

Note by Note Cooking Practical Assignment

Potato Cutlets

&

Coriander Sauce

Advance Molecular Gastronomy



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09 May 2022

Introduction

Molecular Gastronomy, Note by Note Definition, Potential and History:

Note by Note cooking, the concept first proposed by French Physical Chemist and Molecular Gastronomy Co-founder, **Hervé This**, is an application of Molecular Gastronomy. The term molecular gastronomy is credited to Hungarian physicist Nicholas Kurti and Hervé This. Molecular gastronomy also known as progressive cuisine is the incorporation of science and new techniques in the preparation, transformation and artistic presentation of food. It is the study of molecules and how are they linked to physical and chemical processes involved in cooking ([J.B., 2013](#)). Note by Note cooking replaces traditional foods and ingredients used to make a dish, it is the development of new dishes by using generally regarded as safe (GRAS) pure compounds or mixtures of pure compounds ([Burke, R. & Danaher, P., 2016](#)). According to its founder, This, the potential of Note by Note cooking for the development of new foods is boundless. Before moving to its applications and advantages, we will look into the history of Note by Note cooking and the stages it went through before getting in the limelight. Herve This proposed the idea of Note by Note cooking in 1994. According to This, promoting the idea was a struggle between 1994 to 1999. Eventually, in 2006, he convinced one of his friends, [Chef Pierre Gagnaire](#), to develop a dish made from Note by Note cooking. After an year of struggle, they presented the first dish in a restaurant in Hong Kong on 26th of April 2008. After that, the idea has spread and become relatively common. The founder has succeeded in to organize Note by Note dinners events in many places around the globe. The concept has been embraced by academia and is being followed by colleges such as by Copenhagen Hospitality College ([Ball, 2015](#)) and Culinary colleges in other countries such as Portugal and Ireland ([DIT, 2014](#)). Note by Note cooking is the perfect blend of science and technology and culinary arts. We have not yet explored truly the potential of Note by Note cooking. It is not limited to creating existing dishes but has the potential to invent new varieties of edible items. This explained in an interview to [CNBC](#), “Science is so powerful that I can make one new food every month for 20 years”, this is true as even a simple ingredient we consume while making a food possesses compounds of different varieties. Considering that, there are infinite number of chemical combinations which can be experimented with to invent new dishes or cuisines.

Advantages and Applications:

Note by Note cooking, not only provide us with wide range of dishes options but it solves many environmental problems the world is facing today. Food production has a major impact on environment in form of carbon dioxide emission and climate change. A report by [UNEP \(2016\)](#), concluded that food production is responsible for up to 60% of global terrestrial biodiversity loss, also 33% of soils are moderately to highly degraded due to nutrient depletion, erosion and acidification. Along with this, agriculture, and food system accounts for around 24% of global greenhouse gas emissions, chemical pollution salinization and compaction. Food insecurity problem is also on the rise. [United Nations](#) in a report published in 2021, explained that nearly one in one in three people in the world which is around 2.37 billion people were unable to have access to adequate food in 2020, and the numbers have increased by around 320 Million from last year. Raw Meat, fruits and vegetables are prone to spoilage and each year around one-third of the food approximately 1.3 billion tons of food which is fit for human consumption gets lost or wasted,

which ultimately also contributes to a huge environmental impact. Also, as the world population is increasing, expected to reach 9.8 billion in 2050 ([United Nations, 2017 Revision](#)), there will be soon a crisis of natural resources such as water and energy. Considering all these problems, Herve This, think that Note by Note cooking can be a solution to all of this and can redefine our diets and cuisines. Herve this explained in an interview to [BBC](#), that people might not like the idea now, but soon they will accept it and Note by Note will always be there as a better alternative.

Our Product Idea:

In this experiment we decided to work on a savory dish following Note by Note style cooking. The idea was to develop a product keeping in mind a very common and traditional savory snack of Pakistan. It was decided to make **Potato cutlets having exterior egg coating, with a creamy coriander sauce**. For this purpose, chemical composition of potato was checked and pure compounds such as Potato starch, Dietary fiber, Glucose and Patatin protein were decided ([Leonel et al., 2017](#)). Other ingredients for cutlet will be detailed later in report. The potato cutlets should have an Egg coating for which egg white which is mainly composed of egg protein such as Albumin was decide according to the availability in Kitchen. For the sauce we planned to use Casein and Whey protein, which is present in yogurt, also to add milk powder to give the sauce a little milky flavor. Also, flavorings and colorings were used as well in the production of these products.

Serving Size: 1 potato Cutlet. Weight – 20grams served with sauce.

Objective of the Project

The objective of the project is explained as follows.

