EDEXCEL

GCE Design and Technology: Food Technology (AS)

EXEMPLAR MATERIAL 3

UNIT: 6FT01

GCE DESIGN & TECHNOLOGY: FOOD TECHNOLOGY 6FT01

Commentary for exemplar coursework

Product Investigation Task: Apple Pie

Section A: The introduction leads the investigation into performance analysis, where the candidate explores the key technical specification points, with well explained references to the performance of the pre-prepared, uncooked apple pie product. The comparison product is a pre-prepared, ready to eat apple and blackberry pie. Using the technical specification, the candidate compares and contrasts the existing similar product and produces a good summary of her findings. This is detailed and concise, with good application of knowledge and understanding.

Section B: Realistic suggestions for alternative ingredients are discussed, with reference to the quality and performance of the product. Advantages and disadvantages of ingredients, components and materials are clearly discussed. The impact on the environment of using the ingredients, materials and components identified previously, range from origin and source of the fruit, air miles and packaging pollution.

Section C: The use of mass production for the apple pie is evaluated, using advantages and disadvantages to explore the manufacturing processes used in the product. Small scale batch production in a school canteen kitchen is considered with good references to the use of different equipment, standard components to reduce time, cost implications and the ability to vary the production line. Environmental considerations need to be specific to the chosen product and manufacturing processes.

Section D: A good range of quality checks (texture of filling, temperature and time control are specifically related to the apple pie). It is far better to choose and describe two/three quality control checks linked to the chosen product than a long list of unrelated quality control checks. The quality assurance system chosen for the apple pie is foreign body control, with relevant application of knowledge to the chosen product.

Product Design Task: Main meal dish to be served in a restaurant.

Section E: The design brief and design criteria (specification) contain measurable, quantitive statements (weight, portion size, HBV protein content, cost, sensory characteristics). An excellent range of ideas with ingredients and processes discussed at each stage. Effective trialling and modelling (making) throughout, leads to a final design proposal. Stuffing, sauces, and their combinations are trialled, with good use of third party feedback. The design proposal is objectively tested at all stages and design decisions fully justified, with technical details of ingredients, components and processes.

Section F: Good communication techniques are displayed (modelling, photography, word processing and sensory profiling) with precision and accuracy to convey enough detailed and comprehensive information to enable third party

manufacture of the final design proposal. Annotation provides explanation and justification of design intentions and decisions.

Product Manufacture Task: Luxury Food

The short and succinct design brief and design criteria, lead the candidate to make a layered chocolate mousse product as the main product for this task, with an additional product (savoury flan) included to support the making skills in section H.

Section G: A clear and detailed production plan, containing realistic time scales and deadlines for the scale of production in the test kitchen. In the processes section of the production plan, it would be very useful to include the technical information for each process. Thumb nail pictures aided moderation.

Section H: Excellent making skills with high good use of ingredients and components to show a variety of processes and techniques; layering mousse components, piping of cream, gelatine, chocolate cookery, biscuit making, creaming and whisking methods. In the second product, skills include: savoury custard, vegetable preparation, short crust pastry, lining and shaping of flan dish. Thumb nail pictures supported the Centre marks. The annotation in the CAB indicates that this candidate has high level safety awareness and that the products are manufactured and presented to a high standard. Photography evidence is very good and also supports the Centre marks.

Section I: Third party testing using sensory analysis and shelf life testing are used to check the performance and quality of the product. Relevant, measurable points of the design brief and design criteria are objectively referenced. To gain full marks for this section, tests must be described and justified, indicating why the tests have been chosen and how they will be set up and carried out, including relevant references to producing fair and reliable results.

EXEMPLAR MATERIAL 6FT01

GCE AS D&T: FOOD TECHNOLOGY

A. Performance Analysis

Apple Pie

In order for a successful product to be made, the manufacturers will have to follow a detailed specification. On this specification will be the criteria needed to be met. By following this specification when, for example, producing apple pies, means that they refer to this criteria so that all the products have the same ingredients used the same method of producing and the same appearance of the products. To make sure every product is consistent, accurate and regular checks will have to be made.

Technical Specification

Cost: This product cost 99p. This is a very cheap price, which could be because this product is more at the budget end of the market. This cheap price, obviously reinforces the fact that the product must be cheap to manufacture.

Portion Size: This apple pie will most likely to serve 4 people and weighs 425g.

Special Claims: The only special claim this particular product has is that the pie is suitable for vegetarians to eat.

User Requirements: This pie is very quick to prepare as all the consumer has to do is remove the product from it's packaging and then place in a pre- heated oven. It is very convenient as the product is suitable for freezing and will therefore last a lot longer and will be useful in emergencies when the product is needed quickly.

Form: The actual pie is a circular shape and is placed in a aluminium foil tray for easy removal from the outer packaging. This outer packaging consists of a cardboard sleeve that sealed the product in. The cardboard sleeve has many uses including making the product easy to stack in supermarkets and is easy to transport. Additionally the cardboard is used to display a picture of the product, nutritional information and cooking instructions. The pie in the tray measured in with a diameter of 17cm and a depth of 2.5cm.

