, and a monitored care facility.

I chose the Residents at Pakuranga Park Village to be my stakeholders as the village has a range of facilities to allow them to be active and makes them perfect for my brief. I visited the village multiple times to receive lots of feedback to help me with testing and trialing during my product development.

Brainstorm of what I need to find out from my stakeholders



Research – A snapshot of the in-depth research into protein

Why do women over 65 need protein?

Since protein is essential for the development and maintenance of muscles, skin, and other body tissues, women over 65 require more protein in their diets. Protein also helps the body deliver oxygen and fights infections while maintaining fluid balance. Older women's bodies use protein less effectively, so they need more of it to maintain their muscle mass, strength, bone health, and other essential physiological functions. To help preserve muscle mass, even older people who are healthy and active still need to consume extra protein.

New research suggests that elderly people who consume more protein are less likely to lose their "functioning" abilities, such as the ability to dress themselves, get out of bed, climb stairs, etc. Researchers found that people who consumed much more protein had a 30% lower risk of developing cognitive impairment than those who consumed the least during the course of a 23-year trial involving over 3000 seniors. According to a 2017 study that tracked nearly 2,000 people for six years, elderly people who consumed the least protein were almost double as likely to have difficulty walking or trying to climb steps than those who consumed the most, even after accounting for health factors, chronic illnesses, and other characteristics.

How much protein do women over the age of 65 need to eat each day?

The Recommended Dietary Allowance (RDA), which calls for 0.8 grams of protein per kilogramme of body weight per day, is the most frequently mentioned guideline.

75 kg is the average weight for a woman over 65, so she has to consume 60 grams of protein daily.

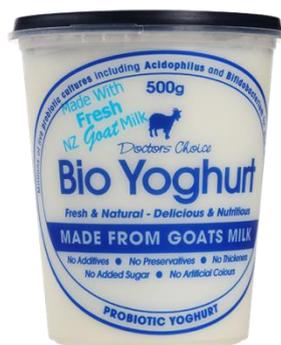
What is protein and what does it do?

The body uses protein for a variety of vital purposes that keep us healthy and sustain bodily functions. Amino acids make up the molecule known as protein. For tissues to grow and remain healthy, protein is needed. Your health and amount of activity will determine how much protein your body requires. Proteins called enzymes enable important chemical reactions in the body. Protein and peptides, which make up many of your body's hormones and carry information between cells, tissues, and organs, are composed of amino acid chains of varied lengths. Fibrous proteins are a subclass of proteins that provide your body's numerous organs and tissues shape, elasticity, and strength. Your body uses proteins as a buffer system to keep the pH of your blood and other physiological fluids at the right levels. The fluid equilibrium between your blood and the surrounding tissues is maintained by proteins in your blood. Antibodies are made of proteins and defend your body from intruders like pathogenic bacteria and viruses. While some proteins retain nutrients, others distribute them throughout your entire body. Only in conditions of starvation, strenuous exercise, or insufficient calorie intake can protein be a useful energy source.

Are there any alternative animal milk yoghurts or frozen yoghurts?



Sheep Milk Yoghurt



Goat Milk Yoghurt



Buffalo Milk Yoghurt

Protein and other health benefits in Deer milk

NUTRITION INFORMATION:		
SERVINGS PER PACK	10	
SERVING SIZE	42g	
	*AVG QUANTITY PER SERVE	*AVG QUANTITY PER 100ml
Energy	1024kJ	512kJ
Protein	13.2g	6.6g
Fat, Total	18.4g	9.2g
Saturated	11.3g	5.7g
Carbohydrate	7.0g	3.5g
Sugars	7.0g	3.5g
Sodium	72mg	36mg
Calcium	483mg	242mg

*Nutrition information is based on reconstituted milk when made according to the directions.

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Pāmu and their work

Pāmu's deer milk is an amazing product which has a track record of success in cosmetic products. It began with a milking technician who had calloused, extremely rough, and dry hands. She became aware of how soft her hands had gotten and how much her nails had grown and become stronger after cleaning the deer milk filters. They stand by their motto "Naturally grown, naturally nutritious, and naturally delicious".

According to co-principal investigator and dietitian Professor Pamela von Hurst, muscle mass decreases beyond age 50 and older persons are more susceptible to arthritis. This demonstrates the potential for older persons to benefit significantly from the higher protein content and anti-inflammatory qualities of Pāmu deer milk, according to the author. A randomised comparison trial with 120 community-dwelling women over 65 with low to normal BMI is part of the initiative. For ten weeks, participants will either drink 200mL of deer milk or a commercial oral nutrition supplement. According to Joanne Todd, the challenge director for High Value Nutrition, "Pāmu sees a clear market opportunity in the healthy ageing space, providing a natural and great-tasting nutritional solution". State-owned company Landcorp goes by the name Pāmu. It is also the Māori term "to farm," and as part of the Treaty of Waitangi settlements, certain farms will eventually be returned to iwi ownership.

Deer have at least twice the amount of milk solids present in cow's milk, which is a wonderful characteristic, according to H [redacted] G [redacted]. According to him, China, Korea, or developing agricultural producers like Argentina and Chile are unlikely to pose any serious challenge to New Zealand's deer farmers, who produce approximately half of the world's farmed red deer.

Nutritional Value of Deer Milk Research

Deer milk is a liquid snack that contains a lot of nutrients and calories. Humans have traditionally consumed moose and reindeer milk, and the expansion of red deer husbandry offers the possibility of a dairy business. Of all the animal species whose milk has been utilised for human nourishment, deer milk has the greatest total fat, protein, and casein protein concentration. Deer milk is also a particularly rich source of vital minerals; in comparison to cow, sheep, and goat milk, it has significantly more calcium, phosphorus, and zinc. Similar to those seen in other ruminants, milk composition changes during lactation. Deer milk has a higher protein content than other milk sources, which offers a unique possibility for producing more protein hydrolysate after digestion and an intriguing high buffering capacity that can have potential medical benefits. Deer milk and its fermented products may provide health benefits, according to a number of anecdotal reports, although the scientific evidence for this is still being looked into.

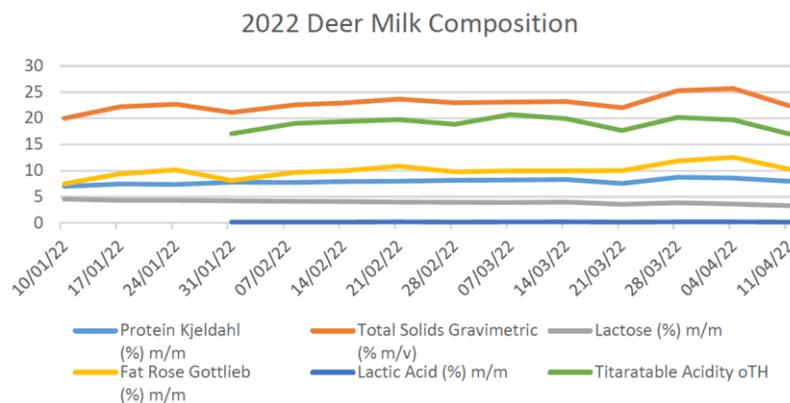
Email Conversations for extended research

H [redacted] G [redacted] – Pāmu's Business Lead for Deer Milk

In order to get a clearer idea of what deer milk is and its attributes, I talked to H [redacted] G [redacted] who is the business lead of deer milk at Pāmu. Below are the questions I asked and his answers.

How does the seasonality (grass nutrients?) affect the nutritional information and physical properties of their Deer Milk?

- This is a good question. In relation to grass, I can't answer this (although I would assume it's the same as other ruminant milks which are eating an all-grass diet).
- I've added a composition across the season in graph below. We tend to see total solids increase towards end of season (this is to get fawns in peak condition before winter)



Why is the deer milk so expensive?

- Deer only produce 1-3 litres per day compared to 25 from a cow.

Is it lactose free, or just low in lactose? Is it safe for those who have a lactose intolerance to have deer milk?

- Pāmu Deer Milk contains lactose. About half that of cows as shown in table.

Composition	Deer milk powder	Cow milk powder
	Per 100 gm of powder	Per 100 gm of powder
Protein	34.7	26
Fat	38.9	28
Lactose	18.6	38.6
Ash	4.68	4.89
Total solid	96.88	96.93

- Lactose slightly decreases during lactation (as seen in first graph)
- We find some people who have intolerances to cow/sheep/goat milk can tolerate deer. This is not necessarily due to lactose, but possibly the proteins.

How does it compare to cow's milk in texture, flavour, and viscosity?

- It tastes delicious!! It behaves like full fat cream. Flavour is very mild.
- It cooks differently to any other milk due to the fat and protein content.

Could the milk be a substitute to protein medication of supplements?

- Yes potentially. Through a clinical trial we are exploring the potential of deer milk in assisting with building muscle mass and supporting general nutrition in the ageing population. This is very exciting.

Does the diet of the deer impact the levels of protein?

- Unsure. Deer are grass fed and given a small number of nuts during milking time.

Is there a way to make the milk more affordable for those who are less fortunate but need the protein? Or will this milk be developed more for institutions like hospitals and elderly people in places such as rest homes?

- This will never be a product for the masses. Not enough of it and it will never be affordable to many.
- We see it being a natural alternative to oral nutritional supplements currently on offer which are fortified with a huge list of ingredients and don't always taste that nice.

What is the consistency of the milk compared to cow's milk?

- Like cream.

Does the climate that the deer are kept in affect the quality of the milk?

- Deer don't like the hot weather. The quality of the milk is exceptional – people cannot believe the low bacteria counts that we get from our raw milk.

What breed of deer produces the milk? Does the milk quality change with the breeds?

- Red deer. The only other main breed of deer in NZ is Wapiti. We are not aware of any changes of quality based on breed.

What vitamins and minerals does it contain and how much?

Minerals	Deer milk	Cow milk	Sheep milk	Goat milk
Calcium (mg/100g)	295	110	200	114
Magnesium (mg/100g)	17	12	17	14
Potassium (mg/100g)	134	144	132	100
Sodium (mg/100g)	38	51	41	36
Phosphorus (mg/100g)	207	96	160	203
Chloride (mg/100g)	78	98	89	164
Copper (mg/kg)	0.15	0.14	0.17	0.11
Iodine (mg/kg)	0.67	0.42	0.22	0.25
Selenium (mg/kg)	0.2	0.24	0.35	0.3
Zinc (mg/kg)	9.5	4.6	5.7	3.6

How is your marketing going forward – will it be through New Product Development (NPD), or will we see the milk on supermarket shelves?

- We have just launched a supplement range called Doe Nutrition.
- It is a finalist in the World Dairy Innovation Awards announced in June
- **Marketing this year will be focusing on the healthy ageing value proposition – targeting those who need extra nutrition in their lives and want a natural product.**

The information calls it a “supermilk” – are you going to use that as a marketing strategy. We see that goat’s milk is high in both protein and calcium – but deer milk trumps this with double – is this why it is a “supermilk”?

- Yes for all these reasons it’s a super milk.
- Deer don’t produce a lot of milk, but what they do produce is concentrated (so the fawns can get up and run, to avoid predators; they are still somewhat wild/non-domesticated).

K M – Food Industry Consultant and Expert in Ice Cream and other Frozen Desserts.

I emailed K M regarding any advice on the process of making frozen yoghurt. Her advice was to pasteurize the milk first, then add probiotics/cultures prior to freezing.

H W – Little Lato Founder and Gelato Expert

H W is the founder of kiwi gelato company “Little Lato”. She has studied food technology and did a gelato course in Italy along with multiple jobs in the frozen dessert industry. She has worked alongside Pāmu previously to create a deer milk gelato. I contacted her about any techniques that she had picked up along the years in either creating frozen yoghurt and also with working with frozen yoghurt. Her advice on the texture was that if the frozen yoghurt is too solid to add more sugar and if it is too watery to add more milk powder to the milk powder: water ratio.



Concept Designs

By examining competitors' products, looking for inspiration, researching protein and the effects of deer milk on frozen yoghurt, and perfecting a base formulation, I was able to create four concept designs. I would then ask my stakeholders for feedback on these concepts in order to determine what to do next.

I developed a survey and distributed it to my intended focus group in order to acquire their input on my product development and the four concepts. They provided me with comments that guided my decision to move through with the concept they liked the most and conduct additional testing.