1. Development of a Traditional Pakistani Savory Snack with a sauce using pure compounds or mixture of pure compound only.
2. Development of Snack containing Fiber as it was also the mandatory requirement for the theme of this years' project.
3. Making the final product in the form a cube.
4. The main focus while designing this project was to develop a food item which not only looks good but also tastes good just like the normal food that we consume. The aim was to develop a savory snack which in terms of its appearance, texture and taste does not feel alien to the common people.

Final Materials and Methods

The experiment was performed in one of the kitchens of TU Dublin Grange Gorman University as a part of molecular gastronomy class project.

The ingredients list and the method of production for our Note by Note product is the final one. Before finalizing this recipe and production method, three weeks of more work was done and the details of which can be found in the Weekly Logbook attached in the annex.

Equipment Needed: Small and Large SS Bowl, Spoon, Knife, Small plastic trays, Plate, Deep Pan, Large SS round Non-stick turner, SS whisker, Weight Scale (limit: 1g up to 1kg)

Ingredients Needed:

Table 1: Potato Cutlet Ingredients List

Potato Cutlet Ingredients List		
Name	Quantity	Brand Name
Potato starch	40g	Tersol
Dietary Fibre - Insoluble	1g	Nutricology
Mashed Potato powder	10g	Knorr
Baking soda	¼ of teaspoon	Gem
Cheese Powder	3g	SOSA
Tomato Powder	2g	SOSA
Salt	2g	N/A
Ground Red Chilli	¼ of teaspoon	Kania
Ground Black Pepper	¼ of teaspoon	Kania
Garlic Powder	1g	Musgrave excellence
Onium Note – Garlic, Onion and green evocation	2 drops	Iqemus
Cumin flavour	1 drop	SOSA
Coriander flavour	2 drops	SOSA
Ginger Flavour	1 drop	MSK
Yellow gel Colouring	1/2 drop	Cake Decoration
Water – for dough making	30g	N/A
Sunflower Oil – for frying	150g	Vita Dior

Table 2: Egg Coating Ingredients List

Egg Coating Ingredients List		
Name	Quantity	Brand Name
Egg white powder	10g	MSK
Water – for coating	100 g	N/A

Table 3: Coriander Yogurt Sauce Ingredients List

Coriander Yogurt sauce Ingredients List		
Name	Quantity	Brand Name
Casein	10g	Pure Series
Skimmed Milk Powder	5g	Milk Value
Salt	2g	N/A
Ground Black Pepper	2g	N/A

Water	100g	N/A
Locust Bean Gum	1g	MSK
Green Colouring	½ drop	Cake decoration

Cutlet Preparation:

All ingredients for the potato cutlets were collected and weighed according to the recipe provided above. In a large stainless-steel bowl, Forty grams of potato starch was taken. All other powdered ingredients such as dietary fiber, mashed potatoes powder salt, tomato powder, cheese powder, baking soda, red chili powder, black pepper powder, and garlic powder were also added according to quantities mentioned in the **Table 1** above. Also flavors such as onion, ginger, cumin, coriander were also added. Because these flavors were strong, only a small amount of them was added during production process. All the ingredients were mixed with the help of a whisker. After that, water (45g), was added into the bowl to mix ingredients well together and make the dough. Dough was made neither too hard nor too soft. It was of the consistency so to easily make round cutlets. During the mixing, 1/2 drop of yellow coloring was also added to the dough to give it the signature yellow color of potato cutlets. Dough was turned into round cutlets of around ½ inch thickness. They were then allowed to rest.

Egg coating Preparation:

Meanwhile the egg white coating was prepared in a separate bowl according to recipe in **Table 3**. 10g of egg white powder was taken in a Stainless-steel bowl and 100g of water was added in it. It was whisked with the help of egg whisker until a foamy thick liquid was prepared. It would serve as the coating for the cutlet. The whisking process almost took 10 minutes to get the foamy creamy consistency and appearance.

Coriander sauce Preparation:

The making of thick creamy sauce with coriander flavor was started. The recipe is given in **Table. 2**. In a separate bowl, 10g of casein powder was taken. In this 5g of milk powder, 2g of salt and 2g of ground black pepper. Now 100g water was added to the bowl and they were whisked with the help of egg whisker. 2 drops of coriander flavor were also dropped in the solution and were mixed again. In the end green coloring was added to give the sauce signature green color and final mixing was done. The sauce was very thin and did not have thick consistency which was required. To make it a bit dense and viscous, 1 gram locust bean gum was added and mixed well with the sauce.

