



Fat-Free Dairy-Based Frozen Dessert

Ruby Jenkins, Hannah Wilson and Kiera Smith - Massey High School

“Indulgence without the fat...”



Brief:

Develop a fat free dairy based frozen dessert at 0.5% fat for females between the age of 25 – 55 in New Zealand. The product must be consistent with the Tip Top image.

Design Specification:

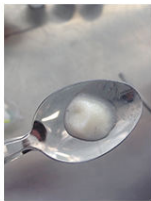
- Contains only natural colours and flavours
- Only fresh cream and milk
- Palm free
- Vegetarian
- Egg free
- Fat free
- Contains dairy

Our Journey

Our initial idea was to develop an 'ice cream' and a frozen yoghurt. We surveyed 104 people in our target market range and found that they preferred ice cream to frozen yoghurt at a 75:25 ratio. As a group we decided to head towards a frozen yoghurt. We spent a couple of months down the frozen yoghurt route and found ourselves at the point of a dead end when our mentors guided us back into the 'ice cream' direction. From there we trialled with various additives including Guar, Locust Bean and Cellulose gums, and Carrageenan as thickeners and stabilisers, along with mono and diglycerides of fatty acids as an emulsifier. We also got in touch with Givaudan to source fat and dairy flavour improvers to improve the mouthfeel of our product. We came across many new methods and techniques including the hydration of the gums with sugar, adding the additives at 60 degrees celcius and aging our product for at least 8 hours before churning. After months of trialling and getting closer to a product our group, mentors and target market were happy with we came across Pioneer produced by Danisco, containing a good mixture of thickeners, emulsifiers and stabilisers. After many trials combining this with other gums we concluded that Pioneer was best used on it's own. Shortly after we approached Ingredion to source some Tapioca Maltodextrin as a bulking agent and thickener to improve the fuller feeling of our dessert. With this we also discovered the wonders of glucose syrup and arrived at our final product. We tested this with our mentors, teachers and target market and came back with reasonably positive results. With more time we could have created a product with a creamier texture and we plan to continue to trial into the future.



Our Initial Trials



Water, Milk Solids Non Fat, Sucrose, Emulsifier (471), Vegetable Gums (460, 410, 412).



Water, Milk Solids Non Fat, Sucrose.



Water, Milk Solids Non Fat, Sucrose, Vegetable Gum (412), Mouthfeel (dairy) Flavour, Masking (fatty) Flavour.

Our Packaging Prototype

Tip Top
Guilt-Free Vanilla
Deliciously smooth and creamy Vanilla flavoured fat-free dairy-based frozen dessert.

	Average Quantity Per Serving	Average Quantity Per 100g
Servings per package: 10		
Serving size: 46g (100ml)		
Energy	62 (kcal) / 258 (kJ)	134 (kcal) / 561 (kJ)
Protein	1.5g	4.1g
Fat, total	0.25g	0.54g
- saturated	0.21g	0.50g
Carbohydrates	7.35g	16g
- sugars	50.2g	22.2g
Sodium	34.5g	75mg

"The pure indulgence of full fat ice cream, minus the fat."

The legal requirements for and ice cream are to have at least 10% milk fat, this product therefore cannot be declared ice cream. A Fat-Free frozen dessert must have no more than 0.5% fat.

Manufactured by Ruby Jenkins, Kiera Smith and Hannah Wilson, 274 Don Bush Road, Massey, Auckland, New Zealand.

Ingredients: Frozen Dessert (Water, Milk Solids Non Fat, Sucrose, Glucose Syrup (From Maize), Tapioca Maltodextrin, Emulsifier (471), Vegetable Gums (460, 466, 407a), Dextrose, Cream, Vanilla Flavour, Modified (dairy) Flavour, Masking (fatty) Flavour, Fat-Free Frozen Desserts must contain as little as 0.5% fat. Contains milk. May contain traces of gluten, peanuts, tree nuts, soy and wheat.

Comments or suggestions? Please email Ruby.Jenkins@futureintech.co.nz

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Flavour Trialling



We had our target market trial 4 flavours, vanilla, salted caramel, chocolate and butterscotch, all without colouring. We concluded that vanilla and butterscotch were the favourites so we went for vanilla.

Our Final Formulation

	%
Milk Fat (Cream)	0.25
Skim Milk Solids	12.0
Sucrose	12.0
Glucose Syrup (36-42DE; 80% solids)	9.0
Maltodextrin powder (17DE)	2.0
PIONEER	1.0
Givaudan Dairy Improver flavour	0.2
Givaudan Fat Improver flavour	0.2
Colour/Flavour	0.25
Water	63.1



Water, Milk Solids Non Fat, Sucrose, Emulsifier (471), Mouthfeel (dairy) Flavour, Masking (fatty) Flavour.



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Water, Milk Solids Non Fat, Sucrose, Glucose Syrup, Tapioca Maltodextrin, Emulsifier (471), Vegetable Gums (460, 466, 407a, 412), Dextrose, Cream, Vanilla Flavour, Mouthfeel (dairy) Flavour.

Our Group and Mentors



We would like to say a special thank you to the following people: Esraa El Shall and Emily Dekker – Tip Top (pictured above) Jacqui Crawford and Delint Ngaue – Massey High School Emmil Perez – Ingredion Derek Horne – Dupont and Danisco Reaz Moorad, Megan Stanton and Daina Dulinskas – Givaudan Gay Watson – Futureintech Michelle Mason – The Hip Group

Our Final Ingredient List

Ingredients: Frozen Dessert [Water, Milk Solids Non Fat, Sucrose, Glucose Syrup (From Maize), Tapioca Maltodextrin, Emulsifier (471), Vegetable Gums (460, 466, 407a), Dextrose, Natural Flavour, Cream]

Some of our ingredients



Disposing of old trials

Mix together pioneer, mouthfeel flavours and half of the sugar and heat the rest of the ingredients to 60 degrees celcius, slowly add the mix.



Pasteurise the mixture



Our Final Method

Cool quickly to room temperature by placing the pot in an ice bath



Transfer to air tight container and age for atleast 8 hours or overnight in the fridge.



Churn for 30 minutes then freeze overnight in air tight container