Concept Drawing 1

Strawberry Flavoured Deer Milk Frozen Yoghurt in a soft serve form

Front View

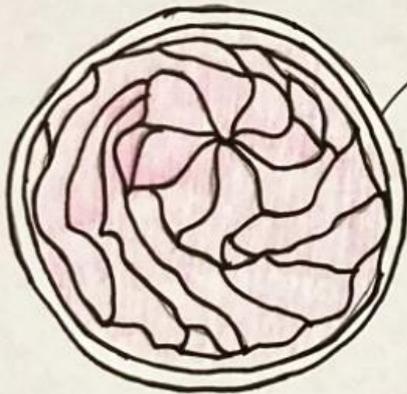


Frozen yoghurt in a soft serve swirl

125g size

in a small cup for easy holding

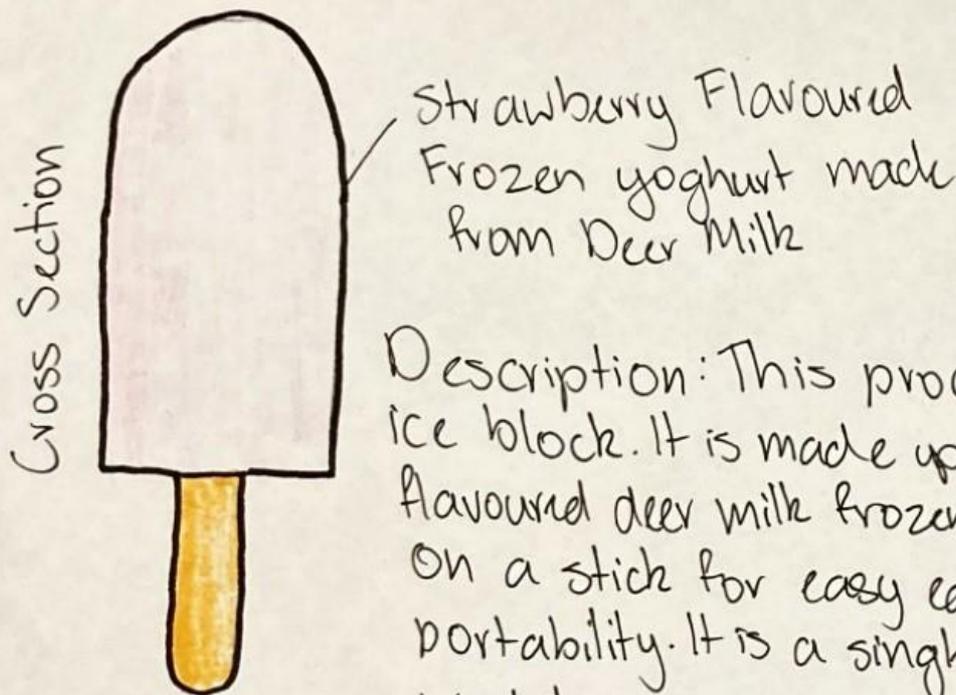
Birds eye View



strawberry flavoured deer milk frozen yoghurt

Description: This product is a soft serve. It is made up from a strawberry flavoured deer milk frozen yoghurt. It is in a small cup that fits in the hand for easy eating and portability. It is a single serve and would come in a pack of 4 pottles. It is inspired by a twisted frozen yoghurt

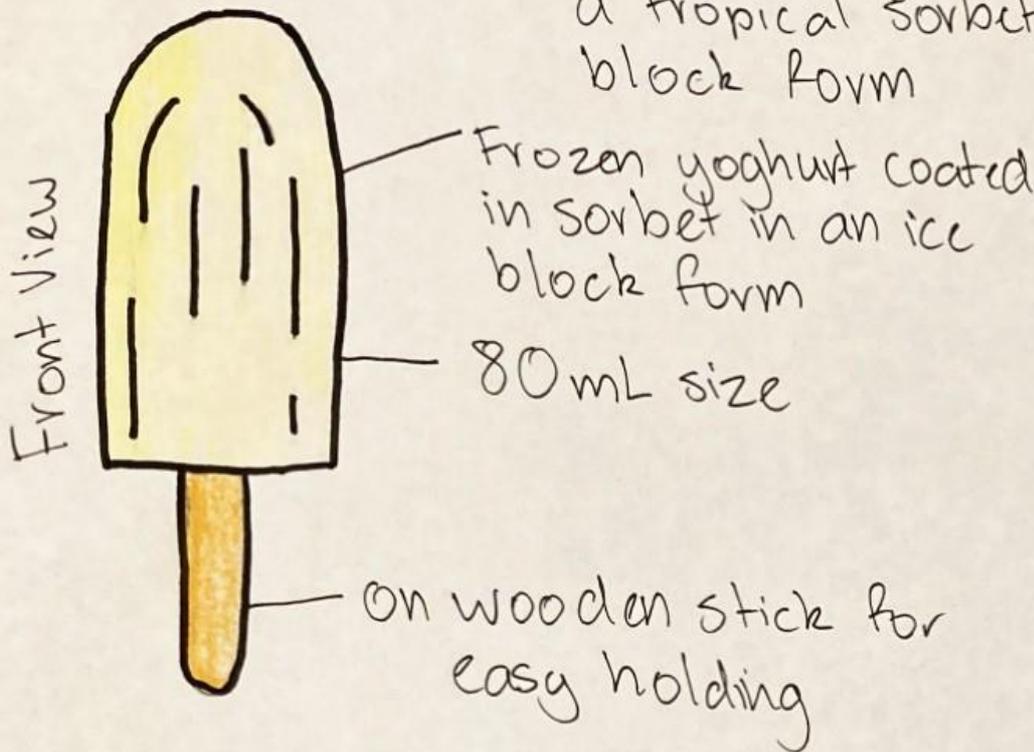
Concept Drawing 2 Strawberry Flavoured Deer Milk Frozen Yoghurt Ice block



Description: This product is an ice block. It is made up from strawberry flavoured deer milk frozen yoghurt. It is on a stick for easy eating and portability. It is a single serve and would come in a pack of 4 ice blocks. It is inspired by Bulla Frozen Yoghurt Popsicles

Concept Drawing 3

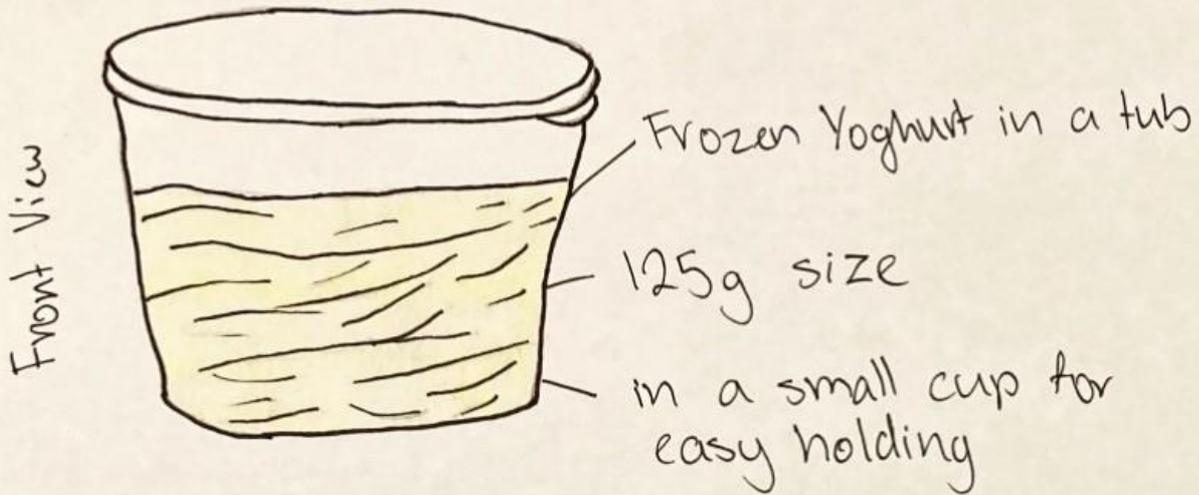
Vanilla Flavoured Deer Milk Frozen Yoghurt coated in a tropical Sorbet in Ice block form



Description: This product is an ice block. It is made up from a vanilla flavoured deer milk frozen yoghurt coated in a crisp tropical sorbet. It is on a stick for easy eating and portability. It is a single serve and would come in a pack of 4 ice blocks. It is inspired by a struts splice.

Concept Drawings 4

Lemon Flavoured Deer Milk
Frozen Yoghurt in a scoop
form



Description: This product is a scooped product. It is made up from a lemon flavoured deer milk frozen yoghurt. It is in a small cup that is easy for holding in the hand to make it easy to eat and portable. It is a single serve and would come in a pack of 4 bottles. It is inspired by a small vanilla ice cream pot.

Responses:

1. Does this frozen yoghurt concept sound appetising? (strawberry flavoured deer milk frozen yoghurt in a soft serve form)

[More Details](#)

Yes	6
No	1
Kind of	5
Not really	2
Unsure	1



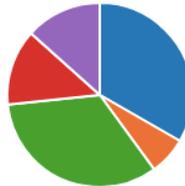
Most of my stakeholders thought that concept 1 sounded either kind of appetising or appetising, this seems like they might be willing to try it but are slightly hesitant

2. Does this frozen yoghurt concept sound appetising? (strawberry flavoured deer milk frozen yoghurt ice block)

[More Details](#)

[Insights](#)

Yes	5
No	1
Kind of	5
Not really	2
Unsure	2



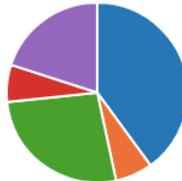
Most of my stakeholders thought that concept 1 sounded either kind of appetising or appetising, this seems like they might be willing to try it but are slightly hesitant

3. Does this frozen yoghurt concept sound appetising? (vanilla flavoured deer milk frozen yoghurt coated in a tropical sorbet in an ice block form)

[More Details](#)

[Insights](#)

Yes	6
No	1
Kind of	4
Not really	1
Unsure	3



Most of my stakeholders thought that concept 1 sounded either appetising or were unsure, this seems like they might enjoy it but would have to try it first.

4. Does this frozen yoghurt concept sound appetising? (lemon flavoured deer milk frozen yoghurt in a scooped form)

[More Details](#)

Yes	13
No	1
Kind of	1
Not really	0
Unsure	0



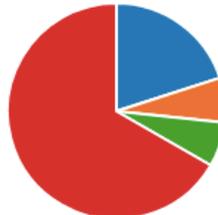
Majority of my stakeholders thought that this sounded appetising.

5. Which was your favourite concept? (0 point)

[More Details](#)

[Insights](#)

Concept 1 - strawberry soft serve	3
Concept 2 - strawberry ice block	1
concept 3 - tropical sorbet vanill...	1
concept 4 - lemon scooped	10



This shows me that my stakeholders' favourite concept was the lemon flavoured deer milk frozen yoghurt in a scooped form.

Conclusion:

These concept designs showed me that the concept that my stakeholders would most prefer is a scooped product in single serve pottles. Although the concept design is for a lemon flavour, I will be experimenting with different flavours to find the one that my stakeholders most prefer.

FUNCTIONAL MODELLING

Prototyping/Testing and Trialling for a base formulation

After my research into the basis of frozen yoghurt, deer milk and protein, I made the decision to begin my testing and trialling process. I researched into different yoghurt and frozen yoghurt recipes. This required a wide range of testing and trialling methods for material evaluation in order to support my decision-making regarding the ingredients, equipment, procedures, and techniques I would utilise for my product. The timing of my testing was also crucial since it helped me make educated decisions about the materials I would use moving forwards in the product development process, which in turn helped my final product meet all the requirements of the brief and be suitable for its intended application. The tests I took are classified as either subjective or objective tests.

Subjective Tests

To conduct a subjective test, views and responses are gathered. Consumer-driven tests help your product meet the needs of your stakeholders and, as a result, appeal to your target market. Graphs can be used to visualise the results of subjective tests and reveal people's perceptions. The feedback I received from the stakeholders regarding the sensory qualities of my frozen yoghurt from my subjective tests was used to guide the subsequent steps. I conducted my testing using a variety of subjective tools, such as star charts, hedonic scales, just-right scales, purchase intent, ratings, rankings, and preferences.

Objective Tests

An objective test has a yes/no response and is factual. This kind of testing is objective since the data is quantifiable and free of subjective opinions that can introduce bias. Therefore, this test aids in the production of a consistent, quality-controlled product, resulting in a product that is consistent each time it is manufactured. A way I used objective tests through my testing and trialling was by doing an overrun test to measure the overrun achieved in the churn.

Consumer Purchasing

Certain factors affect patterns in consumer purchasing. These include:

- Product 'fashion' or trends , for example increased demand for organic foods or reduced fat foods
- Influence of advertising
- Familiarity with and loyalty to brands and products
- Different types of market research, such as surveys, group discussions and home product trials, provide information about what customers are buying, whether they like certain products and whether they would buy a particular product again.
- **Surveys** – surveys are usually carried out in main shopping areas, e.g. shopping centres and high streets. The interviewer has a questionnaire. This is a set of defined questions with a set of answers from which the person being interviewed must select. This type of research provides a 'snap-shot' of trends or opinions.
- **Focus groups** – group discussions – a small group of consumers and a trained interviewer meet to talk about particular products of trends in food consumption. The group is made up of a mixture of consumers representative of the population. However, 'target' groups e.g. 18 year old females or older people, are sometimes used to measure their reactions to specific products.

My consumers may consider factors such as:

- Product appeal (the food and it's packaging)
- Value for money
- Health
- Special attributes, e.g. kosher
- Advertising
- Portion size
- Convenience

Test 1 – Easiyo

Aim: to find out if I can make a plain frozen yoghurt by making a yoghurt using an EasiYo packet mix and maker, and if churning, then freezing creates a smooth frozen yoghurt.

Method: Add water to EasiYo Plain yoghurt and set in EasiYo yoghurt maker for 8 hours. It was then placed in an ice cream churn to freeze for 30 mins. It was then placed in the freezer.

Result: The yoghurt didn't turn out well at all. It was definitely not sweet enough and had a watered down, sour yoghurt taste. The texture was not scoopable, smooth or creamy which consequently meant it was not chewy or had a pleasant mouthfeel. It practically a blocky of milky ice. This was expected considering that the yoghurt powder with water added. The water in the yoghurt (which was majority of the product) froze making a solid ice block. The yoghurt was extremely sour and didn't have any sweetness. It was watery rather than creamy and was practically inedible. From a distance it looked like a vanilla ice cream, however up close it was more of a translucent white and was not appealing. It smelt slightly like cheese and had a sour yoghurt smell. It was not appealing to the point where even adding flavour would not make it better.



Critical Evaluation:

What have I learnt from this trial?

- The consistency of the frozen yoghurt was extremely icy. It had solidified into a block, and was unable to be scooped, was crumbly and needed to be chipped away.
- The flavour of the frozen yoghurt was extremely sour. It was like it was spoiled and was practically inedible.
- This product did not meet parts of the specifications, as it was not scoopable, smooth, creamy, non-crystalline, chewy, or sweet.

How does it inform my practice?

- This taught me that using a sachet yoghurt will not work, as adding the water causes larger ice crystals.
- Next time I will try to make my own yoghurt from scratch. I will make sure to use a formulation with a milk base. High protein milk such as deer milk is creamier already so hopefully this will make it have the right texture and attributes as well as meeting the specifications.
- I will also add vanilla to my yoghurt to make a base yoghurt that it is flavoursome and sweet, with a slight sourness. This way the frozen yoghurt will actually be edible.

Conclusion:

This test has shown me that in order to meet the specifications, I need to create my own yoghurt with a milk base to ensure that it freezes correctly. I need to find both a recipe for a yoghurt and also a recipe that turns a yoghurt into a frozen yoghurt without completely solidifying. Using the insight that Hannah from Little Lato gave me, I know I need one that has sugar to improve the consistency.