Frying Process:

Now the frying part started. 150g of sunflower oil was taken in deep pan and was put on a stove until the oil got hot. The egg white coating was used for the coating of cutlets. The coated cutlets were dropped into the hot oil and were let to be deep fried until the inside of cutlets reached 75 degree Celsius (checked with the help of temperature probe) which indicated that the cutlets were properly cooked. The frying took 3 minutes on an average.

After the cutlets were cooked, extra surface oil was let to drain by keeping the fried cutlets in Large SS Non-stick round turner.

Sensory Evaluation:

The cutlets were then cut and made into small cubes with the help of knife. The final product was then presented in a plate with the sauce before judges and students. Acceptance test was performed for the product's sensory evaluation and students were asked to give their suggestions and feedback about the product. The sensory evaluation was not very detailed because of the time constraints and was done by asking students to rate the product for its appearance, texture and taste. The number of students were also less, and we were able to get only 5 students to perform the sensory evaluation. It gave the overall idea for the concept of product and improvements need to be made for it.

Results and Discussion

The results and discussion part for the report are **combined** in this section and for each result its discussion will be provided as well.

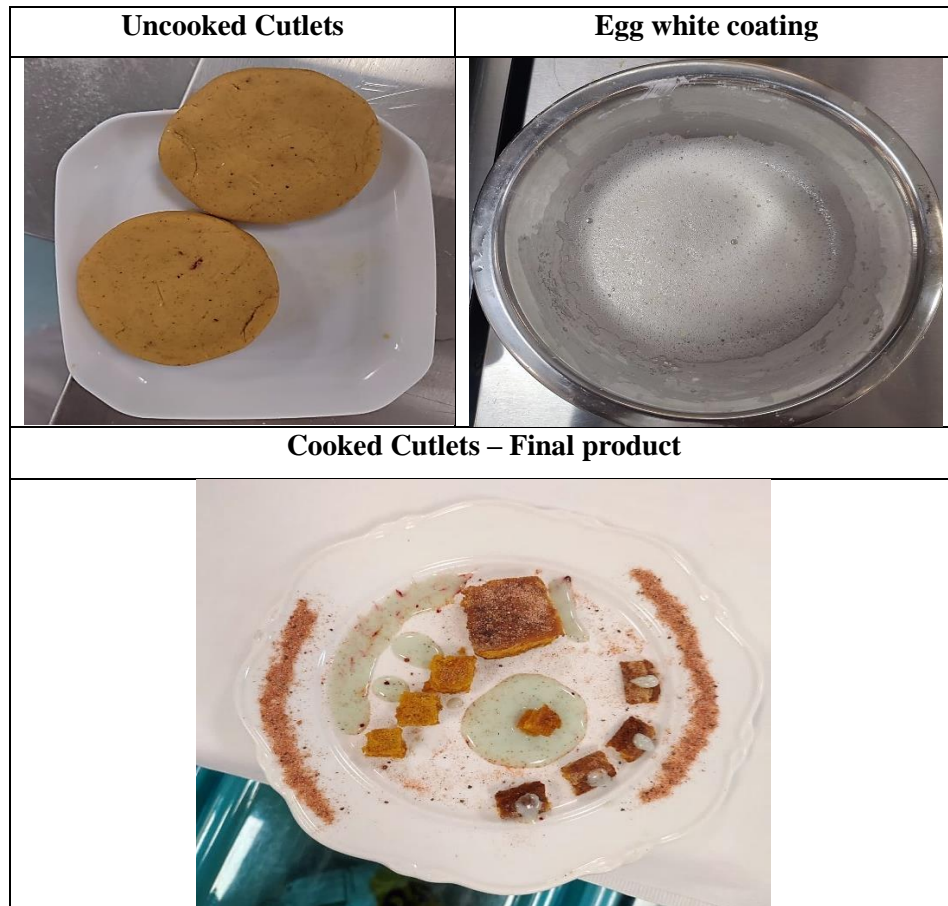


Figure: 1. Results for Uncooked Cutlets, Egg White coating, Cooked Cutlets, and the Coriander Sauce

Uncooked Cutlet and Egg White Coating

As shown in Fig.1, The consistency of the cutlet dough looked fine and the ingredients were able to stick together, it was easy to make a perfectly round cutlets, When the cutlets were being fried, the product retained its shape and there was no breaking and they were able to be cooked like normal fried snack, which is exactly what was needed. This was because as the main ingredient in the product was potato starch which has binding properties and are able to stick ([W.S. Ratnayake & D.S. Jackson, 2003](#)). It has ability to hold water because of its water binding properties ([Van den Berg et al., \(1975\)](#)).