Function: The main function of the product is to be a dessert after a main meal, perhaps served with additional ingredients. For example custard or ice cream. An advantage is that no further preparation is needed.

Performance: There is no further preparation required apart from cooking the product in the oven for 40 minutes. It has the ability to be re-heated and maintain the same shape and moist filling. The product however cannot be reheated in the microwave partly due to the aluminium foil container. Additionally, the pastry would not remain crisp.

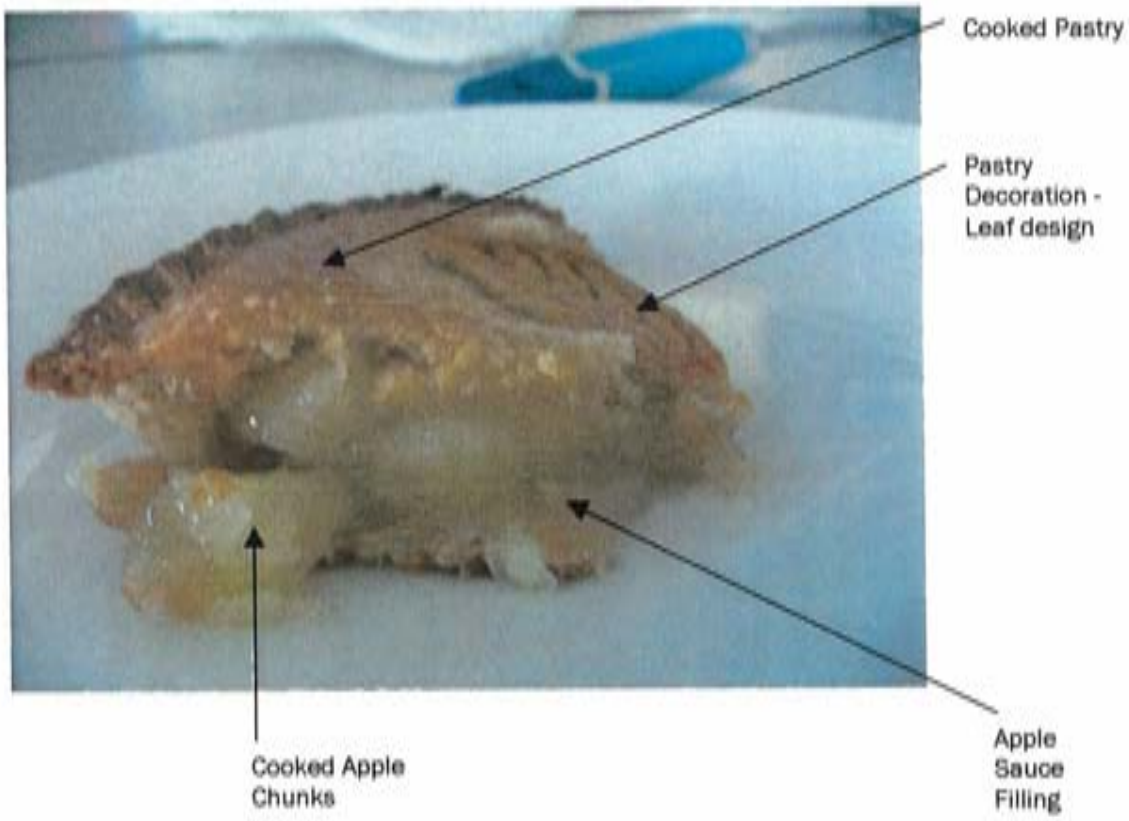
Materials/Components:

Apple: This ingredient is the main ingredient used as the bulk of the filling.
(Antioxidants)- Citric Acid: Due to the apples in the filling, citric acid will be used to make the level of acid consistent Which will maintain a consistent acidic level to the fruit filling.
Firming Agent: This agent will help keep the shape of the product.
Wheat Flour: The wheat flour in the product is the bulk and form of the pastry and is the carbohydrate.
Vegetable Oil: This will give the pie a richer flavour and better consistency.
Glucose Fructose Syrup: This adds sugar as it acts like a sweetener.
Water: The liquid will provide the product with moisture and also combine the dry ingredients in the pastry.
Sugar: This also adds sweetness to the product.
Butter: This provides fat to the product, which will help form the pastry.
Modified waxy maize starch: This will be used as another thickener.
Dextrose: This again adds sweetness to the pie.
Whey Powder: This along with another liquid helps to form moisture for the product.
Skimmed Milk Powder: This is better for manufacturers to use instead of fresh milk as it has a longer shelf life and is easier to store, as it doesn't require to be constantly refrigerated.
Raising Agents: This makes it possible for the product to rise during baking.m
Modified Potato Starch: This is pre gelatinised and similar to other ingredients will be used to make the product thicken.
Stabiliser: This stops the ingredients from separating, therefore keeping the product's shape.