Test 2 – Vanilla Bean Frozen Yoghurt Recipe

Aim: to find out if I can make a plain frozen yoghurt by making a yoghurt using the formulation I have found and then using said yoghurt in another recipe to make it into frozen yoghurt

Method: Boil milk for 20 mins, stirring to homogenise. Take off heat and add sugar and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir until smooth. Refrigerate for 30 mins. Combine yoghurt, sugar, honey, and vanilla and mix in blender. Churn in ice cream churn for 30 mins or until smooth and airy. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving.



Result: This yoghurt turned out much better than the last yoghurt. Its level of sweetness, sourness and vanilla flavour were just right. It was sweet enough to be considered a sweet frozen yoghurt, without being too sweet that it ruined the flavour. It had the slight twang of sourness just like yoghurt does but it wasn't too strong, leaving a strange aftertaste or making it less enjoyable. The texture was much better than the initial trial, however it still could be improved. It had a smooth, creamy consistency and was non-crystalline but it was still quite hard to scoop and a lot of effort was needed to scoop it. It did crumble slightly when scooped however. It was not gritty and it melted at an ideal rate. It did need to melt slightly before scooping, however this was expected. The colour was a crème colour and what you would expect a vanilla flavoured frozen product to look like. It smelt like vanilla and didn't have the sour and spoiled smell that yoghurt can sometimes smell. It smelt just like a vanilla frozen product should. This trial was very successful however there are some tweaks that will need to be made to improve the texture more.

Critical Evaluation:

What have I learnt from this trial?

- The consistency of the frozen yoghurt was smooth when it came straight out of the churn. It was slightly icy, but in a way that frozen yoghurt should be.
- The flavour of the frozen yoghurt was sweet and strong but not unbearable. It was quite vanilla but it cancelled the sourness of the yoghurt
- The only problem is that in order for it to scoop, it needed to sit for a moment to melt and it still slightly crumbled when scooped.
- This product did meet parts of the specifications, as it was scoopable, smooth, creamy, non-crystalline, chewy, and sweet, it could just be enhanced more.

How does it inform my practice?

- This taught me that this recipe worked, but needs to be slightly altered in order to make it scoopable.
- The honey did however alter the flavour of the yoghurt so next time I will substitute the honey with glucose syrup
- Next time I will try to make my the same yoghurt but using glucose syrup rather than sugar and honey in both recipes. Glucose syrup helps to reduce the ice crystals and make it more smooth and easy to scoop.

Conclusion: This test has shown me that in order to meet the specifications, I need to make the texture of the frozen yoghurt better, by making it easier to scoop and smoother. For the next trial, I will make the same yoghurt but substituting the sugar with glucose syrup and in the frozen yoghurt I will substitute the honey for glucose syrup and substitute the sugar with caster sugar. This way the frozen yoghurt will have smaller ice crystals making it easier to scoop.

Test 3 – Vanilla Bean Frozen Yoghurt Recipe with Glucose Syrup

Aim: to find out if substituting glucose syrup with the sugar will make the frozen yoghurt smoother and easier to scoop.

Method: Boil milk for 20 mins, stirring to homogenise. Take off heat and add glucose syrup and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir until smooth. Refrigerate for 30 mins. Combine yoghurt, caster sugar, glucose syrup, and vanilla and mix in blender. Churn in ice cream churn for 30 mins or until smooth and



airy. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving.

Result: This yoghurt had a smoother and more scoopable texture. It had the perfect amount of vanilla flavour, sourness, and sweetness. While not being overly sugary to overpower the flavour, it was sweet enough to qualify as frozen yoghurt. It had a faint tang of sourness, much like yoghurt does, but it wasn't overpowering enough to leave an odd aftertaste or make the food less delicious. The texture was smoother and creamier and was less crystalline than the previous trial. It was easier to scoop but it was still slightly icy. It no longer crumbled when scooped. It had to melt slightly before being able to scoop but for only 5 minutes rather than 10 like the last trial. It was not gritty and it melted at an appropriate rate. The colour was crème, as you might anticipate the vanilla frozen yoghurt to look like. It had a vanilla scent rather than the occasionally detectable sour and rotten smell of yoghurt. It had the typical vanilla scent of a vanilla flavoured frozen yoghurt. Although this attempt was quite successful, there still need to be some adjustments made to the texture.

Critical Evaluation:

What have I learnt from this trial?

- The consistency of the frozen yoghurt was smooth when it came straight out of the churn. It was slightly icy, but in a way that frozen yoghurt should be.
- The flavour of the frozen yoghurt was sweet and strong but to the right level. It had the vanilla flavour as expected but it also had a strong flavour from the deer milk.
- It was super creamy and soft in the mouth. This was probably due to the amount of fat in the deer milk, or the added sugar changing the consistency.
- The frozen yoghurt didn't need as much melting time as the previous trial and scooped much easier.
- This product did meet the specifications, as it was more scoopable, smooth, creamy, non-crystalline, chewy, and sweet, it could just be made better.

How does it inform my practice?

- This taught me that this recipe worked, but needs to be slightly altered in order to make it an even better texture.
- The next trial I will increase the level of sugar/glucose as from the information from Hannah, adding more sugar helps to make it smoother.

Conclusion: This test has shown me that in order to meet the specifications, I need to make the texture of the frozen yoghurt better, by making it easier to scoop and smoother. For the next trial, I will make the same frozen yoghurt but increasing the amount of glucose before churning. This way the frozen yoghurt will be smoother making it easier to scoop.

Test 4 – Vanilla Bean Frozen Yoghurt Recipe with Increased Sugar

Aim: to find out if increasing the amount of sugar will make the frozen yoghurt smoother and easier to scoop.

Method: Boil milk for 20 mins, stirring to homogenise. Take off heat and add glucose syrup and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir



until smooth. Refrigerate for 30 mins. Combine yoghurt, caster sugar, glucose syrup, and vanilla and mix in blender. Churn in ice cream churn for 30 mins or until smooth and airy. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving.

Result: This was the best frozen yoghurt so-far in terms of texture. It was just the right amount of sweet, tart, and vanilla-flavoured. It was sweet enough to be considered frozen yoghurt even though it wasn't extremely sweet to drown out the flavour. Like yoghurt, it had a slight tang of sourness, but it wasn't strong enough to leave a strange aftertaste or reduce the food's appeal. It had a non-crystalline, creamy, and smooth texture. It wasn't icy and was simple to scoop. When scooped, it wasn't crumbly any longer. Prior to scooping, it had to somewhat melt, but just for five minutes. It melted at the proper rate and was not grainy. As one may expect vanilla frozen yoghurt to look, the colour was crème. Instead of the occasionally noticeable sour and rotten smell of yoghurt, it had a vanilla flavour. It smelled like a vanilla-flavoured frozen yoghurt, as is customary.

Critical Evaluation

What have I learnt from this trial?

- The consistency of the frozen yoghurt was smooth when it came straight out of the churn. It was slightly icy, but in a way that frozen yoghurt should be.
- The flavour of the frozen yoghurt was sweet and strong but to the right level. It had the vanilla flavour as expected but it also had a strong flavour from the deer milk.
- It was super creamy and soft in the mouth. This was probably due to the amount of fat in the deer milk, or the added sugar changing the consistency.
- The frozen yoghurt didn't need as much melting time as the previous trial and scooped much easier.
- This product did meet the specifications, as it was more scoopable, smooth, creamy, non-crystalline, chewy, and sweet.

How does it inform my practice?

- This taught me that this recipe worked and it is a perfect base formulation. I am happy to use this as my base formulation and move forward with investigations with flavouring.

Conclusion: I am happy with the result from this trial. I have created a successful base formulation that I will be happy to use to investigate the flavours in the next steps of my project.

Flavour Ideas and Brainstorming

Frozen Yoghurt Flavour Brainstorm



Flavour Ideas

Frozen Yoghurt Flavour Ideas - Vanilla Base



Certain flavours won't be suitable for my product due to specific reasons.

None of the flavours will be able to contain any grapefruit. Certain chemicals in grapefruit juice interfere with enzymes that breakdown the medications in the intestines. This can cause too much medication in body and can cause serious health implications.

I am avoiding using rhubarb as due to previous experience I have struggled to bring the flavour through.

Frozen Yoghurt Flavour Ideas - Chocolate Base



Frozen Yoghurt Flavour Ideas - Flavoured Base



I am also not going to use any modern or outrageous flavour ideas such as “ginger and beetroot” as my this would most likely not appeal to my target market.

My goal is to stick with classic flavours and flavour of comfort and possibly nostalgia. This way if they know the flavours already the product will seem more appealing.

I have chosen a range of flavours in a vanilla base, chocolate base and then also some that would have an original flavoured base. These are all flavours that I think will appeal to my target focus group.

I am now going to conduct a survey with target focus group to find out more about me stakeholders and their opinions towards my product.

Frozen Yogurt Survey

I am creating and developing a High Protein Frozen Yoghurt using Deer Milk

Would you prefer single serves or a multiple serving product?

Single Serves

Multiple Serves



If single serves, how many would you purchase at once?

2

4



7 (whole week)

14 (fortnight)

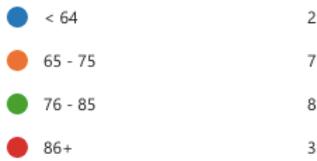


Snapshot of the initial stakeholder survey

Initial Stakeholder Survey

1. What age are you? (0 point)

[More Details](#)



All but 2 of these people are in my target market due to being over the age of 65. This means I have an appropriate group of people to get precise feedback.

This feedback shows me that most of my stakeholder regularly have some variant of ice creams or puddings. This means that should be interested in trying a frozen yoghurt.

This shows me that most of the time the dessert products that they consume are not very frequently and more of a novelty snack. I am hoping to give them a healthy treat that is very enjoyable.

This shows me that my target market will be more inclined to eat my product for dessert or as a snack.

This was a very close outcome, but I think for practicality I will use single serves which was also the majority vote.

2. What frozen or refrigerated, ready to eat dessert products do you purchase? (0 point)

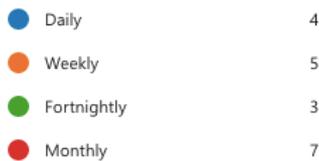
[More Details](#) [Insights](#)

11 respondents (65%) answered **Ice cream** for this question.



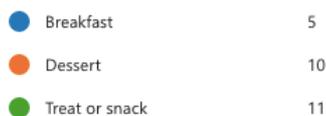
3. How often would you eat these dessert products? (0 point)

[More Details](#)



4. What time of the day would you eat one of these products? (0 point)

[More Details](#)



12. Would you prefer single serves or a multiple serving product? (0 point)

[More Details](#)



13. If single serves, how many would you purchase at once? (0 point)

[More Details](#)

2 serves	6
4 serves	10
7 serves (whole week)	3
14 (fortnight)	0



This indicates that my stakeholders would rather buy a pack of 4 frozen yoghurts. Therefore my product will have 4 pottles of frozen yoghurt.

This shows me that the flavours that my stakeholders would prefer in my frozen yoghurt would be:

1. Apple and cinnamon
2. Salted caramel
3. Lemon and ginger

This shows me that the flavours that my stakeholders would like are:

1. Mint chocolate
2. Raspberry chocolate
- 3 = Dark chocolate
- 3 = Milk chocolate

This shows me that the flavours that my stakeholders would like are:

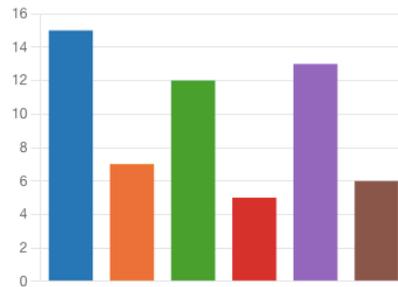
1. Tropical
2. Mixed berry
3. Rum and raisin

My stakeholders also had other suggestions as to what flavours they would enjoy so I have taken these into consideration.

14. I am developing ideas for a range of flavours using a common base. Which flavours would you enjoy with a vanilla base?

[More Details](#)

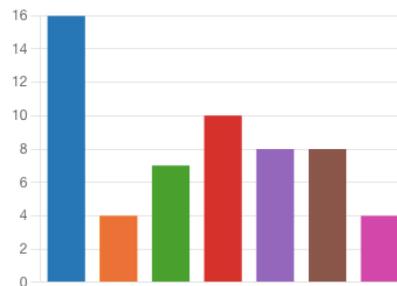
apple and cinnamon	15
hokey pokey	7
lemon and ginger	12
caramel	5
salted caramel	13
plain vanilla	6



15. I am developing ideas for a range of flavours using a common base. Which flavours would you enjoy with a chocolate base?

[More Details](#)

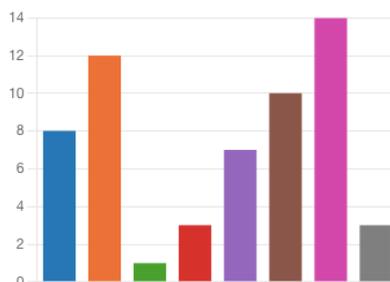
mint chocolate	16
coffee chocolate	4
orange chocolate	7
raspberry chocolate	10
dark chocolate	8
milk chocolate	8
white chocolate	4



16. I am developing ideas for a range of flavours using a common base. Which flavours would you enjoy with a flavoured base?

[More Details](#)

lime and mint	8
mixed berry	12
strawberry	1
boysenberry	3
raspberry	7
rum and raisin	10
tropical	14
banana	3



17. Do you have any other flavour ideas you would like? (0 point)

[More Details](#)

[Insights](#)

1 respondents (17%) answered **almond marzipan** for this question.

feijoa **Apple**
almond marzipan
none **passionfruit**

Conclusion from initial stakeholder survey

This initial survey has helped me to find out from my stakeholders what preferences they have towards my product. This helped to get important information from my stakeholders such as their age, existing products they purchase, how often these are eaten and at what time of the day, would they prefer single or multiple serves per pack, if single how many, and many flavour options. All of these questions helped me to find valuable information and I was able to use this when making my product. In conclusion, my stakeholders are almost all over the age of 65. Many of them already purchase existing dessert products such as ice cream, ice blocks and puddings and they are eaten around monthly or weekly. These products are usually consumed for dessert or as a treat/snack. My stakeholders would rather have single packs with 4 pottles in each. Their preferred flavours in a vanilla base included apple & cinnamon, salted caramel, and lemon & ginger. Their preferred flavours in a chocolate base included mint chocolate, raspberry chocolate, dark chocolate and milk chocolate. Their preferred flavours in a flavoured base included tropical, mixed berry and rum & raisin.