Also the egg white coating looked fine and it had good thick consistency. It was easy to stick on the cutlets and make an outer coating just like normal eggs. Egg white are considered to be very good binding agents (G.H Lu & T.C Chen, 1999). They were also used to provide the nutritional properties to product. When the cutlets were being fried, it made a crispy white coating on the outside of cutlets which was according to requirements. The results can be seen in **Fig.1**.

Before presenting the final products to the judges and students, the products were tasted first, and sensory analysis was done to evaluate the product on following parameters.

Coriander Sauce

Appearance: Visually the sauce looked very good. It was shiny, having light green color with small granules of black pepper.

Texture: The texture of the sauce was good; it was grainy and thick enough to be combined with the cutlets. It also felt creamy which is also a good attribute for a sauce. Overall, the consistency and the viscousness of the sauce was acceptable. Locust bean gum was used to thicken the sauce, along with its many other functional properties, it is used as a thickening agent, stabilizer and gelling agent in food application and is classified as GRAS (Generally recognized as safe) by FDA (Sheweta Barak & Deepak Mudgil, 2014).

Taste: The sauce was tasted. It did taste like having yogurt or milky flavor. The sauce contained casein and milk powder as their ingredients. Casein along with compounds are the chemical constituents of yogurt and that's why it was used to make the sauce to make it taste like yogurt. It did not produce exact taste because sauce was missing many other important ingredients such as lactose, whey protein etc. (Tamime, A.Y. & Deeth, H.C., 1980). It did not taste great in combination with cutlets but was somewhat acceptable. It had salt and black pepper flavor, but it was little blank with no such rich and refreshing flavor which was expected. Because of time restraints no more improvements could be made for the sauce.

Potato Cutlets – The Main Product

Appearance: Visually the product looked very good, and appetizing. The color of the cutlets was very appealing, it was not neither too light nor too dark or burnt. The product had yellowish- brown color which was up to the mark with a little thin egg white coating outside. The product look like a fried savory snack and that was the main purpose of this project. The product improved a lot and continuous improvement was noted starting from the first week. The product did not feel like alien or unusual to the common person and that's what was the aim of this project to create something which looks like normal food to consumers. The product was then cut into small cubes according to the theme of the project and was then presented to judges with the sauce.

Texture: The texture of the product was also good. It was crispy on the outside. It had crispy thin layer of egg white and the crispy outer layer of product as well because of frying. The inside of the product improved from very thick and dense and hard to chew in first week to thin, soft, not dense with air spaces and easy to chew and swallow in the final week. A great deal of improvement was seen in the final week. The product was easy to cut and turn into cubes. Insoluble dietary fiber was used in the product, It was not only used because it was mandatory to use the fiber but it was

the chemical compound of potato. Dietary fiber not only provide the nutritional values to the product but also play a functional role such as water retention and textural properties (Thebaudin, et al., 1997). Fiber quantity was also right, and product did not feel rubbery and hard to chew and had a good mouthfeel. If there were more fiber in product, then it would become very hard and rubbery which was the case in first week. Baking soda which is a chemical raising agent usually used in baking industry and it has the property to release Carbon dioxide when it is heated (Jillian Claire, 2014).



Baking soda was used in the formulation, and it helped with the raising of the product with the release of carbon dioxide and made the product lighter and fluffier from inside. The problem with texture was that product became little hard and rubbery when it got cold which should not have happened. There was room for more improvements for the texture of the product but because of limited time it could not happen.

Taste: The product was tasted, and it was analyzed that it did not tasted much like potatoes. This could be because of the reason that it did not contain all the compounds which a potato contains like glucose, patatin protein etc. The main ingredient of the product was Potato starch, which is extracted from the tubers of *Solanum tuberosum*, which was first cultivated around ad 200 in Peru. Around 65-80% of the tubers is starch and that's why it was used in big quantity so that we get the most taste and flavor of the product out of it (W.S. Ratnayake & D.S. Jackson, 2003). Also the mashed potato powder flavor could not be perceived much, this maybe because that it was not used enough, only 10g of mashed potato powder was added. But it did work and contributed a little of potato flavor. Otherwise, all other spices and flavor combinations such as salt, black pepper, red chili, garlic powder, coriander flavor, onion and cumin flavor. Tomato powder and cheese also contributed a very rich flavor to the product. The overall taste of the product was really good, and it can be consumed as a savory snack made from pure compounds only. Of course, the taste of the product could be improved by trying to introduce ingredients to it which could give more potato like flavor and more rich and interesting flavor combination. But overall, the product taste test passed, and it was up to the expectation.