Image of uncooked Apple Pie in aluminium foil tray.

At this stage, before the cooking of the product, the pie has a slightly unattractive look as the uncooked pastry lacks colour. However, the appearance is improved by the decoration of the pastry around the edge of the pie and the leaf pattern.

Image of cooked Apple Pie, showing the cross section



Scale of Production

To make this apple pie, I believe mass production has been used. I think this because the product is probably made in large numbers but not manufactured 24 hours a day.

Some of the ingredients could be bought into the factory as standard components. For example, there is a possibility that the pastry was brought in already made. However, depending on the size of the factory, if the factory is big enough then they may have the equipment available to them in order to make the pastry themselves on site. This will benefit the consumer more as they know the actual location the pastry has come from.
Another example of a standard component is the apples. The apples could be brought to the factory already partially cooked, which will lower the manufacturing time significantly. Or the apples could be brought already cut and peeled to make it easier on the manufacturing line as it means that a huge stage in the manufacturing process can be left out when making this particular product. In this product there isn't many high risk ingredients used. However, ingredients in the pastry such as the butter is perishable and therefore will have to be correctly stored in controlled temperature storage. This refrigeration being 0-5°C. In addition to this, health and safety means

that all ingredients should be stored by using a good stock rotation. Each ingredient should be stocked according to sell by dates to ensure that all ingredients used are in date and no ingredients are wasted.

Cost

It is clear by the cost of this product, that the Apple Pie is aimed at the lower end of the market, who are living on a tighter budget in comparison to others who would normally buy from the luxury range of products available in Supermarkets. Costs will be kept at a minimum throughout the entire production in order to justify the cheap retail price. It is noticeable that producing the product will be quite simple and low cost due to the simple form of the pie. In addition to this, the decoration on the pie is limited, using a simple design and lacking colour. This again shows the manufacturer is working with a low cost product. The price of the product was probably decided because the ingredients can be easily found (don't need to be imported), and aren't of the best quality, which people are normally prepared to pay a lot more for. However, even though the pie isn't particularly exciting and doesn't offer much of a quality appearance, a large range of people will buy this product if they are on a budget or just want a simple family dessert after a main meal.

Comparison to an existing similar product:

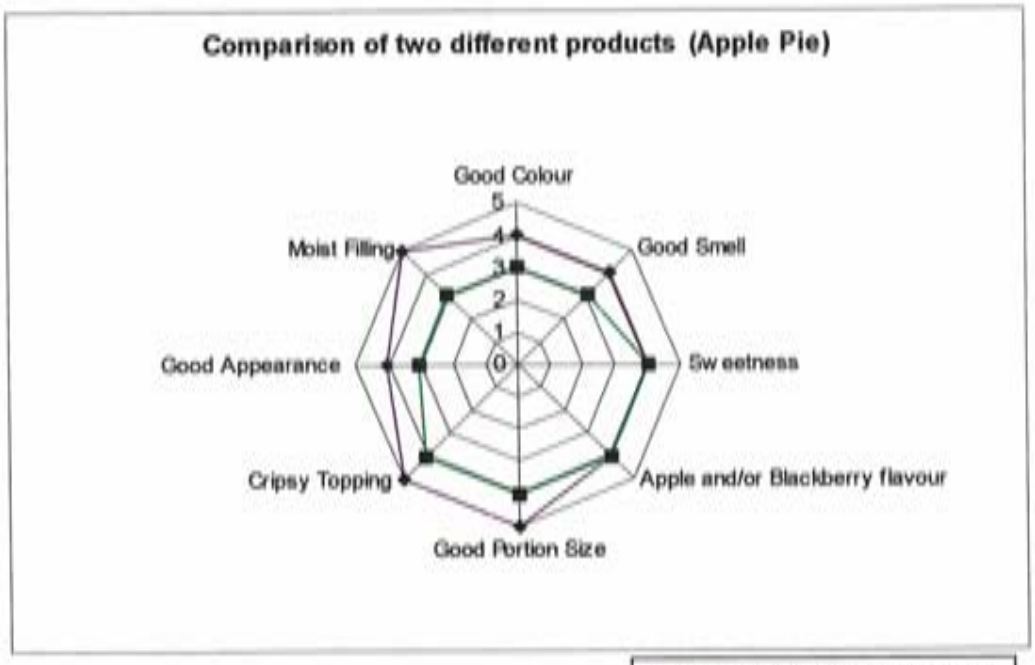
Sainsbury's Apple and Blackberry Pie

Cost: £2.29

Portion Size: Serves 6

User Requirements: This product is easy to serve with only having to reheat the product in the oven as the pastry is already cooked. It is also suitable for freezing. In this product there are 292 calories per sixth of the pie, which is the recommended portion size. The pie also contains 11.4g of fat and 16.8g of total sugars. This is compared to 283 calories per portion in the original Apple Pie I analysed. This pie also has 11.7g of fat and 14.8g of sugar.