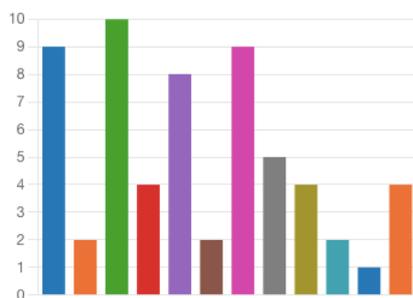
After thinking about the product in more depth, I realized that the flavours that were chosen most likely weren't going to work in the product. This is due to the flavours all being very "ice cream based" whereas in a frozen yoghurt some of these flavours weren't going to be as nice with the more tanginess of the frozen yoghurt. I then concluded that in order to have a flavour that actually goes well with the frozen yoghurt it needed to be a very natural flavour, like fruity. I then went back to my stakeholders with fruity flavour suggestions and got their feedback.

Flavour Survey – Modified Flavours

1. What flavours would you like the most in a frozen yoghurt? (0 point)

[More Details](#)

Mango	9
Pear	2
Lemon	10
Pineapple	4
Raspberry	8
Banana	2
Strawberry	9
Boysenberry	5
Peach	4
Kiwifruit	2
Melon	1
Orange	4



This indicates that my stakeholders would prefer the flavours

1. Lemon
- 2 = Mango
- 2 = Strawberry
3. Raspberry

Due to this I will trial these 4 flavours and then gather sensory feedback from my stakeholders and from then on I will modify the product until finding out the preferred flavour for my stakeholders to use for my final product.

Flavour Trial 1 + Visit to Pakuranga Park 1

Aim: to find out if the flavours I have chosen for my product will work through adding freeze dried fruit powder. Also if the strength of the flavour is correct.

Method: Boil milk for 20 mins, stirring to homogenise. Take off heat and add glucose syrup and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir until smooth. Refrigerate for 30 mins. Combine yoghurt, caster sugar, glucose syrup, and vanilla and mix in blender. Add freeze dried fruit powder and blend again. Churn in ice cream churn for 30 mins or until smooth and airy. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving.

Percentages of each flavour (all flavours are fresh as freeze-dried powders)

Strawberry – 2.5% Lemon – 2%
Mango – 2% Raspberry – 3%

Visit 1 Focus group sensory testing session 1.

My introductory speech

Ata marie. Ko L [redacted] M [redacted] ahau.

Thank you all so much for signing up to be part of the focus group for my new product design. Consumer feedback is the most important part of technological modelling in terms of identifying and clarifying the target markets preferences. The design process for new food products involves seeking feedback from consumers and considering that feedback to refine ideas. This cycle will allow me to continue seeking feedback until my product has been refined and agreed upon by key stakeholders.

I have been working with - Pāmu, pioneers in organic farming of deer, sheep, goats and cows, have worked to create a “super milk” from deer, which is full of protein, minerals, calcium and fat. A concentrated source of nourishment, Pāmu's Deer Milk is a rich and creamy super-milk. The milk has a naturally high level of fat and protein, is low in lactose, and contains significant amounts of calcium, phosphorus, and vitamin A. A clear, rich,

creamy, and delectable flavour characterises deer milk.

Based on the information I received from you through the initial survey around design ideas, I have been working towards developing a formulation for a frozen yoghurt. The samples you will taste today, and your honest feedback will help me to refine the flavour profiles.

I have also brought with me some ideas for ways that a frozen yoghurt could be marketed – which might be of interest. Over the next month, I will continue to develop the product and will come back with refined samples. I will also be asking for feedback on purchase intent, and packaging/ branding ideas.

I will bring the samples around to you in order of the discussion forms in front of you.

Thank you again for your valuable time – and I hope you enjoy my deer milk frozen yoghurt!



Results:

1. How was the strength of the strawberry flavour? (0 point)

[More Details](#)

[Insights](#)

● no strawberry flavour	0
● a little strawberry flavour	4
● just right	14
● a little too strong	0
● way too strong	0



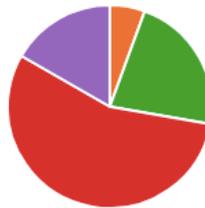
Strawberry Flavour

This shows me that the strawberry flavour is strong enough and doesn't need to be altered.

2. How much did you like the strawberry flavour? (0 point)

[More Details](#)

● didn't like at all	0
● didn't like it much	1
● average	4
● liked it	10
● loved it	3



This shows me that my stakeholders like the flavour, therefore I can continue with this flavour.

3. How was the strength of the lemon flavour? (0 point)

[More Details](#)

● no lemon flavour	1
● a little lemon flavour	6
● just right	10
● a little too strong	1
● way too strong	0



Lemon Flavour

This shows me that the lemon flavour is almost right but needs to be increased slightly.

4. How much did you like the lemon flavour? (0 point)

[More Details](#)

● didn't like at all	1
● didn't like it much	2
● average	4
● liked it	5
● loved it	6



This shows me that my stakeholders like the flavour, therefore I can continue with this flavour.

5. How was the strength of the raspberry flavour? (0 point)

[More Details](#)

● no raspberry flavour	3
● a little raspberry flavour	11
● just right	2
● a little too strong	2
● way too strong	0



Raspberry Flavour

This shows me that the raspberry flavour needs to be increased.

6. How much did you like the raspberry flavour? (0 point)

[More Details](#)

● didn't like at all	2
● didn't like it much	8
● average	8
● liked it	0
● loved it	0



This shows me that my stakeholders do not like the flavour, therefore I will not be continuing to make this flavour.

7. How was the strength of the mango flavour? (0 point)

[More Details](#)

[Insights](#)

● no mango flavour	2
● a little mango flavour	9
● just right	7
● a little too strong	0
● way too strong	0



Mango Flavour

This shows me that the mango flavour needs to be increased.

8. How much did you like the mango flavour? (0 point)

[More Details](#)

● didn't like at all	1
● didn't like it much	1
● average	4
● liked it	7
● loved it	5



This shows me that my stakeholders like the flavour, therefore I can continue with this flavour.

9. What did you think about the sweetness of the frozen yoghurt? (0 point)

[More Details](#)

● no sweetness	1
● a little sweetness	3
● just right	14
● a little too sweet	0
● way too sweet	0



Sweetness Level

This shows me that the frozen yoghurt has a good level of sweetness.

Conclusion:

This has overall given me a clear insight into the levels of flavour in my product. This has shown me how I need to modify the flavour levels and also whether I should continue to keep trialing with each flavour. This has taught me that for the strawberry flavour it is at a good level and that it should be continued as my stakeholders liked it. The lemon flavour is not strong enough so the level of lemon will need to be increased but my stakeholders still enjoyed it so I will continue to make it. The raspberry flavour was not strong enough so it would need to be increased however, my stakeholders didn't enjoy it much, so I have decided to not continue making this flavour. The mango flavour is not strong enough so it will need to be increased but majority of my stakeholders liked it so I will continue to make this flavour. The overall level of sweetness in the product is at a good level so I don't need to worry about making it sweeter.

Flavour Trial 2 – Visit to Pakuranga Park 2

Aim: to find out if the modification of the strength of the flavours I have chosen for my product is better/right.

Method: Boil milk for 20 mins, stirring to homogenise. Take off heat and add glucose syrup and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to

homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir until smooth. Refrigerate for 30 mins. Combine yoghurt, caster sugar, glucose syrup, and vanilla and mix in blender. Add freeze dried fruit powder/essence and blend again. Churn in ice cream churn for 30 mins or until smooth and airy. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving.

Percentages of each flavour

Freeze Dried Strawberry – 2.5%

Freeze Dried Lemon – 2.5%

Freeze Dried Mango – 3%

Lemon Lime Essence – 2.5%

For this trial I also found a natural lemon lime essence, which I trialed to find out if this would work better.

Results:

1. How was the strength of the strawberry flavour? (0 point)

[More Details](#)

● definitely not strong enough	0
● not strong enough	1
● just right	10
● a little too strong	0
● much too strong	0



Strawberry Flavour

This shows me that the strawberry flavour is strong enough and doesn't need to be altered.

2. How much did you like the strawberry flavour? (0 point)

[More Details](#)

● didn't like at all	0
● didn't like it much	0
● average	1
● liked it	8
● loved it	2



This shows me that my stakeholders like the flavour, therefore I can continue with this flavour.

3. How was the strength of the lemon flavour? (0 point)

[More Details](#)

[Insights](#)

● definitely not strong enough	0
● not strong enough	0
● just right	8
● a little too strong	3
● much too strong	0



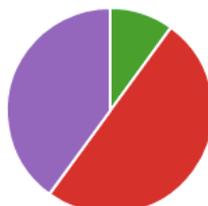
Lemon Flavour

This shows me that the lemon flavour is almost right but is slightly too strong however if it was decreased it would be back to not being strong enough

4. How much did you like the lemon flavour? (0 point)

[More Details](#)

● didn't like at all	0
● didn't like it much	0
● average	1
● liked it	5
● loved it	4

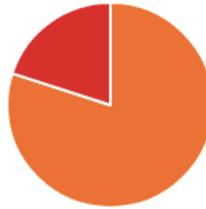


This shows me that my stakeholders like the flavour, therefore I can continue with this flavour.

5. How was the strength of the new lemon flavour? (0 point)

[More Details](#)

- definitely not strong enough 0
- not strong enough 8
- just right 0
- a little too strong 2
- much too strong 0



6. How much did you like the new lemon flavour? (0 point)

[More Details](#)

- didn't like at all 2
- didn't like it much 4
- average 4
- liked it 0
- loved it 0



7. How was the strength of the mango flavour? (0 point)

[More Details](#)

[Insights](#)

- definitely not strong enough 0
- not strong enough 4
- just right 7
- a little too strong 0
- much too strong 0



8. How much did you like the mango flavour? (0 point)

[More Details](#)

[Insights](#)

- didn't like at all 0
- didn't like it much 3
- average 2
- liked it 4
- loved it 2



New Lemon Flavour (essence)

This shows me that most people think the new lemon flavour is not strong enough, but some people think it is too strong

This shows that my stakeholders didn't like the new lemon flavour therefore I will not be continuing this flavour.

Mango Flavour

This shows me that the flavour is still too weak, so I need to increase it more.

This shows me that the mango flavour is not overly liked by my stakeholders, therefore I will not be continuing with this flavour.

Conclusion:

This has overall given me a clear insight into the levels of flavour in my product. This has shown me how I need to modify the flavour levels and also whether I should continue to keep trialing with each flavour. This has taught me that for the strawberry flavour it is as a good level and that it should be continued as my stakeholders liked it. The lemon flavour is now strong enough so I will continue to make it. The new lemon flavour (essence) was not strong enough so it would need to be increased however, my stakeholders didn't enjoy it at all, so I have decided to not continue making this flavour. The mango flavour is not strong enough so it will need to be increased but it was not overly liked by my stakeholders so I will not be continuing with this flavour.

Sorbet Trial

To create another style of ice block for my stakeholders, I decided to make a Vanilla Deer Milk Frozen yoghurt ice block which would be coated in a tropical flavoured sorbet. The frozen yoghurt in the centre would be smooth and creamy, where the sorbet would be sweet and refreshing creating a nice contrast.

Aim: to see if coating a deer milk yoghurt in a tropical flavoured sorbet will work and whether it creates a better product than the plain flavoured deer milk yoghurt.

Method – Yoghurt: Boil milk for 20 mins, stirring to homogenise. Take off heat and add glucose syrup and vanilla, stirring constantly. Cool to room temperature and let sit for 10 mins. Add yoghurt cultures, stirring to homogenise. Place in Yoghurt Machine and leave to set for 24 hours. Remove from yoghurt machine and stir until smooth. Refrigerate for 30 mins. Combine yoghurt, caster sugar, glucose syrup, and vanilla and mix in blender. Churn in ice cream churn for 30 mins or until smooth and airy. Place mixture into ice block molds. Store in freezer for 30 minutes minimum. Let sit at room temperature for 10 mins before serving. **Sorbet:** Add the frozen pineapple to the thermomix bowl and mix for 30sec/speed 8. Scrape down the sides of the bowl. Let the pineapple thaw for a few minutes, depending on how warm the room is. Insert the butterfly whisk and add lime juice and maple syrup and blend for 1 min/speed 3 until smooth and creamy. Take ice blocks out of the freezer and shave off 1cm off the frozen yoghurt, place in a container for future use. Scoop sorbet into the ice block mold and coat the sides so there is an even 1cm layer around the mold. Place shaved down ice block back into the mold pushing down all the way so that the sorbet is coating the frozen yoghurt ice block. Freeze for 30 mins until the sorbet is solid.

Results:



Stakeholder Feedback

1. How was the strength of the tropical flavour? (0 point)

[More Details](#) [Insights](#)

- definitely not strong enough 1
- not strong enough 6
- just right 4
- too strong 2
- way too strong 0



This shows me that majority of my stakeholders found that the strength of the tropical flavour was not strong enough but a large portion also found it was just right.

2. How much did you like the tropical flavour? (0 point)

[More Details](#) [Insights](#)

- didnt like at all 2
- didn't like it much 5
- average 3
- liked it 3
- loved it 2



This shows me that it was a very across the board preference of the flavour. However with such a wide variety of answers this will be a risk.

3. How much did you like the sorbet with the frozen yoghurt? (0 point)

[More Details](#)

[Insights](#)

● didn't like at all	1
● didn't like it much	6
● average	2
● liked it	3
● loved it	2



Majority of the stakeholders found that they didn't like it. This shows me that my stakeholders would not like this product so it should not be carried on.

This shows me that it is a 50/50 split on whether my stakeholders would purchase my product or not. With such a close margin between them, it is not a good idea to carry on with this concept.

This shows me that my stakeholders preferred the original idea and that I should go back to the flavoured frozen yoghurt rather than the sorbet coated prototype.

This shows me that even if I was to carry on with the product they would not have liked a tropical flavour.

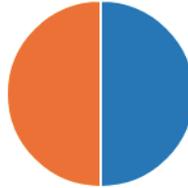
This shows me that even if I was to carry on with the product they would prefer a lemon, mango, or berry flavour.

