



SARA Ice Cream

Nutrition Information			
Servings per package:	1.00		
Serving size:	127.00 g		
	Average Quantity per Serving	Average Quantity per 100 g	Average Quantity per 100 g
Energy	1520 kJ	1190 kJ	1190 kJ
Protein	4.2 g	3.3 g	3.3 g
Fat, total	23.5 g	18.5 g	18.5 g
- saturated	16.1 g	12.7 g	12.7 g
Carbohydrate	33.1 g	26.1 g	26.1 g
- sugars	32.8 g	25.9 g	25.9 g
Sodium	83 mg	42 mg	42 mg



ISSUE

We need to develop an ice cream product which contains reduced additives, but still maintains a smooth, pleasant and desirable texture and taste that people will enjoy.

INITIAL ATTRIBUTES

- The ice cream must look appetising, so that the product is attractive and will appeal to people to persuade them to purchase and eat our product. The colour must be clearly representative of the flavour.
- The texture must be creamy and smooth, as texture influences the taste, and since we are reducing the amount of additives/stabilisers (therefore, this is significant). If the texture is unappealing and unpleasant, our product will be less desirable to consumers.
- The time to make our ice cream must take only 1 hour to prepare, and then freezing time of 5-6 hours/overnight.
- The product must be served in a one serving cup/bowl, as this will mean that the product will be ready-to-eat as soon as the consumer purchases the product, in comparison to 1L tubs of ice cream.
- The ice cream must have a fruity flavour, with balances between creamy and sweet (the fruity flavour must be the dominant taste). Flavour is usually what first attracts consumers to a product. Therefore the flavour must be interesting and different, and still appealing and appetising.
- The environment in which our product needs to be sold is dairies, convenient stores and possibly (high-end) supermarkets. This is the environment which has the easiest accessibility for our target market. Higher-end supermarkets tend to contain ice creams of a higher quality, or with different and unusual ingredients, and special dietary requirements, similar to our product.
- The price of our ice cream must be a reasonable and affordable for teenagers. It is important for us to consider the cost of the ingredients used so our target market are able afford our ice cream.
- The ice cream must have a balance between creamy and sweet smells, but the dominant scent must be the particular flavour of the ice cream. This is important as scent is one of the four senses and vitally important for the consumer's opinion of the product.

RESEARCH

Throughout the development of our product, we have done much research. We did this through:

- The Environmental Investigation process**, by using the internet to research information on ice cream, such as average shelf-life, where ice cream can be sold, is it ready-to-eat, problems and hazards usually encountered while making ice cream, and we also researched common stabilisers used in ice cream making, and the effects of them. We visited dairies, convenient stores, supermarkets, and high-end supermarkets, to view the existing ice cream selection available in each (different) environment.
- We also evaluated existing ice cream products, and discussed the flavour, texture, smell, appearance, packaging, and possible target markets for each, also comparing and contrasting the differences and our preferences, whilst comparing to the ingredients they used, particularly the stabilisers.
- Before devising our attributes, we created an ice cream survey to research many factors such as where consumers buy ice cream, their favourite ice cream brands, favourite ice cream flavours, and how much they would typically spend on ice cream, whilst also taking into consideration the individual's age/gender. After each trial (both initial and key trials), we received stakeholder feedback, by using a Stakeholder Sensory Feedback Form, that we constructed using questions to help us improve for further trials.
- Throughout the project we gained stakeholder feedback on considerations, need/opportunity, environmental investigation, attributes table, Plus Minus Interesting (PMI) chart, PISC chart, and all trials. In order to receive standardised feedback on stakeholder's opinions and how they believe we can improve the development of our product.

CONSTRAINTS

Our constraints included having a limited budget to buy ingredients and also equipment. This meant that for a long time we used a constraining ice cream machine before getting the funds to purchase a good quality ice cream machine. We also had a limited amount of time in which we had to complete each task and had to comply with deadlines set for the CREST competition. This meant we did not have enough time to perfect every detail of our products and the research leading up to the production of our Mango Gelato and Black Forest ice cream. Also since ice cream takes a long time to produce (preparation and freezing) it was constricting as it was difficult to trial our products during class time. This meant that we could not conduct as many trials as wanted to enable us to perfect and experiment with different aspects of our products.