Special Claims: Special claims of this product is that it's suitable for freezing and vegetarians.



Purple: Sainsbury's Apple and Blackberry Pie

Green: Morrisons Apple Pie

Summary

After looking at both the Apple Pie and the Apple and Blackberry Pie, I have come to the following conclusion. Both the products' appearances were appealing and although the first Apple Pie I looked at clearly had more decoration with the leaf pattern, I believe it was the second pie that looked more appetising, as even though it didn't have as much decoration, customers may prefer this pie as the appearance is simple and you can see the colours of the filling, which are bright yet natural. In addition to this, the packaging of the second pie had a clear window, showing the consumers what the product really looks like, rather than just having a picture of the product. The preparation of both products were also different. Although they both were easy to prepare, the 2nd pie took less time to prepare due to the pastry already being cooked. The 1st pie, on the other hand took longer because the pastry was raw.

When tasting the products, it was again the second pie that had the better flavour, looked the best cooked and the smell was a high standard as well. It was clear to see, when disassembling the pies that the second pie was better value for money, as it served more people and yet had a lot more fruit in the pie in proportion to the amount of pastry. The 1st pie consisted of 65% pastry and 35% fruit filling. In comparison, the second pie was 56% pastry and 44% fruit filling, showing that it is the second pie that had a considerable higher amount of fruit. Consumers will most likely be more satisfied with this pie as you could actually see the chunks of apple and whole blackberries, which made the product, seem a lot fresher.

When it came to comparing the tastes, the Apple and Blackberry pie tasted better, in my opinion, as the flavour was strong and tasted like proper fruit, rather than the product using artificial flavourings to gain this flavour. The Apple and Blackberry filling, apart from the fruit pieces was really smooth, which contributed to a pleasant mouthfeel. In comparison to this, the first Apple Pie, had hardly any fruit pieces and the colour was relatively dull. Due to the lack of fruit, the filling seemed to be mostly sauce that had been thickened. Evidence backs this up with the many thickeners stated in the list of ingredients.

In comparison to this, the Apple and Blackberry pie's list of ingredients were more acceptable, as there were less thickeners used and higher quality ingredients seemed to be used with Kent Apples, Butter (from Cow's Milk) and Rape seed oil. The use of these more expensive ingredients

seems to reflect why the price of this pie was higher. However I think the pie justifies the price, as you get a better portion size, it feeds more people and the ingredients seem to be of a higher quality. Contrasting to this, the Morrisons Apple Pie's flavour seemed to be slightly overpowering and was quite sour when comparing it to the flavour of the other pie. Despite that, I think that this pie also justifies the price as it is aimed at the lower end of the budget and therefore less ingredients e.g. Less apples were used in a thickened juice to provide a cheaper alternative. Both products were made using short crust pastry which is most suitable for this type of product. Butter was used in both pastries to give a rich flavour.

Form: Circular shape. With a diameter of 20.5cm and a depth of 4.5cm. The packaging of this product is an aluminium tray in which to hold the pie. The pie is then placed into a square cardboard box which provides a convenient way of stacking the products and a way of displaying both the nutritional information and picture of the product. However, for this product, there is a plastic window, which benefits the consumer as they will be able to see the actual product rather than just a picture.

Function: This Apple and Blackberry Pie is a more upmarket product, which due to the higher price is seen as a more luxurious item and would probably be served as a dessert at dinner parties, or on special occasions.