4. Would you be interested in purchasing this in the form of a deer milk frozen yoghurt ice block covered in sorbet (like a splice)?

[More Details](#)

[Insights](#)

● Yes	7
● No	7



5. Did you prefer the flavouring in the yoghurt or vanilla frozen yoghurt with tropical sorbet?

[More Details](#)

● flavoured frozen yoghurt	10
● vanilla frozen yoghurt with tropi...	3



6. If i was to got with the sorbet would you still want tropical flavour or would you prefer another flavour?

[More Details](#)

● tropical	5
● other	9



7. If other, what flavour? (0 point)

[More Details](#)

[Insights](#)

7 respondents (88%) answered **lemon** for this question.

lemon mango or lemon
boysenberry

Conclusion

Although this test was fun and informative to complete, I have decided to stop this trial and go back to the original. Some of my stakeholders seemed to like the product however, not enough of them enjoyed it to make it viable to produce. Therefore I will be going back to continue to make a flavoured frozen yoghurt.

Stakeholder focus group visit 2.

Survey for Stakeholders – Flavour testing

Name: _____

Email: _____

Please tick or colour in the star under the heading which matches your opinion.

Strawberry Flavour Frozen Yoghurt

How was the strength of the strawberry flavour?

Definitely not strong enough	Not strong enough	Just right	Too strong	Extremely too strong
★	★	★	★	★

How much did you like the strawberry flavour?

Didn't like at all	Didn't like it much	Average	Liked it	Loved it
★	★	★	★	★

Lemon Flavour Frozen Yoghurt

How was the strength of the lemon flavour?

Definitely not strong enough	Not strong enough	Just right	Too strong	Extremely too strong
★	★	★	★	★

How much did you like the lemon flavour?

Didn't like at all	Didn't like it much	Average	Liked it	Loved it
★	★	★	★	★

New Lemon Flavour Frozen Yoghurt

How was the strength of the new lemon flavour?

Definitely not strong enough	Not strong enough	Just right	Too strong	Extremely too strong
★	★	★	★	★

How much did you like the new lemon flavour?

Didn't like at all	Didn't like it much	Average	Liked it	Loved it
★	★	★	★	★

Mango Flavour Frozen Yoghurt

How was the strength of the mango flavour?

Definitely not strong enough	Not strong enough	Just right	Too strong	Extremely too strong
★	★	★	★	★

How much did you like the mango flavour?

Didn't like at all	Didn't like it much	Average	Liked it	Loved it
★	★	★	★	★

Overall Ranking

Please rank the flavours on 1 being your favourite and 4 being your least favourite.

1.	
2.	
3.	
4.	

Flavours:
- Strawberry
- Lemon
- New Lemon Flavour
- Mango

Pricing

How much are you willing to pay for a pack of two yoghurts approximately 125g (the size of a yoghurt pottle)?

<\$5 each	\$5 each	\$6 each	\$7 each	\$8 each	>\$8 each
★	★	★	★	★	★

Any other feedback, thoughts or suggestions?

Thank you so much for helping me with feedback and giving up your time! It is much appreciated ☺

Final Frozen Yoghurt in Pottles

After all of the prior testing and trialing I finally came up with a clear formulation of my product that I have chosen to use. I have chosen to make both the strawberry and the lemon flavours and include 2 of each flavour per pack (pack of 4).

Final Formulation

Deer Milk Vanilla Bean Frozen Yoghurt with Glucose for 500mL batch

Ingredients

Deer Milk	500mLs
Glucose syrup	20g
Yoghurt Culture	2.5g
Vanilla Paste	2.5mLs

Method

1. Boil milk until reaching 80°C, stir to homogenise.
2. Add glucose and vanilla, stirring constantly
3. Cool to room temperature and let sit for 10 mins.
4. Add yoghurt culture, stir to homogenise.
5. Leave in yoghurt machine for 24 hours.
6. Stir until smooth and refrigerate for 30 mins.

Ingredients

Deer Milk Yoghurt	500mLs
Caster Sugar	50g
Glucose Syrup	1 Tbsp
Vanilla Paste	1.5 tsp
Freeze Dried Lemon/Strawberry Flavour	12.5g/15g

Method

1. Combine ingredients and mix in blender
2. Churn in ice cream churn for 30 mins
3. Store in freezer for 30 minutes minimum
4. Let sit at room temperature for 10 mins before serving

Final Product Photos



Churn test

The performance properties that I wanted my ice cream to have been:

Appearance: Glossy, non-crystalline, smooth

Texture: Smooth, creamy, scoops easily, silky, velvety

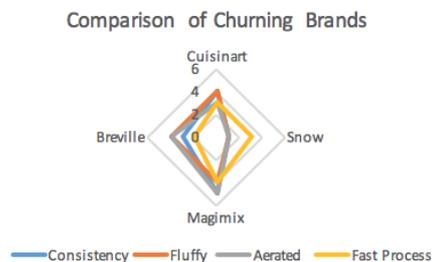
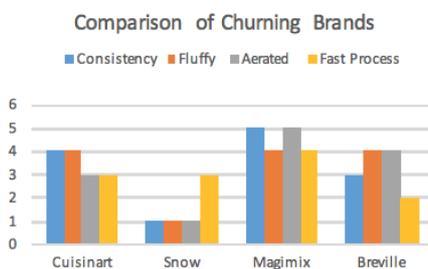
Flavours: balanced

The performance properties of my yoghurt are affected by changes made in manufacturing the product. For example, the final outcome of my product may be altered or manipulated by using a low-grade ice cream churner, heating my mixture over pasteurization temperature of 80 degrees Celsius. The point of heating to pasteurization level is to kill the harmful bacteria in milk through heating. If I were to execute this step incorrectly, there are risks of diseases caused as a result of the lurking bacteria.

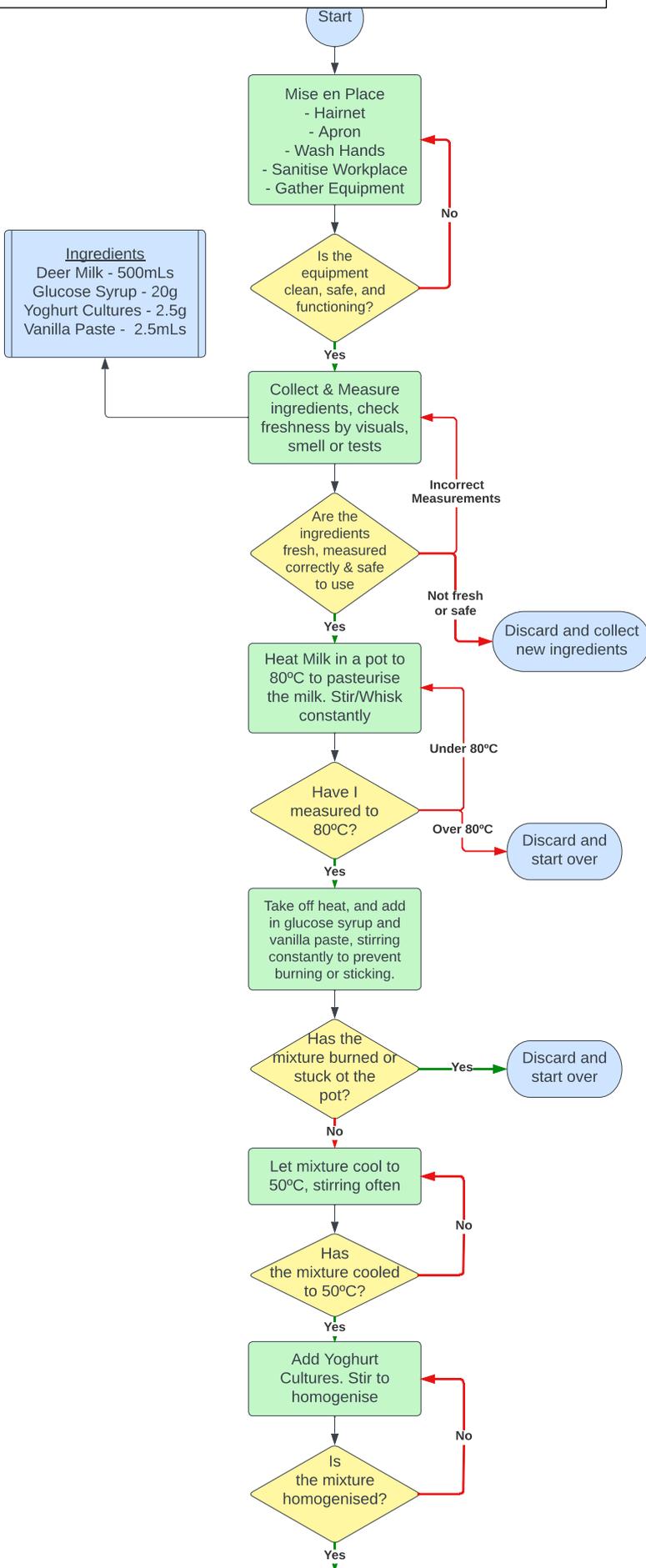
The churner used to churn the product also has a great impact in the final outcome of the product. A test was carried out in our class to rate the performance and quality of each churner that the school offers. Our school owns four different brands of ice cream churners, I wanted to know which of these had the best outcome in terms of consistency, fluffy, aerated, and fast process. The four brands we had were Cuisinart, Snow, Magimix and Breville.

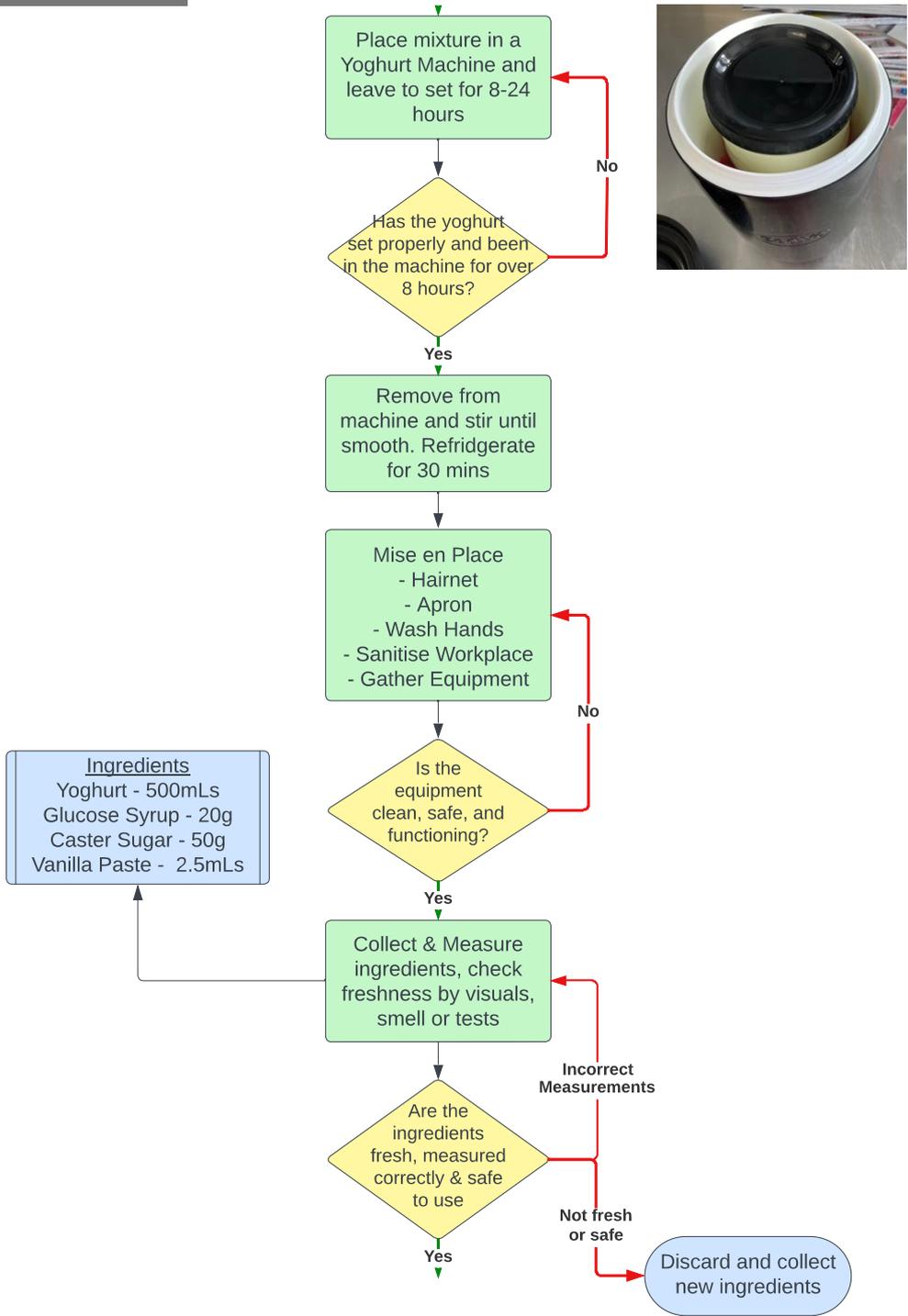
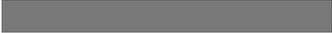