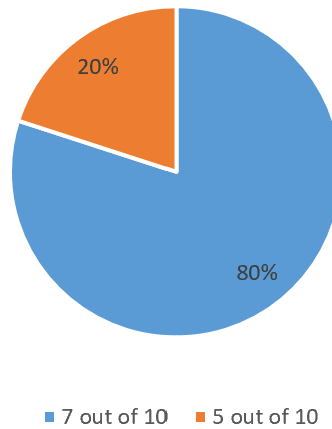
Sensory Evaluation

Sensory Evaluation was performed to have the overall idea of products' acceptability by the actual consumers. Class students in this case were asked to do the sensory for the product. It was not very detailed and only few basic questions were asked. Following are the questions with their results,

1. Rate the Taste of the product from 1 to 10?

80 % of the participants gave the rating of 7 out of 10 and 20 % gave 5 out of 10. It shows us that most of the panelists liked the product. 7 is considered a good mark. For some potato taste was not evident. Improvements could have been made in the product, but overall the acceptability percentage by the consumers in terms of its taste was really good and satisfactory.

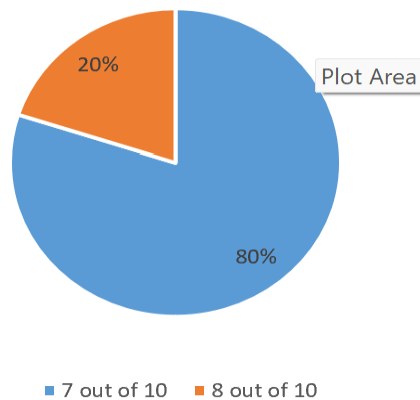
Taste



2. Rate the Texture of the product from 1 to 10?

20% of the panelists rated the product 8 out of 10 while the rest of them gave the rate of 7 out 10. It also indicates that the texture of the product was also good and acceptable by the consumer and they liked it.

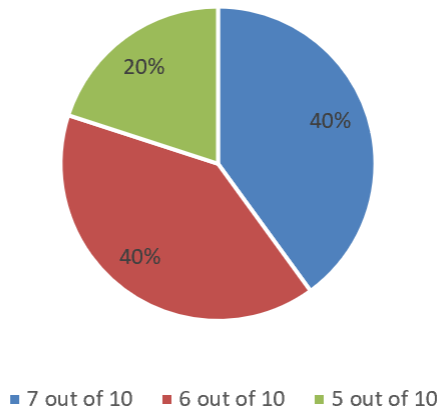
Texture



3. Rate the Appearance of product from 1 to 10?

40% of respondents thought it should be rated at 7 out of 10, other 40 % gave product's appearance 6 out of 10 while the rest of them gave it 5 out of 10.

Appearance

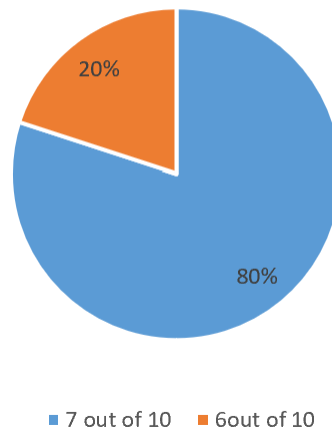


4. Rate the overall acceptance of the product?

Final question was regarding overall acceptance of the product, 80% of panelists gave the product 7 out 10 while the rest 20 % gave 6 out 10. These figures show that the produced passed in terms of overall quality, appearance, texture, and taste. Consumer accepted and liked the product. This shows that with even more work and research the product can be improved and used as a daily savory snack.

Overall acceptance

Chart Area



Nutritional Value of Product

Potato cutlets and sauce contains different ingredients which are chemical compounds in their pure form or their mixture. These ingredients not only provide the functional properties of the product but also a source of nutrients. The main ingredient of the product is potato starch. In human nutrition starch plays a great role in providing the energy needed for metabolism which enables the body to perform its function. It is the most basic source of energy for a huge percentage of world's population (John H. Dupuis & Qiang Liu 2019). The product is also a source of dietary

fiber which consists of non-digestible forms of carbohydrate i.e., polysaccharides that originate from plant-based foods. Dietary fiber offers many health benefits, in contrast, the western diet lacks dietary fiber. Dietary fiber is associated with metabolic health and helps in reduction of risk for cardiovascular disease, colorectal carcinoma and gut motility. It is also linked with colonic and overall gut health (Thomas M et al., 2020). Egg white powder is used for the coating if product and it is considered a good source of proteins, and carbohydrates (E.D.N.S et al., 2013). Other ingredients such as tomato also is a good source of various minerals needed for healthy function of body such as nitrogen, phosphorus, potassium, calcium, copper, and boron (Passam, H.C, 2007).