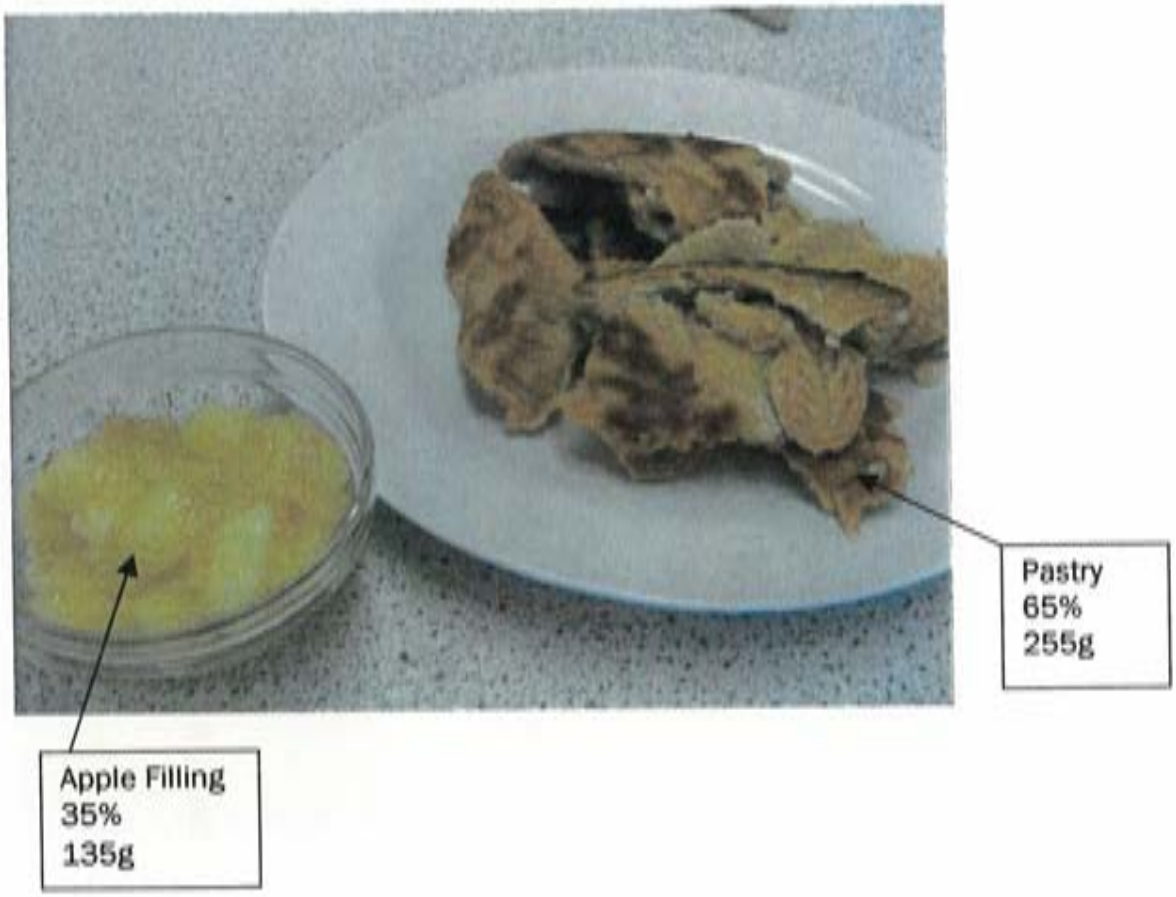
Performance: The pie has a shelf life of seven days and can be frozen for up to one month. However, once cooked it cannot be refrozen. The product keeps its shape and structure when cut and put on a plate to serve after the cooking of the pie.

Materials/Components: In this product there isn't such a long list of ingredients in the Sainsbury's Apple and Blackberry Pie in comparison to the cheaper Apple Pie.
Ingredients in filling:
Apples and Blackberries: The Apples and Blackberries provide flavour, texture and extra colour to the product. Along with providing the bulk of the filling. The fruit is also supplying vitamin C.
Sugar: The sugar is used to make the filling sweeter
Water: The water is to provide moisture
Cornflour: The cornflour will be used as a thickener, to help control the consistency of the filling
Citric Acid: With the addition of citric acid means that the flavour of all the products made is consistent.
Ascorbic Acid; Salt: Preservatives. Help increase the product's shelf life.
Ingredients in pastry:
Wheat Flour: The wheat flour in the pastry will provide the bulk and will help form the structure of the pastry.
Butter (From Cow's Milk): This fat will provide colour and improve the texture and flavour of the pastry .
Water: The water will be used to add moisture and can help bind the other dry ingredients.
Palm and Rapeseed Oil: The Rapeseed and Palm oil contributes to both the flavour and the texture.
Sugar: To provide sweetness to the pastry and the fruit and is used as a form of decoration by being sprinkled on top of the pie, which improves the appearance.
Glucose Syrup: Acts like a sweetener.
Salt: The salt provides flavour to the pastry.
Mono Diglycerides of Fatty Acids: Acts as an emulsifier to prevent the separation of the oil and water in the pastry.

B. Materials and/or Components/Ingredients

Morrisons Apple Pie

Image showing the breakdown of the individual component parts



In the Morrisons Apple Pie, the filling was only 35% of the actual product. In addition to this, there were hardly any fruit pieces in the sauce. With a higher fruit content, flavour will be improved. The remainder of the pie (65%) was pastry. This would have been done to keep the cost to a minimum. The high proportion of pastry made it overwhelm the filling and did not give a balance to the product.

Both Modified Potato Starch and Modified Waxy starch are successful thickeners. However, less consumers will be pleased with the product as people tend to be against modified ingredients. By using so many thickeners, less fruit will be needed in each individual pie meaning the manufacturers can produce a large amount of pies, whilst still keeping the cost of the product low so that it will be appealing to a large part of the market.
The Modified Waxy Starch makes the filling glutinous and although it's effective, using more wheat flour will give the filling a better consistency and provides the bulk of the pastry.
The modified Starch has been used because it's pre gelatinised and therefore will not retrograde and will not produce moisture which will make the pastry soggy.

In my opinion, I thought the portion size of the product was good and will probably be acceptable to consumers. However, to some, the portion size may seem too much due to the large quantity of pastry, which will make the product a lot more filling.