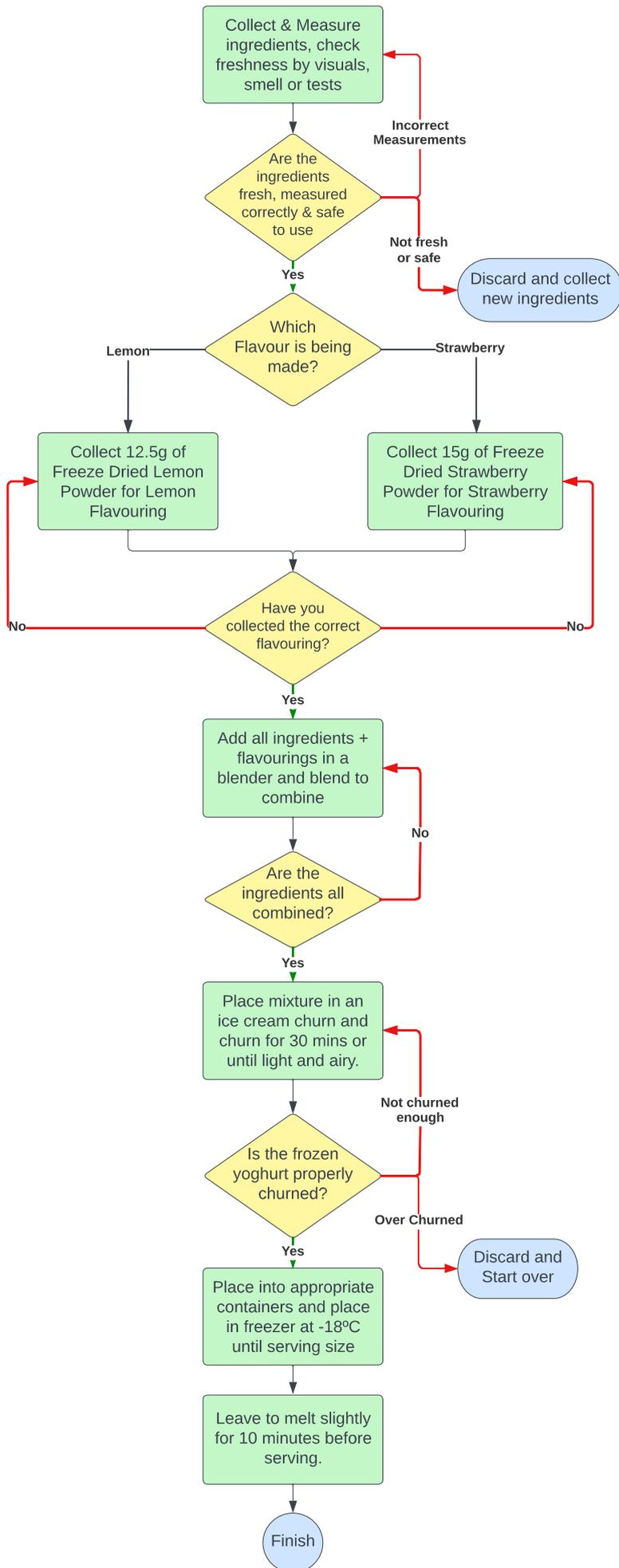
After carrying out this experiment through following appropriate safety measures and using fair measurements and testing criteria, the final conclusion made was that the MagiMix gave the overall best results and had a significant difference in the amount of overrun (aeration), compared to the Snow machine which had the lowest results. Overrun is the amount of air that is whipped into the mixture, which affects the total amount of finished ice cream.



Final Process Plan – Lemon or Strawberry Deer Milk







HACCP Plan

A HACCP plan is used to produce a product that is safe to consume by highlighting all of the critical control points in making my product and the actions to take in order to mitigate safety risks from occurring.

Process	Hazard	Control	Corrective Action
Preparation	Bacteria in hands, hair, clothing Cross contamination	Effective and thorough cleaning using quality products Ensure cleaning of equipment is effective Clean surfaces using anti-bacterial cleaner, hair covered with net or tied up, remove jewellery, hands thoroughly washed and dried, clean apron.	
Preparation of Frozen Yoghurt Mix	Incorrect measuring Expired ingredients Unclean equipment Foreign matter, pathogens present i.e. incorrectly stored.	Visual check of product plus use by dates. Correct storage Use appropriate measuring equipment – calibrated digital scales, double check Ensure ingredients are kept at correct temperatures Product contact surfaces are clean and sanitary before beginning	Discard expired, damaged ingredients and equipment
Heating (Pasteurisation) Heating the milk	Burning yourself and the mixture Growth of pathogens if incorrect temperature	The pasteurisation temperature is measured and achieved.	Run burnt hands under cold water, discard of any burnt mixture.
Cooling	Mixture not fully cooled Other dirt etc falling into mixture Pathogens can grow + contaminate unclean containers	Cooling rapidly after heating to 4°C or below Ensure containers are clean	Discard of any contaminated mixture
Ageing in Yoghurt Machine Allows the yoghurt to set and cultures to grow	Other dirt falling into mixture, pathogens can grow at wrong temperatures. Pathogens can contaminate unclean container	Sufficient time given for ageing – for at least 8 hours but preferably over night Ensure containers are clean and not damaged	Discard contaminated mixture
Adding colours, flavours, inclusions	Expired additives, incorrect quantities, inclusions go rancid, foreign bodies.	Check use by dates Check for foreign objects – visual check	Discard expired/ damaged ingredients
Churning/freezing Adds air Forms ice crystals Water content frozen	Broken tools/equipment Not properly frozen Mixture left out for too long Pathogens contaminate	Turn machine on in advance or chill bowl of machine as per manufacturer's instructions Ensure machine is functioning correctly	Discard damaged equipment and ingredients
Packaging Protects finished product	Bacteria or air getting in through packaging Incorrect labelling Not sealed, bacteria grows, foreign matter	Hygienic handling when ice cream is packed Staff use correct hygiene techniques Visual check Store packaging appropriately	Discard damaged packaging and products
Storage of finished product for sale	Product not cold enough and sealed well	Check freezer temperature to ensure frozen state is maintained Ensure product handling is done with care	Discarded damaged products

Health and Safety:

Manufacturing sure that the product adheres to health and safety rules to satisfy the standards of New Zealand and Australian health and safety regulations is one of the most crucial aspects of making my frozen dessert. This will allow customers to enjoy my product safely. Therefore, I developed a process plan that I adhered to each time I manufactured the frozen yoghurt and a HACCP plan in order to ensure that my product complied with the health and safety laws. The process strategy ensured that my product would be the same each time and made it simpler to make the frozen treat according to the recipe. With the use of quality control points and critical control points, the HACCP strategy ensured that the biological, chemical, and physical dangers would be kept to a minimum. By letting me know when crucial control points that I needed to monitor in order to guarantee the safety of my product were approaching, these two documents helped me to ensure that my product not only complied with health and safety regulations but also met the attributes of the ideal frozen dessert. To comply with health and safety laws, I needed to make sure that not only was my workspace and equipment thoroughly disinfected before use, but also that I was always prepared with a clean apron, hair net, removed jewellery, and washed hands to minimise

contamination from goods. This meant that not only did my frozen yoghurt itself need to adhere to health and safety standards, but also its packaging. As a result, I had to make sure my container was kept in a suitable setting without any gases that could have contaminated my frozen dessert when it was added to the packaging. In order to be able to pour the mix directly in and fast freeze to prevent crystals from forming, I had to disinfect my packing before using it in the churning stage.

Selected ingredients

SPECIFICATIONS:

- “Scoopable”
- Non-crystalline
- Smooth
- No “off” flavours
- High protein content
- Product “true” to label
- Only natural flavours and colours
- Pottle size 125ml

Ingredients I tested	Function of the ingredient in ice-cream	Why I have chosen to include this ingredient	Image
<p>Sugar/sweeteners Granulated sugar Glucose Sugar/glucose</p>	<p>Sugars add sweetness but also improves texture and body. Also lowers the freezing point of the mix, ensuring that the ice cream does not freeze rock-solid. A lower freezing point makes ice cream easier to scoop and eat, although the addition of too much sugar can make the product too soft.</p>	<p>I tested many different sugars and combinations of sugars to find out what would best suit the sweetness level and improve the flavour and texture of my frozen yoghurt. Stakeholder feedback and evaluating the results of test showed that the glucose gave the best result, both in terms of sweetness level for all three flavours and the smooth, non-crystalline texture. The sugar produced a slightly gritty texture.</p>	
<p>Fat deer milk Deer milk/high protein milk</p>	<p>Milk fat provides creaminess and richness to ice cream and contributes to its melting characteristics. The minimum fat content is 10% and premium ice creams can contain as much as 16% milk fat. Sources of milk fat include milk, cream, and butter.</p>	<p>I have tried a combination of deer milk and high protein milk – mainly because of the cost of the deer milk. While both products met most of the specifications, the one using only deer milk was creamier – and felt more “luxurious”. This also met the brief of high protein better when I did an NIP comparison.</p>	

<p>Stabilisers LBG (locust bean gum) Xanthan gum Guar gum</p>	<p>Stabilisers are used in ice cream and frozen dessert products to increase mix viscosity and increase the creaminess. This helps provide a resistance to melting. Stabilisers prevent the growth of ice and lactose crystals during storage. Stabilisers also help to preserve the structure of the ice cream.</p>	<p>Xanthan gum is commonly used - it is a binder that is used to help enhance the mouthfeel and creaminess to the texture. LBG (locust bean gum) is water soluble and is a thickener and stabiliser. Often LBG and Xanthan are used together as they are synergetic. I tested stabilisers in my product, but found they made little or no difference. Stakeholder feedback informed my decision to not include a stabiliser – thus keeping my product as close to a “clean label” as possible.</p>	
<p>Flavours Lemon – freeze dried lemon Hawkins Watts lemon flavour Strawberry – freeze dried strawberry Strawberry essence Frozen strawberries Mango – freeze dried mango Mango pulp</p>	<p>The flavour intensity of a product is incredibly important, and can make or break a product. It is subjective, so I needed to use a variety of ways to collect data to make decisions. I tested different means of adding flavour, through essences, pulped product and freeze dried powders.</p>	<p>The clear favourite for all the flavours was the freeze dried powder. This again, met my desire for a clean label. The industry standard essences I got through Hawkins Watts and Sensient were difficult to “tweak” and my stakeholders all gave them a thumbs down – commenting on the artificial flavour – some referred to the lemon as tasting like pledge! Freeze dried powders are expensive and added to the total cost, but the compromise was worth it. The pulps and frozen fruit changed the texture -making the product very icy – due to the increased water content.</p>	

Nutrition Information Panel

Amount	Unit	Specific gravity	Food name	Energy (kJ)	Protein (g)	Fat (tot) (g)	Fat (sat) (g)	Carb (tot) (g)	Sugars (g)	Sodium (mg)	Actions
<p>Values in this table indicate how much each ingredient contributes to the components per 100 g of the recipe before adjustments are made in Step 2 and Step 3. Creating a custom ingredient that is a liquid? Read about specific gravities in the User Guide. Note that the NPC will use the ingredient's specific gravity to convert the values for liquid ingredients entered as millilitres or litres into grams</p>											
500	g		Deer Milk (C)	425.74	5.49	7.65	4.74	2.91	2.91	29.94	
20	g	1.39	Glucose, liquid or syrup	45.00	0.00	0.00	0.00	2.65	1.34	4.99	
8.8	g	0.87	Vanilla bean extract, alcohol based	17.80	0.00	0.00	0.00	0.18	0.18	0.13	
70	g		Sugar, white, granulated or lump	197.90	0.00	0.00	0.00	11.64	11.64	0.00	
2.5	g		Yoghurt Cultures (C)	6.19	0.00	0.00	0.00	0.36	0.00	0.60	

NUTRITION INFORMATION				
Servings per package:	4			
Serving size:	125g			
	Average Quantity per Serving		Average Quantity per 100 g	
Energy	1080	kJ	861	kJ
Protein	8.3	g	6.6	g
Fat, total	11.3	g	9.1	g
- saturated	7	g	5.6	g
Carbohydrate	29.1	g	23.3	g
- sugars	25.4	g	20.3	g
Sodium	53	mg	42	mg

NUTRITION INFORMATION				
Servings per package:	4			
Serving size:	125g			
	Average Quantity per Serving		Average Quantity per 100 g	
Energy	1080	kJ	862	kJ
Protein	8.4	g	6.7	g
Fat, total	11.6	g	9.2	g
- saturated	7.1	g	5.7	g
Carbohydrate	28.3	g	22.6	g
- sugars	22.2	g	17.8	g
Sodium	61	mg	49	mg

Strawberry Flavour Deer Milk Frozen Yoghurt

Lemon Flavour Deer Milk Frozen Yoghurt

Packaging

Since the packaging is the very first thing a buyer sees when considering a product, it must be appealing and clearly explain to the customer what they are looking at and purchasing. I will thus need the packaging to draw in customers and convey all of the information about what my product is. The packaging for my prototype will need to reflect the fact that it is a high-end product for an older demographic and that it is intended for a mature audience. To appeal to my older customer niche, I will need to design a high-end, mature-looking package for my prototype. Therefore, I'll gather stakeholder input on my packaging design to guide my decision-making and next stages.

My container must be able to contain, secure, preserve, advise, promote, and offer consumers convenience. My final packaging meets all of these requirements by...

1. Due to the sturdy hard plastic used in my packaging, which makes it difficult to break or shatter, the contents is well contained inside. Because my container is airtight, no product may escape, effectively containing the product.

2. Because it is durable and resilient, my packaging safeguards my goods by not breaking or cracking when dropped. My product is packaged safely to prevent damage during transportation or presentation.
3. My packaging protects my product by keeping it airtight and preventing light from penetrating it, extending its shelf life. The product's durability also ensures that it keeps its original packing and condition.
4. The packaging educates the buyer about the product by having accurate labelling that explains exactly what is inside and what the product is in order to advertise it. Everything I make features my brand and logo, which aids in marketing the item and lets customers know what brands they are purchasing, allowing them to decide whether to purchase it again in the future if they liked it.
5. To provide consumers convenience. Because it comes in a single-serve tub that is easy to grip and manage, it is practical because it can be consumed right away and because it is small enough to store in the freezer without causing a problem with regard to freezer space. Because of its ergonomic shape and size, the product is very simple to hold and convenient for the customer to take around while consuming.

Brand Name Ideas:

1. Deer oh deer
2. Oh deery me
3. Two deer

Stakeholder feedback on brand names

Stakeholder	Favourite	Why?
Maureen	Oh deery me	This name is my favourite as it is a playful twist on the common phrase, and I think that it has a ring to it
Carol	Deer oh deer	Deer oh deer is my favourite as the repetition is nice and it is catchy
Beverly	Oh deery me	Oh deery me is my favourite as it such a fun and adorable name and love the pun!
Rosemary	Oh deery me	My favourite is Oh deery me as it is something that you hear said often so it would spread the name of the brand.
Margaret	Two deer	I like two deer as it is very simple and sounds like a brand name

Chosen brand name: Oh Deery Me

Conclusion: I have chosen the name for my brand to be Oh Deery Me as it was the most liked by my stakeholders. They liked the name as it was a nice take on the well-known phrase. They think it is good because it has a ring to it and gives it a cute product name. Rosemary also made a good point in that as it is a commonly said phrase it will help to spread the name of the brand which is beneficial for my product.