Therefore, we can say that this is not only product which have a good taste and also good nutritional properties.

Conclusion

We can conclude our report by saying that the experiment of making Potato cutlets with sauce was successful. All the chemical compounds worked well together to produce a flavorful product. We can say that the we were able to achieve the aim of the project which was to develop a savory which can tastes like normal food and can be consumed by general people. This was a traditional Pakistani snack but developed 100% from pure compounds. The product not only offer good taste but rich in terms of its nutritional properties as well. There were still some improvements which could be made with the taste of the cutlets and sauce. But overall the product was good. Hence, we come to the conclusion that Note by Note can be used as an effective alternative to traditional cooking and it can help solve many of the problems which we are dealing with today.

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Annex

WEEK-1

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Zain Ali

FOOD PRODUCT: Potato Cutlets

Practical WEEK NO.: 1

DATE: 28-March-22

Weekly Aims and Objectives

- Check if all required ingredients are available
- Get to know about the kitchen and how each equipment work
- Which equipment will be needed for the project?
- Start the Project, Run First trial
- Record and analyse the results

Materials and Method (Ingredients, Equipment and Method)

Equipments used: Small and Large SS Bowl, Spoon, Knife, Small plastic trays, Plate, Deep Pan, Large SS round Non-stick turner, SS whisker, Weight Scale (limit: 1g up to 1kg)

Ingredients List		
Name	Quantity	Brand Name
Potato starch	100g	Tersol
Dietary Fibre Cellulose	20g	Nutricology
Salt	2g	N/A
Onium Note – Garlic, Onion and green evocation	5 drops	Iqemus
Yellow gel Colouring	1 drop	Cake Decoration
Coriander flavour drops	3 drops	SOSA
Tomato Powder	2g	SOSA
Egg white powder	10g	MSK
Water – for dough	60g	N/A
Water – for coating	100 g	N/A
Sunflower Oil	150g	Vitadior

Method:

Cutlet Preparation:

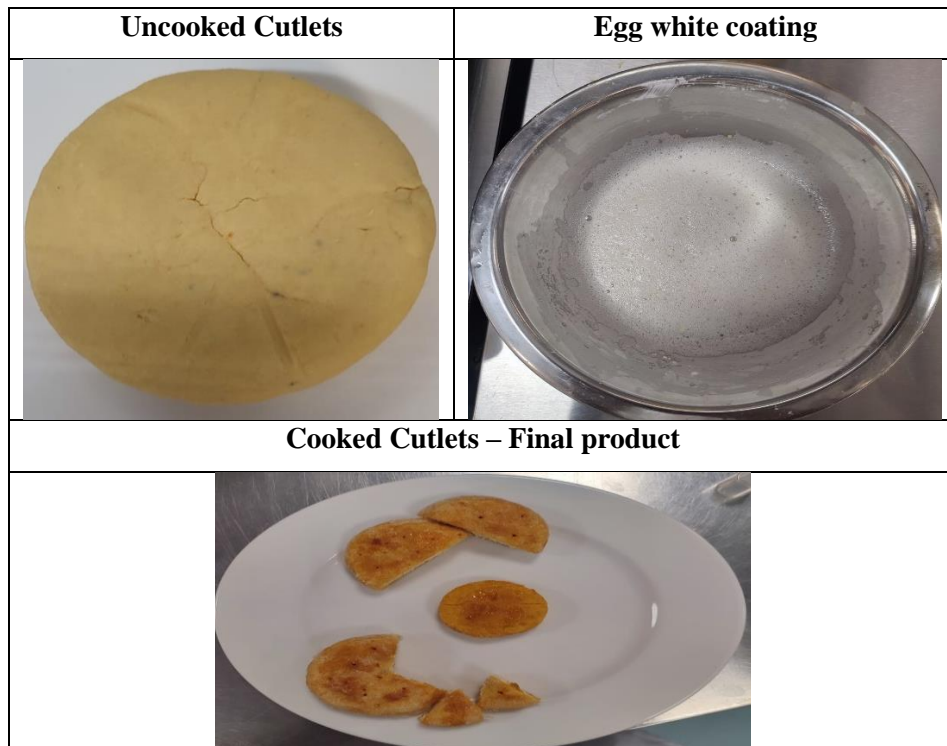
The experiment was performed in one of the kitchens of TU Dublin Grange Gorman University, All ingredients were gathered. All ingredients were weighed according to the recipe. 100g of potato starch was taken in a big bowl. Dietary fibre was added in it, all other powdered ingredients such as salt, tomato powder were also added according to the recipe mentioned above. Water was added to the bowl slowly and the ingredients were mixed. When the ingredients turned into the dough, 1 drop of yellow colouring was added and the dough became yellowish in colour. Now the dough was divided in half and each half was turned into round cutlets of around ½ inch thickness. They were then allowed to rest.