The pastry itself was good, with the ability to brown easily and was crispy rather than really thick, which wouldn't be satisfying to consumers. The vegetable oil used is good to use for manufacturers because it's cheap and provides good mouthfeel. However, by substituting some of the vegetable oil with more butter will give the pastry a more buttery flavour.
The use of skimmed milk powder will benefit both the manufacturer and the consumer because it's cheap, has a longer shelf life, it's easier to store and is very low in fat.

The Apple flavoured filling was reasonably smooth and the chunks of Apple improved the mouth feel. However it's clear to see that the product would be better if the amount of fruit pieces were increased.

When it came to flavour, this particular product was bland. This is most likely because of the low amount of real apple; therefore making the apple flavour of the product limited. By not using as much apple means that the manufacturers would have to resort to using artificial flavours in order to gain more flavour. However, the manufacturers are limited as less people are prepared to pay for products high in additives, meaning the flavour of the apple pie will have to remain bland until a suitable alternative can be discovered. The use of a spice such as cinnamon or adding dried fruit. e.g. raisins should enhance the flavour of the filling.

Overall, I don't think the pie was well balanced at all. With 65% of the pie being pastry meant, that the main bulk was pastry which overpowered the pie and made it very filling yet plain due to the low level of filling.
The filling was mainly glutinous juice with hardly any fruit pieces. The pie would be better balanced if more fruit was used.

After tasting the product, I think the pie can be improved by containing the following things:

<u>More fruit pieces</u>

Advantages: Improves the appearance of the product

Improves the texture of the filling

Less need to use thickeners to bulk the filling

Different fruit will create a more interesting flavour

Disadvantages: More expensive to produce

Extra equipment required peeling and dicing all the Apples efficiently.

<u>Less sweeteners</u>

Advantages: makes the consumers believe the product is more wholesome and will make the product appealing to more health conscious people.

Disadvantages: will affect the flavour of the product and will make the flavour bland.

<u>Cornflour</u>

<u>Advantages:</u> Cornflour thickens well

The Cornflour gelatinises easily. (maize starch)

Disadvantages: Cornflour retrogrades easily.

Other Flavourings

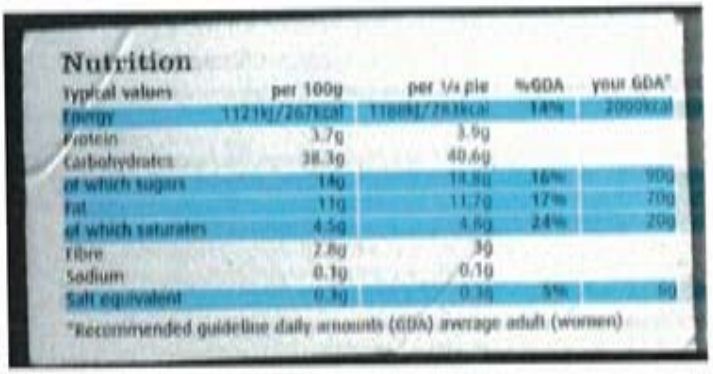
Advantages: To enhance the taste of the apple

Possibilities could be mixed spices, nutmeg, cinnamon

They are natural spices and fruit and is a better alternative to additives.

Dried fruit could be used which are natural sweeteners and add both flavour and texture

Nutritional Profile



Nutrition				
Typical values	per 100g	per ¼ pie	%GDA	your GDA*
Energy	1121kJ/267kcal	1180kJ/283kcal	14%	2000kcal
Protein	3.7g	3.9g		
Carbohydrates	38.3g	40.6g		
of which sugars	14g	14.8g	16%	90g
Fat	11g	11.7g	17%	70g
of which saturates	4.5g	4.8g	24%	20g
Fibre	2.8g	3g		
Sodium	0.1g	0.1g		
Salt equivalent	0.3g	0.3g	5%	6g

*Recommended guideline daily amounts (GDA) average adult (women)

The label on the back of the Apple Pie packaging states all the nutrients in the product both per 100g and per ¼ pie, which is the recommended portion size. Having this information makes it possible for consumers to see exactly what nutrition the product provides. In addition to this, the information shows the consumer how much of the percentage of a person's GDA (guideline daily amount) is being provided. This is useful as it means the consumers can use the information to plan around their daily diet.

Environmental Issues

Most of the ingredients used in the apple pie will be able to be sourced in this country, so the costs of transporting the ingredients will be lowered along with the reduced amount of fuel being used. Both of these benefiting the environment. In addition to this the apple, which is the most important ingredient, can be found in Great Britain. Therefore a lot of fuel, air miles and money will be saved from having to import any ingredients from foreign countries. However the amount of air miles will be increased depending on where the sugar and wheat comes from. A possibility could be that the wheat originates from Australia, however this is uncertain so the amount of air miles is unknown.