PROBLEMS ENCOUNTERED

The main problems we encountered during the development of our product were textural issues. These were mainly iciness and hardness. To overcome these problems, we asked for feedback from our mentors, and they provided ideas, such as; increasing the fat content, as fat does not freeze, therefore resulting in a softer consistency; adding fruit which adds pectin, which is a natural stabiliser to help these consistency issues; ensuring that the ice cream is fully chilled before adding to the churner, if the ice cream is not cool enough it can cause larger ice crystals during the freezing process; too much sugar can cause hardness, however too little sugar can result in a too soft texture; the churning of the ice cream must be fast, if it is too slow, larger ice crystals can develop - the faster the churning the more air that is incorporated; adding alcohol, as it also does not freeze. Therefore, in recipes which we used that required milk and cream, we decided to replace the milk with cream, and this therefore helped, along with the use of stabilizer in later trials, with these textural problems. At the beginning of our project the equipment provided by the school was constraining, such as the ice cream churner and the scales. The ice cream churner difficulties meant that the churning time took longer, and most times we had to stop the churning process before it was ready, and also producing inconsistencies. The scales meant that we were unable to measure the ingredients accurately which can ultimately affect the overall flavor of the ice cream and can also have other effects such as textural issues. However, both of these issues were overcome before we started our further trialing process.

AMA

Therefore, we have decided to create an ice cream that only uses one stabiliser rather than the usual two or more, as this is not currently available in the market. Therefore, our aim is to develop an ice cream which is more natural and also pleasing to taste. We will also create a flavour that is appealing to our target market of teenagers (aged between 13 and 18), because teenagers are more interested in, and have stronger desires for a healthier alternative. We will create a fruity flavour which is a current popular flavour (particularly in summer) and since fruits contain the natural stabiliser, pectin, which will also help in our task to reduce stabilizers.

Many commercial ice creams are a conglomerate of chemicals and additives. These include hydrogenated oils, high fructose corn syrup and dry milk solids as well as other chemicals used as cheaper alternatives to replace natural products and to give flavouring. Although additives are regulated by the Food Standards Australia New Zealand and bodies overseas, there is still a belief that additives can cause behavioural and learning difficulties such as ADHD. Our aim was to prove that we

Method

Planning

We researched a variety of different planning tools that we believed would be useful for us in this project and discussed each of their advantages and disadvantages. Examples of research tools were, to do lists, flow charts, gantt charts and action plans. Our chosen planning tool was the gantt chart as it easily identifies all necessary tasks and the interaction between them, as they include key stages, time allowed for each key stage of the project, formal dates (checkpoints, school holidays), planned time and actual time taken for each key stage, reflections, resources needed and any limitations. We also created an action plan as it is a requirement for CREST.