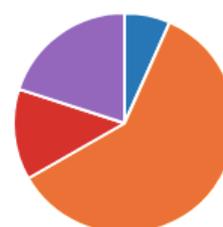
Logo's font ideas

1. Oh Deery Me
2. OH DEERY ME
3. *Oh Deery Me*
4. Oh Deery Me
5. *Oh Deery Me*

1. Which is your favourite font for the logo? (0 point)

[More Details](#)

● Font 1	1
● Font 2	9
● Font 3	0
● Font 4	2
● Font 5	3



Conclusion: I will be using font 2 for my brand name as it was the most voted for font choice. This will be the font used as the main font of my logo. It was the most liked font by my stakeholders as they thought that it was clear to read but still gave it an elegant look. This way it complemented the product but was still clear for my target market to be able to read.

Colours for logo

I chose a gold and navy colour scheme for my product as these are the colours used in the Pāmu logo. As I created my project alongside Pāmu I wanted to include their logo on my packaging. Therefore to make the packaging look cohesive, I used a very similar colour palette to Pāmu's logo.



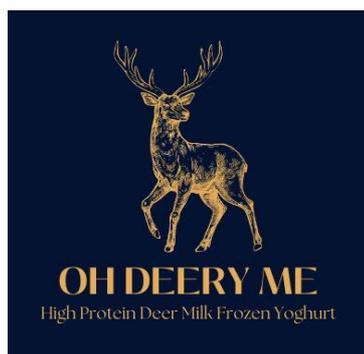
Logo Design Ideas

By using the feedback I have gathered from my stakeholders, I created 3 logo concept designs using the chosen colours, fonts and name.

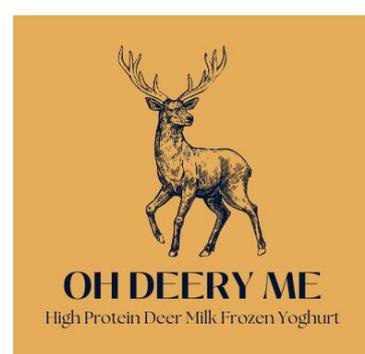
1.



2.



3.



2. Which logo is your favourite? (0 point)

[More Details](#)

- Option 1 1
- Option 2 3
- Option 3 11



Conclusion: My stakeholder's favourite logo was logo 3. They liked the simplicity and elegance of the design and how clean it looked. They liked the deer on the logo as it popped but still made it look for the aesthetic that my product was going for. I will incorporate this into my packaging.

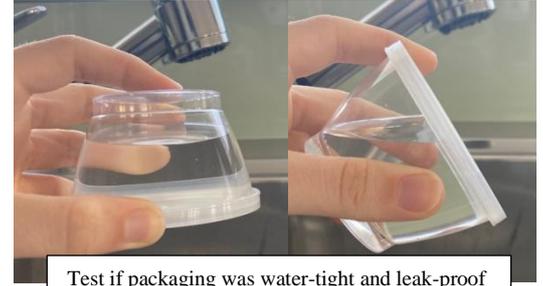
Final Packaging

The packaging I have designed has incorporate all of the elements specified and chosen by my stakeholders. The packaging has the logo on the top of the package along with the flavours, size of contents and Pāmu's logo. On the sides of the pakaging I have added the nutrition information panel of both flavours and their ingredients list and on the other side panel I have storage instructions, complaints address etc.

By doing all of this I created a packaging design that appealed to my consumer market and met the packaging specifications which were to contain, secure, preserve, advise, promote, and offer consumers convenience.

My product's packaging has to be sturdy enough to retain it securely and maintain its integrity in the event that it were to fall. It had to be airtight to prevent product leaks and to prevent foreign objects or germs

from entering the package and contaminating the product. In order to make it simple for customers to hold in their hands and simple to eat from, it also needed to be practical. My target market prefers to purchase a 4 pack of 125g pottles, as shown by my stakeholder surveys, thus this has to be taken into account. As a result, I chose a container that could hold 4 x 125g pottles. The pottles were fashioned of a sturdy, thick plastic, and their lids were airtight. Then, a cardboard sleeve was placed over the four pottles, which had been arranged in a square pattern. The pottles were held in place and prevented from moving by the centre cut-outs of the sleeve, which folded inward. Additionally, the packaging had a visually appealing appearance. This made it more likely to grab the consumer's interest and draw them to my offering. It included all the relevant details, including ingredients, storage needs, nutritional information, etc.



Test if packaging was water-tight and leak-proof

Packaging Design:

Strawberry Flavour			Lemon Flavour		
NUTRITION INFORMATION			NUTRITION INFORMATION		
Servings per package	4		Servings per package	4	
Serving size	125g		Serving size	125g	
	Average Quantity per Serving	Average Quantity per 100g		Average Quantity per Serving	Average Quantity per 100g
Energy	1080 kJ	864 kJ	Energy	1080 kJ	864 kJ
Protein	8.3 g	6.6 g	Protein	8.4 g	6.7 g
Fat, total	11.3 g	9.1 g	Fat, total	11.6 g	9.3 g
-saturated	7 g	5.6 g	-saturated	7.1 g	5.7 g
Carbohydrate	29.1 g	23.3 g	Carbohydrate	28.3 g	22.6 g
-sugars	25.4 g	20.3 g	-sugars	22.2 g	17.8 g
Sodium	3.5 mg	2.8 mg	Sodium	4.1 mg	3.3 mg

Strawberry Flavour Ingredients: Deer Milk, Sugar, Glucose Syrup, Sugar, Freeze Dried Strawberry Powder, Vanilla Extract, Yoghurt Cultures

Lemon Flavour Ingredients: Deer Milk, Sugar, Glucose Syrup, Sugar, Freeze Dried Lemon Juice Powder, Vanilla Extract, Yoghurt Cultures

CONTAINS MILK

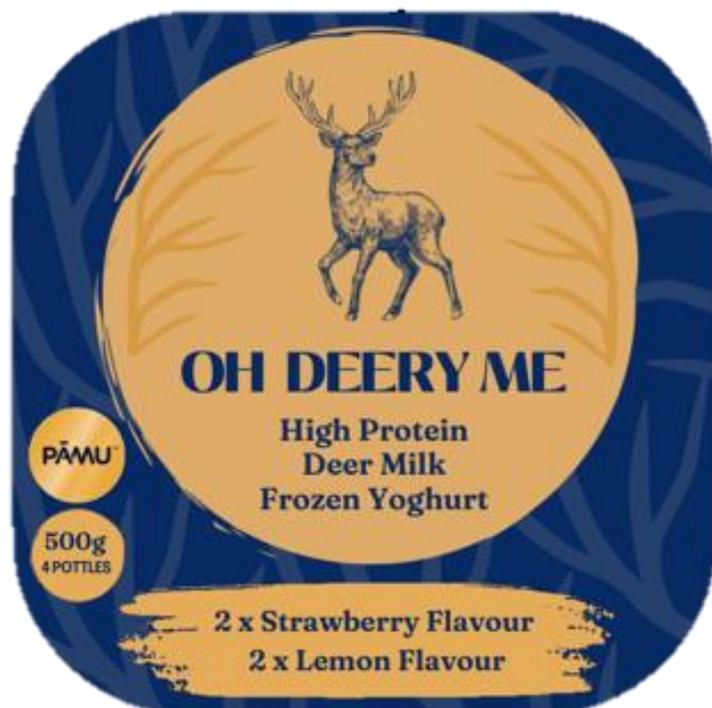
Storage Instructions:
Keep Frozen. Store below -18°C.

Made in New Zealand with local products.

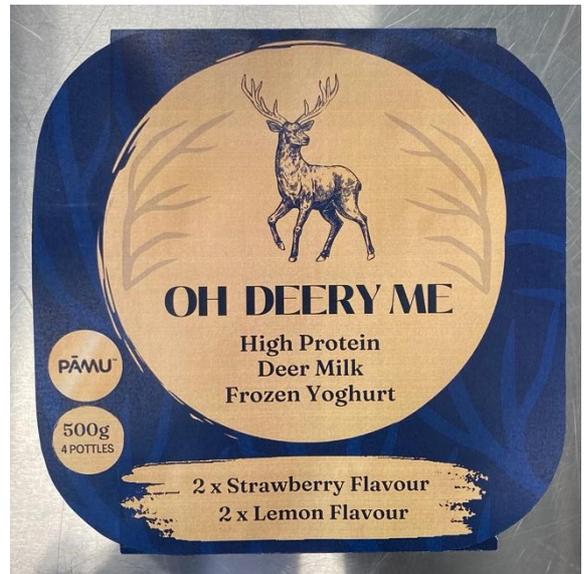
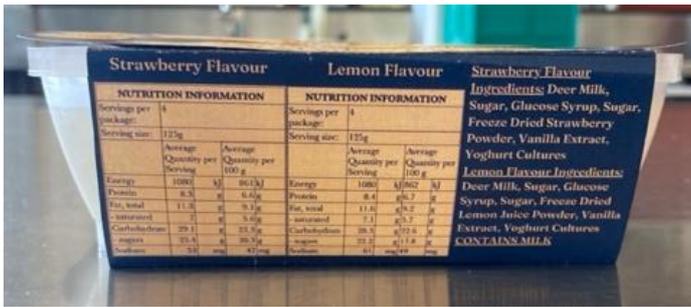
Deer Milk from Pāmu™

Please dispose correctly. ♻️

Have a complaint? Let us know. We want to make you the best product possible but sometimes things don't go to plan.
B210, 237 Victoria Avenue, Remuera, Auckland 1050



Final Product in Packaging



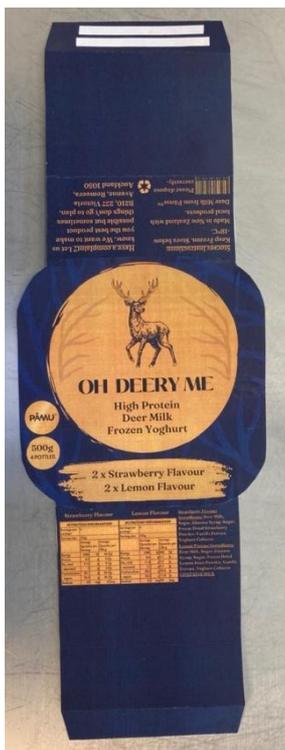
Environmental impact of my packaging

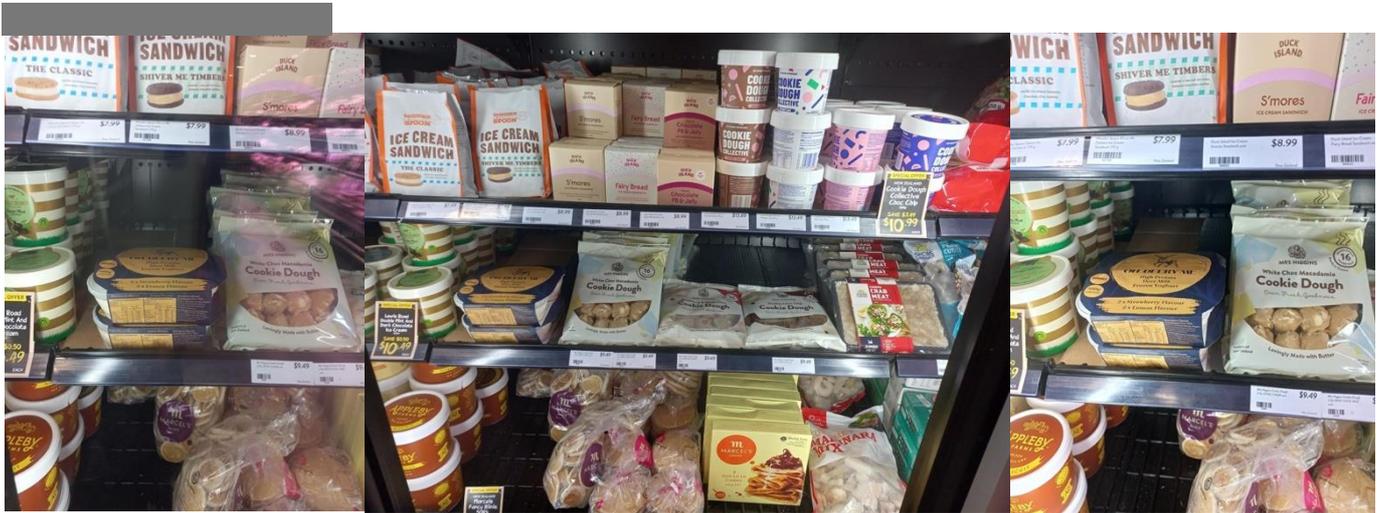
My packaging must be recyclable and environmentally friendly.

Since frozen dessert packaging is not yet accessible, I am unable to utilise biodegradable packaging for my product. However, since milk packaging is already available, I am hopeful that I will be able to use this form of packaging in the future. Additionally, I am unable to utilise compostable packaging since the liquid in the frozen yoghurt would cause it to fall apart. In addition, the packaging would allow light and air into the food, which would shorten its shelf life. I've decided to use recyclable packaging as a result. This has a significant impact on the volume of landfill in New Zealand because there is already a lot of it and my product won't add to it. I could recycle my packaging and use it to store fresh food. To accommodate my target market's demands and tastes, the packaging will have 4 single serves. Therefore, my product will be more socially acceptable due to its positive environmental impact. Due to the recyclable label on my packaging, shoppers will be able to tell that my product is recyclable. In order to make sure the labelling on my packaging was accurate, I compared it to the New Zealand Food Safety Labeling Guide. This ensured that my packaging had all the necessary labelling.

Product in situ

My product is in situ at a specialist supermarket dairy where my product would be sold if it was developed. It is standing along with similar products in the freezers showing how my product is sturdy and fit for purpose. My packaging looks fancy and high quality compare to the other products, making it stand out to my target market.





A new development -consideration of “clean” labelling.