The packaging of the product is an important environmental issue. Fortunately the product has limited packaging, which means there is less waste material. The pie is in an aluminium foil tray, which is then placed in a cardboard box.
The cardboard box is extremely useful as it displays important information and is used to protect the product when being distributed or stored in supermarkets and because cardboard is used it's recyclable as it clearly states on the packaging.
However, the aluminium foil tin isn't recyclable, which is worst for the environment, as the material cannot be reused so it increases the amount of household waste, and will therefore have to be disposed in a landfill. It's also a waste as the foil cannot be used in a microwave, which is sometimes more convenient to a lot of consumers. Additionally, the product isn't usually eaten straight from the packaging, which again has negative effects on the environment due to the waste of the packaging.

On food product's packaging it should state both whether the packaging is recyclable and give advice on the correct disposal of the packaging in order to be better for the environment. For

example the Apple Pie I am researching has written on it that the cardboard can be recycled, which will encourage consumers to recycle the packaging.

Now, manufacturers are taking a lot more care over what materials they use for packaging. This means that more cardboard boxes, similar to the one used for the apple pie, are being used so that the packaging can protect the product and help reduce the amount of bacteria reaching the product whilst the product is being stored. However there are some disadvantages to using cardboard. For example, the cardboard isn't transparent so consumers can't easily see what the product really looks like. Also the cardboard isn't that strong, so it can easily be damaged by water or ripped which as a result will damage the food product.

C. Manufacture

Production Method

The Apple Pie would be mass produced. Because the product is popular with consumers and therefore will be made in large numbers. The production system will be highly automated and to begin with the production will be very expensive as the factory will be costly as will the equipment needed to produce the product. However, once established, the labour costs will start to reduce. The circular shape allows the assembly of the component parts to be easy using CAM. The component parts will be ready available for production and easy to store in order for production to be quick and simple on a daily basis. Some of these component parts will be standard. For example apples already diced. Also the pastry could either be brought in as a standard component or made on site.

Raw materials:

Apples: The apples will be peeled, washed and chopped using rotary cutting knives. However, as a standard component, the apples could already be diced or even cooked to form a puree which will later be used in the filling.
Sugar: Standard component. Brought to the factory ready to be measured.
Wheat Flour: Standard component ready to be measured
Vegetable Oil: Standard component ready to be used in production
Butter: Standard component ready to be measured
Skimmed Milk Powder: Standard component. Dried for longer shelf life, easy to use and store and cheaper than regular milk.

The additives will also be brought to the factory, ready to be measured and used straight away in the filling.

Production Process

- Apple Sauce Filling: All the ingredients cooked together in large vats. The temperature will be computer controlled.
- Assembly Line of Components: The Assembly line will be computerised to ensure the consistency of the products. The pastry will be rolled and shaped and placed at the bottom of each container. The Apple Filling will then be extruded into the container. Once this is done the pastry topping will be placed on top and finished with the decoration of pastry leaves.
- The pies will be chilled within 90 minutes between 0-4 °C. This temperature will be controlled by computers.
- All the pies will be sealed in a cardboard box packaging, with all the appropriate information printed on it. Then each product is date stamped.
- The pies are stored in chiller rooms before distribution
- The pies are then distributed in chiller lorries. The cool temperature has to be maintained through all stages of production including when being stored in the supermarket to ensure the product remains fresh.

Comparison with Scale Production

The product could also be produced by using batch production for example in a canteen kitchen. The pies will still be made in reasonably large numbers but the method of production isn't as large scale and will not be as automated. The pies would be made on large baking trays and the apple pies will be prepared, cooked and sold on the same day. This type of production means the

ingredients will have a reduced storage time and therefore with the use of stock rotation will use up the ingredients and will reduce the storage space taken.

In order to produce the pies quickly, some ingredients will come as standard components:

- Pre-cooked Apples
- Pastry already made

The method of producing the product will be similar in both mass and batch production. However, the processes will not be automated as they will most likely be manually done.

- Chop Apples (if necessary)
- Place ingredients in a large cooking vat. (Fruit, sugar etc.)
- Remove from heat once the sauce has thickened and the apple is soft.
- Prepare the pastry (only have to roll out the pastry if it's a standard component)
- Assemble the pie. Place the pastry at the bottom of the trays the filling will then be poured in and finished with a pastry lid on top. Each part of the pie will be carefully measured to ensure that the pies have a consistent size.
- Bake the pie until the pastry is golden brown in colour (40 minutes) at 200°C
- Serve

Unlike mass production, in batch production the production process can be slightly altered. However, due to the fact that the processes have to be done manually, the cost of the individual products will be higher than the mass produced product. Also by batch production enables the manufacturer to adapt the product more. For example if an apple pie was made by batch production the manufacturers could vary the flavour to apple and raspberry, or apple and blackberry etc. The pastry could also be made using wholemeal flour which would increase the fibre content of the product and will be more appealing to heath conscious consumers.