Brief Development

- Considerations**
We completed a chart of aspects that we needed to consider when developing our product. In this table we identified the aspect needed to consider, which stakeholder(s) can help us with this, key things to consider for this, and why do we need to take this into consideration. An example of an aspect we needed to consider was where the product will be sold. We then gained stakeholder feedback on this table, to receive advice for further development and consideration.
- Need or opportunity**
We identified and explained the need and opportunity for our product, which is to trial making an ice cream product using different thickeners, and replace the several stabilizers commonly used in commercial ice creams with just one, creating a more natural and more desirable product for consumers.
- Environmental Investigation**
Firstly, we researched environmental considerations, such as the average shelf life of ice creams (2-3 months), problems and hazards usually associated with the development of ice cream, and stabilizers commonly used and their effects. We investigated the places where our product may be sold. For this, we visited locations which sold ice cream and took photographs of their selection and then annotated these to document and describe the differences of environment. These places included Dairies/ Convenient Stores, "Pak-n-Save," and "Farro." Aspects which we took into consideration were the packaging, prices and variety of the different locations. We also evaluated different existing ice cream products, we compared and contrasted three different brands, all vanilla flavoured as this created easier comparing, also taking into consideration of the ingredients they used and in particular the amount of stabilizers. For further investigation of the most popular trends/ desires, we constructed an ice cream survey consisting of questions which we believed would aid the development of our brief.
- Conceptual Statement**
We produced a conceptual statement based on the research achieved so far, also explaining the purpose of our product development, the physical and social environment in which we aim to sell our product, and why we need to develop this.
- Attributes**
We discussed the eight most important physical and functional attributes for our product, which included appearance, texture, time, size, taste, environment, price and scent. Then we constructed a table justifying why we chose these attributes and whether they were functional or physical.
- Initial trialing**
In this section we trialed a range of different fruit flavoured ice cream flavours, except for our first initial trial which was a basic vanilla ice cream. For each trial we took photographs of all the processes involved and then annotated these photos. Once we tasted the ice cream and gained stakeholder feedback we drew a diagram testing the product against the attributes, and then finally we wrote an evaluation describing how the process went, the stakeholder feedback and our opinion, and whether the product was fit for purpose. This helped us develop ideas for our end flavor/product, ensuring that it meets our issues and fits the context provided by CREST.
- Brief**
We wrote a brief explaining the desired outcome for our product which we have decided to develop, modifying our chosen attributes into specifications.

Processing and Trialing

- Research**
We researched eight different products that met our brief and identified five different processing operations from each. The recipes we chose were Mango Gelato, Classic Vanilla Ice Cream, Mixed berry ice cream, Black Forest ice cream, Strawberry ice cream, Tangy Lime Ice cream, Watermelon ice cream, and Pistachio-Berry ice cream. We then created a PMI Chart on the recipes we researched and identified plus, minus and interesting aspects of each. After this, we chose five recipes we wanted to further investigate and completed the Product Idea Screening Chart on these. We chose Mango Gelato, Black Forest Ice Cream, Mixed Berry Ice Cream, Watermelon Ice Cream, Pistachio-Berry Ice Cream and Tangy Lime Ice Cream. To do this we identified the processing operations involved, of the product can be made in the available time, if all the equipment is available at WGHs, and whether we have the skills to produce this product.
- Product selection**
From our research we chose two products that we wished to trial and adjusted our set of sensory and measurable specifications for these products. We decided to continue to develop the Mango Gelato and the Black Forest Ice Cream. We chose these two recipes to further develop as these seemed the most popular among stakeholders and also fit our brief, issue, and aim well. We then used the recipe's method to create a flowchart including tests and hazards to indicate how we were going to process our products. After that we designed a basic set of tests to use to test our products against our specifications and a basic sensory test to gain stakeholder feedback.
- First Trial**
We carried out our first product trial of each flavor which was to receive accurate measurements for all ingredients so we are able to trial using stabilizer in the next trials, as the usage the stabilizers is calculate from the total mass of ingredients (measured in grams).
- Second and Further Trials**
We trialed, following our annotated flowcharts (containing the information of what we are going to do and how we will test), whilst taking photographs to make an annotated processing photos sheet, justifying any changes made. After each trial we would complete the processing and tests form, with annotated pictures, complete our self-assessment specifications form, gain stakeholder feedback on the product, and then write an evaluation similar to that in the initial trialing stage. We did this until we developed a product that met the brief and the specification we made. During this stage we developed a HACCP plan for the production of our product containing the critical control points of storage, preparation, cool/freezing, serving storage of leftovers, and cooking. In our chart we identified the hazard, control measure, critical limit and how we will measure this.
- Preparation for final product**
By this stage we finalized our flowcharts and testing to produce successful products.

Packaging and Poster

We created packaging for our product, that matched our product, which was attractive and appropriate. We also created a poster containing information on how our all our development for the production of our product, which will be presented to the CREST judging panel.

Further development :

If we had more time we would have liked to have the opportunity to trial using other stabilisers to see the result, and find possibly more beneficial options, and also have a better understanding on the effect stabilisers have on the product.

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