Meanwhile the egg white coating was prepared in a separate bowl. 10g of egg white powder was taken in a bowl and 100g of water was added in it. It was whisked with the help of egg whisker until a foamy thick liquid was prepared. It would serve as the coating for the cutlet.

Now the cutlets were ready, and they were dipped inside the egg white coating material. 150g of sunflower oil was taken in deep pan and was put on a stove until the oil got hot. The coated cutlets were dropped into the hot oil and were let to be deep friend until the inside of cutlets reached 75 degree Celsius (checked with the help of temperature probe) which indicates that the cutlets were cooked. The frying took 3 minutes on an average.

After the cutlets were cooked, extra surface oil was let to drain by keeping the fried cutlets in Large SS Non-stick round turner. Cutlets were allowed to cool down a bit and then little hole were made on the top of cutlets using the fork, and the flavour drops were added. The flavours penetrated inside the cutlets. The flavouring was not used during dough making because of the fear that flavour will be evaporated during frying. At the end, Cutlets were put into plates and sensory analysis was performed. The cutlets were then cut and made into small cubes with the help of knife.

Results and discussion



Precooked product and the frying procedure:

The consistency of the cutlet dough looks fine and the ingredients were able to stick together, it was easy to make a perfectly round cutlets, also the egg white coating look fine and also it had good thick consistency. When the cutlets were being fried, the product retained its shape and there was no breaking and they were able to be cooked like normal fried snack, which is exactly what was needed.

Sensory Analysis:

Product was finally tasted. Following parameters were checked, we will discuss each of the parameter also,

Appearance: Visually the product looked particularly good, appealing and appetizing. There was an egg coating outside the cutlet which indicates that the egg coating very well like it was supposed to. This was because the consistency and the texture of the raw ingredients held very good together. The final product was light brown in colour. We can say that the frying time and temperature was okay and to be followed for the rest of experiments.

Texture: Texture of the product when it was cut with the knife felt very hard. The outer layer texture was good, it was crispy but not as crispy as required. Upon tasting, the product felt very hard and rubbery. It was supposed to be soft from inside. The inside of the product was very dense with no more air spaces/bubbles. It was very thick and not easy to chew. When analysed, it came to attention that 20g of dietary fibre was too much. 100g of potato starch was used and 20g fibre was little too much for that. This was the reason that product was dense and very fibrous.

Taste: Product was tasted. It did not taste like potato but a savoury filling snack. Tomato flavour was just right in the product. The flavour of coriander and onion was overwhelming in the product. The product became bitter, it was realized that too much flavour drops were added on the top of the product. The flavours felt very strong, and raw. For this amount of ingredients only 1-2 drops of the flavours were enough. It was noted for next time. Though the saltiness of the product was all right. The overall taste of the product was acceptable with lesser flavouring.

Conclusions

This week the project was started, first trial went very well. It was seen that the ingredients are working very well together, and we were able to get some final product which can be considered a savoury snack. The taste of the product was acceptable. We learnt to use less fibre and flavourings in the product to get desired results.

Recommendations for following week.

Following things will be checked.

- Less use of fibre
- Less use of flavours
- Experiment with other ingredients and flavours.

Ingredients required for the following 2 weeks.

All of the above, in addition to some extra ingredients e.g., ground pepper, garlic, baking soda etc. available in the kitchen for experiment.

WEEK-2

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Zain Ali

FOOD PRODUCT: Potato Cutlets

Practical WEEK NO.: 2

DATE: 1-April-22

Weekly Aims and Objectives

- Run the second trial
- Sensory evaluation
- Record and Analyse of the results

Materials and Method (Ingredients, Equipment and Method)

Equipments used: Small and Large SS Bowl, Spoon, Knife, Small plastic trays, Plate, Deep Pan, Large SS round Non-stick turner, SS whisker, Weight Scale (limit: 1g up to 1kg)

Ingredients List		
Name	Quantity	Brand Name
Potato starch	60g	Tersol
Dietary Fibre Cellulose	3g	Nutricology
Potato Powder*	10g	Kitchen made
Cheese Powder*	2g	SOSA
Salt	2g	N/A
Baking soda*	¼ of teaspoon	Gem
Onium Note – Garlic, Onion and green evocation	2 drops	Iqemus
Yellow gel Colouring	1/2 drop	Cake Decoration
Coriander flavour drops	2 drops	SOSA
Ginger Flavour drops*	2 drops	MSK
Tomato Powder	2g	SOSA
Egg white powder	2g	MSK
Water – for dough	30g	N/A
Water – for egg solution*	25 g	N/A
Sunflower Oil	150g	Vita Dior

Note: Ingredients with green star * means they are new in this week.