It occurred to me early on in my project, and after asking my target focus group how often they read the labels/ ingredients list, that perhaps the people in the demographic/ target market for my product would desire a Clean label.

For most consumers, the term “clean label” means 'healthy' and free from artificial additives or preservatives. The main consumer drive behind the “clean label” movement is perceived health and wellbeing.

Consumers can feel concerned when faced with the ingredients list on product labels. The list may be a lot longer than they expect, due to ingredients added for preservation or processing.

My research of existing products showed that most products contained many ingredients – even some of the premium and very highly priced products. Conversely, I noted, that some of the Artisan producers had two different formulations -one for “scooping” – from a gelato parlour or ice cream store, and another for product to be sold in high end stores like Farro – where the same flavour had far fewer ingredients.

When I discussed this with my Pakuranga Park focus group -it took a little bit of explaining, but when they understood, the discussion was “full on”! I asked them how much notice they took of the NIP, and of the ingredients list. Many (more than half) of the group, said that they did consider it, as they were often looking at such things as fat and sugar, due to dietary requirements. They also commented that they would be prepared to pay for more for a product that met their dietary requirements, and their first port of call would be the ingredients list – not necessarily the NIP. They were not sure about many of the E numbers – so I showed them a range of ingredients lists on products that they purchase. They were very surprised!!

Therefore – a CLEAN label became an important specification for “Oh Deery Me”.

Ingredients list compare with existing product

The list of ingredients used in my product is very small and with every day ingredients, proving to my stakeholders that I was able to show how clean my product is compared to a big company

Strawberry Flavour

Ingredients: Deer Milk, Sugar, Glucose Syrup, Sugar, Freeze Dried Strawberry Powder, Vanilla Extract, Yoghurt Cultures

Lemon Flavour Ingredients:

Deer Milk, Sugar, Glucose Syrup, Sugar, Freeze Dried Lemon Juice Powder, Vanilla Extract, Yoghurt Cultures

CONTAINS MILK

My Product's ingredient list



Twisted Strawberry and Vanilla Bean Frozen Yoghurt



INGREDIENTS

Reconstituted Milk Solids, Yoghurt 25% (Milk, Milk Solids, Cream), Live Cultures (Acidophilus Bifidus and Casei), Sugar, Soluble Tapioca Fibre (IMO), Strawberry Puree (Strawberries, Ascorbic Acid), Dextrose, Maltodextrin, Acacia Gum, Citric Acid, Natural Flavours, Guar Gum, Xanthan Gum, Red Beet (Colour).

Feedback on my product from S [redacted] T [redacted] – Dietician and Researcher

S [redacted] T [redacted] MSc. NZRD |
Research Assistant
School of Sport, Exercise &
Nutrition
College of Health – Te Kura
Hauora Tangata
Massey University

Hi L [redacted]. I am so impressed with your final products! These certainly sound like flavours that age group would enjoy and would be consistent to the trends I saw when entering their diet recalls (3-day food diaries at the start and end of the study).

Frozen yogurt seems like a great use of the "super milk". As a dietitian, some issues to be concerned about in this age group would be:

1. Calcium intake for bone health in post-menopausal women (I know you couldn't add it to the NIP but dairy products in general are good sources of calcium) and 2-3 serves a day are recommended in this group.

2: Protein intake - to maintain muscle mass for health aging.

This would also be appropriate for those that have difficulties with hard foods e.g. due to loose dentures or missing teeth.

The sugar content is about what I would expect – especially when the product is positioned as a treat food e.g., comparable with ice cream. May be a little high compared to everyday products, but I think in this age group, sugar intake wouldn't be the biggest health concern. Saturated fat is also looking better than I would expect!

Serving size seems about right, about the volume of a pottle of yoghurt.

Ngā mihi,

S [redacted]

VERY EXCITING!!!

At the time of writing this report, I have a meeting scheduled with H [redacted] G [redacted] and K [redacted] N [redacted] – Pāmu for further feedback on my product. This is scheduled for 14th November. Based on S [redacted]'s research and my NPD, H [redacted] is conducting additional focus groups with S [redacted]'s and my participants to hear more about why they liked it – the deer milk, and the yoghurt.

Technical feasibility - **OH DEERY ME !!!???**

During this meeting I will be able to discuss with Pāmu the possible ways of being able to lower the price of production as it is very high due to the price of deer milk. I am hoping to find a way to make the costs more affordable as it is not technically feasible at its current cost of production. At this point the cost is prohibitive to further development, however, on-going discussions with the team seems to be positive with batch costs reduced by larger scale production and wholesale pricing of raw materials.

I am very much hoping that we will see my product on the Pāmu website as a new product – and in the freezers at specialty supermarkets and stores.

Specifications:

Specification	Why?
Lifecycle	Since the product that I am developing is an original product it needs to appeal to not only my target market but also the wider audience. My product is a specialty product so it is of a higher class so it will most likely only be sold in specialty supermarkets such as Farro or Huckleberry. This means that I was trying to make a product that is a higher quality and has a more fancy look to it as the people buying my product will be upper-class. I tried to keep the flavours very simple which creates a clean product. My product should have a longer lifecycle within the market due to it filling a gap in both frozen yoghurt products and high protein products aimed at women over 65.
Technical Acceptability	Both the ingredients and the manufacturing process for my product need to be safe. In order to accomplish this, I must be certain that I followed an exact HACCP plan, which will be followed by proper hygiene standards, giving me the assurance that my product will be safe for consumption.
Maintenance and disposal	For my product to appeal to more consumers, it must have a long shelf life. Because the product has a longer shelf life, customers are relieved of the pressure to consume it right away. The likelihood of the food going bad is reduced. To extend the shelf life of my goods, I can take measures like using packaging that is acceptable, doesn't allow air in, and is sealed so moisture can't get in either. The possibility of my goods being damaged and destroying the aesthetic appeal when broken is eliminated by having a strong and sturdy package. Because the square shape keeps its position and shape effectively on supermarket shelves, this is why I chose to design a box packing.
Ethical nature of testing	I have to follow proper food handling procedures when making my goods. I'll adhere to both my HACCP plan and my process plan, which includes feedback mechanisms. I will adhere to the labelling and food safety regulations of New Zealand and Australia. There will be labels on allergens. When gathering feedback from stakeholders, I shall organise formal meetings after first receiving their approval. I'll make sure they are aware of the product's ingredients, its manufacturing process, and the purpose for which I'll use their comments. By doing this, you can be sure they aren't ingesting anything that could injure them or violate their cultural or personal beliefs. So that interested parties are aware of the origins, information regarding the ingredients' sources will also be made available.

<p>Cultural appropriateness of trialling and testing procedures</p>	<p>Seasonal Ingredients being used, are they currently in season? If they are not, the price may increase, which would affect the product's profitability. Due to being transported from abroad, the ingredient might not taste as delicious.</p> <p>In order for my product to be accepted by everyone, I need to make sure that it is being built with the right moral and cultural values. This implies that I must carefully assess if every ingredient I use will be accepted.</p> <p>All of the food is prepared correctly and safely for consumption by adhering to the essential HACCP and health and safety procedures. Aprons are worn, hair is tied back, jewellery is taken removed, and the bench area has been sterilised. Given how the workspace is organised, it exudes professionalism because everything is being handled properly.</p>
<p>Social acceptability</p>	<p>Consumers can trust that their products are being formulated with top-notch regional ingredients since they are made using materials and techniques that are acceptable by New Zealand society. It is crucial to support neighbourhood businesses, particularly during periods like the ones we are currently going through with COVID-19. When my product is supplied to customers on the market, it will be accepted much more as a result of my decision to buy locally sourced ingredients.</p> <p>Because there are no additional preservatives or sweeteners, this Kiwi favourite sweet treat is nutritionally important and healthful, making it much better to ingest. It is well known that coconut milk and cream support our general health. However, by using vegan substitutes for products that not only help lower blood pressure and provide our bodies with essential vitamins, but also add to the nutritional value of my ice cream, such as coconut milk and cream.</p>

Final Specifications in consultation with key stakeholder

- A high protein content
My product meets the specification of having a high protein content. It has a high level of protein from the deer milk and compared to other existing high protein products on the market it can be classified as high protein. Usual products are generally between 2 to 3.4g of protein in normal yoghurt whereas mine is a mine is 8.3/8.4. Its only other rival is Anchor+ yoghurt which is at 8.2g.
- Only natural flavours and colours
I have only used natural and ethically sourced vanilla paste, freeze dried lemon powder, freeze dried strawberry powder and I didn't use any colours in my product.
- Clean label product
As justified earlier in the report, my product has a clean label. It has a small amount of ingredients that are familiar to consumers and are simple.
- Nutritious
My product is nutritious as it has high health benefits. It is high in protein and calcium as well as other health benefits included in the deer milk, making it a nutritious product.
- Only uses clean, ethically sourced ingredients
The only ingredients I used were all clean and had been ethically sourced. This was an important part of my project as I wanted it to be completely ethically produced.
- Be lemon / strawberry flavoured
I have both strawberry and lemon flavours in my product. This was essential as they were the flavours that my stakeholders had requested.
- Balanced flavour
I made sure through several tests to ensure the flavours were balanced by working back and forth with my stakeholders to get the right flavour levels until they were satisfied.
- Smooth, creamy, and chewy texture, non-crystalline and scoopable

I modified my base formulation several times in order to make sure the texture and scoop ability were right. Through all the trials, I implemented feedback from the professionals I consulted with in order to make the perfect texture.

- Food safe packaging

The plastic pottles used to hold the frozen yoghurt are specifically made to hold food, therefore it is food safe packaging.

- An accurate NIP on packaging

I created an accurate Nutritional Information Panel through the Australia, New Zealand Food Standards website and then placed in a visible spot on my packaging, making it clear and easy to read.

- Packaging meets the New Zealand and Australian food safety standards

I followed all of the New Zealand and Australian food safety standards' guidelines for packaging in order to make a packaging that met the requirements.

- In a 125g size tub

The size pottle I used to be slightly over 125g. When putting the product into the pottles, I carefully weighed the size and made sure that it was exactly 125g.

- Manufactured to meet Health and Safety standards – process plan/ HACCP

I used both a process and HACCP plan in order to make sure I was meeting the Health and Safety standards every time I made my product.

Stakeholders' response to my final product



How much would this cost in Farro? When can I purchase this?



WOW! I love the packaging!

"Oh Deery Me" – how clever

The colours and logo are really great. I really like that you have taught me how to read an NIP



Thank you for all your efforts. It has been a very interesting experience. I never thought I would like deer milk.



Perfect sized pottles, and I love the 2 of each flavour in the pack. It would be good to buy a two pack too – can you do that?



I didn't realise that the work you were doing was so complex and so detailed. The packaging is very effective

I am going to save this for when my daughter comes to visit – she has been very interested in your project.

Eye catching and clever. Classy packaging

It is great to see so few ingredients in this product and also good to hear that the dietician you have been working with thinks it is good for us because it is delicious! Perfect size for my freezer.

[REDACTED]

This project has taught me so much. I have learned the importance of strong project management skills, interpersonal skills, patience, how to confidently present to groups of people I do not know. How to graciously accept both the positive and negative feedback and act on it. I have had to try, try and try again in some cases. At the beginning -I felt the project was going nowhere – and all of a sudden it fell into place.

My product is fit for purpose in the broadest sense because it is of premium standard, meets desired attributes as well as meeting the specifications of the brief. While I was making my product I was aware of competing and contesting factors. A huge factor in my project was the impact of COVID – particularly when trying to set up face to face meetings and sensory analysis testing, as it restricted my time, resources and creativity, however I treated this as a learning opportunity and a challenge which I overcame.

Working with experts in their field was invaluable -as without them I would not have a released outcome/prototype. Their expertise allowed me to develop the project efficiently. The packaging of my product is eye-catching and appealing. All my initial failures and setbacks this year, have allowed me to create an even stronger product that I am passionate about and that I believe could benefit society in time. People should care about my project because of its health benefits for the target market, and the general public. I feel confident it would hold its own against similar products on the market.

I am really looking forward to my final discussion with K [REDACTED] and H [REDACTED] from Pāmu, and hope, like my target focus group members, to see my product showcased on their website!!

Outstanding Scholarship Exemplar 2022

Subject	Technology		Standard	93601	Total score	22
Q	Grade score	Annotation				
Synthesis and integration	7	<p>A high protein frozen deer yoghurt product is developed as an outcome for an authentic issue. Requirements and attributes are well researched to establish the parameters of the brief in the broadest sense.</p> <p>The appropriate knowledge was extracted and presented in a concise and efficient manner. The commentary clearly communicates the technological process undertaken to systematically develop the prototype through a very high level of modelling.</p> <p>The project flows easily demonstrating good design thinking in the technological process.</p> <p>A well thought out and developed prototype is underpinned by some complex knowledge and a level of refinement that is underpinned by highly competent technological practice.</p> <p>The efficient testing and knowledge that has been integrated within the project demonstrated the required elements of synthesis, polish and optimization that lead to a prototype that is seen as a viable and responsive design.</p>				
Justification	7	<p>A combination of very well written evidence and imagery provides visual connections to support the ongoing commentary.</p> <p>This is aided by evidence that is always relevant and with limited repetition of content.</p> <p>A high level of technological modelling is evident throughout which has enabled the candidate's technological practice to be responsive to the products development.</p> <p>The student has been discerning with their work to ensure the scholarship criteria has been met.</p> <p>The candidate communicates convincingly and systematically which supports the technological practice of their prototype. This included outlining how complexities and constraints of the developed prototype were resolved and reviewed throughout the project.</p> <p>The result of this allowed the student to justify both their technological practice, decision making and the effectiveness of the prototype.</p> <p>The student has provided a clear and convincing narrative that further enhances our perception of the product.</p>				
Critical reflection	8	<p>In this report it is evident that the student has critically reflected on their own technological practice.</p> <p>The candidate used a range of external experts and engaged with a wide range of stakeholders on an ongoing basis. They then critically reflected on the information to inform and guide their practice.</p> <p>This student demonstrated that they were able to integrate knowledge gained from their technological experiences. This is evidenced by the application of skills and knowledge to develop and refine the prototype.</p> <p>There is evidence of how the student made their decisions and progressed their ideas, with independence, to ensure the product was fit for purpose.</p>				