<u>Environmental issues related to manufacture</u>

60% of all UK packaging originated from food, causing several environmental problems:

- Land, water and air pollution from the distribution of ingredients and food products
- Gas emissions from the factories, whilst food products are being manufactured
- Natural resources like trees are used in order to make packaging
- Land fill sites are usually used for the large amount of packaging that can't be recycled

<u>Consumers may also be aware of:</u>

- Farm assured ingredients- many consumers are concerned about where the ingredients for the food products they eat originate from. They need to know that the ingredients come from a reputable supplier.
- Awareness of animal welfare issues – consumers are less likely to eat the products if it's apparent that the animals used are harshly treated
- Use of Fairtrade ingredients – many more people now want ingredients from foreign countries to be fairly made, so the farmers in other countries are benefiting as well as the consumers.
- Organic ingredients –many people believe organic ingredients are better quality however the higher cost makes less people prepared to eat organic ingredients.

D. Quality

Quality checks during manufacture

There are many checks that need to be done to ensure the overall high quality of the product. Good Manufacturing practice (GMP) takes place to maintain the quality of the product and to make sure the quality standards of the product are consistently high. A number of checks are made throughout the production to ensure that specifications are being met.

- **Sourcing the ingredients**- The ingredients have to come from a reputable supplier in order for the product to be high quality. The supplier will be regularly checked to make sure that the quality of the product is maintained.

- **Visual checks of ingredients when delivered**- The ingredients all have to be checked for any visible contamination . For example, the packaging will be checked for any damage. The colour and size of the ingredients will also be important and constantly checked to ensure that they are receiving the same standard of ingredients time after time.

- **Viscosity and colour checks**- Once the filling has been made. The manufacturers have to test to make sure both the viscosity and colour is suitable for the product and is the same for each product.

- **Texture of filling**- The Apple filling will have to be tested to see whether the taste and texture is consistent. The taste of all the components including the filling can be randomly tested with the use of taste testers and using fair testing methods to ensure reliable results.

- **Overall Weight**- Once the final product has been made, it will be weighed. This will all be computerised and a tolerance will state that the weight can be between two certain points.

- **Organoleptic checks**- These checks will be carried out when testing the final product and to see that the taste, smell and appearance all meet expectations.

- **Random testing throughout the manufacturing process**- These checks will see whether all the stages of production are successful and working correctly and efficiently.

- **Date and traceability**- This is an extremely important check to be carried out as it gives vital information so that if any possible problems occur in the future, it can be easy to track the product back to when it was manufactured.

- **Labelling information**- Other dates labelled on the product, such as the use by date are also very significant as it advises consumers to eat the product within a certain amount of days before the quality of the product starts to deteriorate and the dates can also help reduce the possibility of any contamination that could lead to food poisoning.

- **Physical controls**- Physical control checks are made to eliminate any contamination. Examples of physical control checks are metal detectors, using HACCP or microbiological screening.

- **Chemical Controls**- Samples of food will be taken to make sure that any preservatives or additives that may be present in the food are used correctly and safely.

- Temperature and time control- These checks will be computerised (CAM) and make sure that all high risk or perishable goods are stored at the correct temperature. For example the butter needs to be kept in refrigerated conditions. Time control will include stock rotation to limit waste and make sure that the ingredients used are all as fresh as possible.

Quality Assurance System

The Quality Assurance System is used to maintain the overall high quality of a product. Doing this ensures the consumer is satisfied with the product and therefore will have more confidence to buy the same product again. The system has been developed in order to set guidelines for the quality of products. In order for a factory or manufacturer to be seen as producing high quality products, they have to:

- Carry out measures at critical control points based on hazard analysis (HACCP)
- Have correctly working equipment
- Have properly trained staff
- Have ingredients from a reputable supplier. All ingredients must be free from contamination and packaging not damaged
- Have proper maintenance services.
- Have adequate premises for the factory
- Written cleaning schedules and operational procedures
- Keep records of any complaints that may have occurred

Effective food control should also be used during manufacturing. Effectiveness involves:

- Correctly trained staff and facilities to carry out inspections, sampling and monitoring the various stages of production
- Good food control management.. The use of specifications to use when testing the products.

One quality Assurance System that could be used when producing an Apple Pie or another product similar to the one that I have investigated is foreign body control. Throughout different stages of the production of the product, checks for foreign bodies need to be made. On arrival at the factory, the ingredients will have to be checked to make sure there is nothing visibly contaminating the ingredients. Once manufacturing starts other checks have to be made. For example the flour used in the pastry (if the pastry is made on site) will have to be sieved, in order to remove anything that isn't flour. Whilst the product is on the conveyor belt, the staff working that machinery and that come in contact with the product will have to make sure that they wear hair nets, gloves, no jewellery etc so that nothing can get into the food during production.

Once the product has been produced, a metal detector could be used to scan the product and double check that the product is free from foreign bodies as possible. The metals detectors are used in the rare cases of the presence of metal which could be from broken machinery etc and therefore need to be checked to keep the product safe for consumers to eat. In the past the amount of foreign bodies found in food was a lot higher. However nowadays, better control checks have improved this. Some metal detectors detect metal quickly and efficiently without slowing down the production. Therefore, in the production of Apple Pies, the process doesn't need to stop in order for foreign body control checks to take place.