Method:

Cutlet Preparation:

The second week of experiment started. All ingredients were gathered. All ingredients were weighed according to the recipe. The quantities of the ingredients used previously were reduced and some new ingredients were also used. 60g of potato starch was taken in a big bowl. 3g of Dietary fibre was added in it, All other powdered ingredients such as salt, tomato powder, cheese powder, potato powder and baking soda were also added according to the recipe mentioned above. Water (30g) was added to the bowl slowly and the ingredients were mixed to make the dough.

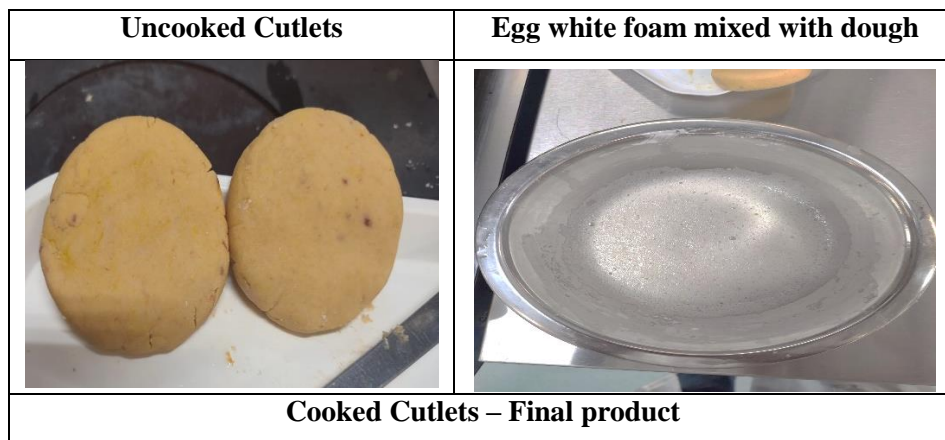
In the second bowl, the egg white foamy liquid was made by adding 25g of water into 2g egg white powder. It was whisked with the help of egg whisker until a foamy thick liquid was prepared. The thick foamy cream like liquid was then added to the dough and the dough was then again mixed and the foamy egg solution was incorporated in the dough. This method along with baking soda addition was used in the hopes to get a good texture of final product with air bubbles inside. During the mixing flavours such as onion, ginger and coriander were also added. The stage of flavour addition was changed from last week as adding the flavour in the final product gave too much strong and bitter flavour. This week, stage of the flavouring was experimented.

1/2 drop of yellow colouring was added to the dough it became yellowish in colour. Now the dough was divided in half and each half was turned into round cutlets of around 1/2 inch thickness. They were then allowed to rest.

Now the frying part started. 150g of sunflower oil was taken in deep pan and was put on a stove until the oil got hot. The egg white coating from last week was used for the coating of cutlets this week also. The coated cutlets were dropped into the hot oil and were let to be deep friend until the inside of cutlets reached 75 degrees Celsius (checked with the help of temperature probe) which indicates that the cutlets were cooked. The frying took 3 minutes on an average.

After the cutlets were cooked, extra surface oil was let to drain by keeping the fried cutlets in Large SS Non-stick round turner. At the end, Cutlets were put into plates and sensory analysis was performed. The cutlets were then cut and made into small cubes with the help of knife.

Results and discussion





Precooked product and the frying procedure:

The consistency of the cutlet dough was much lighter and had air bubbles than previous week. All ingredients were able to stick together, it was easy to make a perfectly round cutlet. When the cutlets were being fried, the product retained its shape and there was no breaking and they were able to be cooked like normal fried snack. The only difference seen this week was the cutlets were able to rise, because of the baking soda and egg white solution.

Sensory Analysis:

Product was finally tasted. Following parameters were checked, we will discuss each of the parameter also,

Appearance: Visually the product looked very good, appealing and appetizing. Only the downside was the products rose too much because of excess carbon dioxide release from the product. It became like a round ball as it can be seen from the picture above. The problem with this appearance and texture of the product was difficulty to make cubical shape small cutlets out of it. Otherwise, the product looked good with light yellowish-brown colour. The product was yellow because of the colouring we used.

Texture: Texture of the product this week was very good as compared to last week. When it was cut with the knife it was very easy to cut. The product was light, fluffy with air bubbles inside. Still fibre felt a little extra as product was little rubbery in texture, otherwise it was good and acceptance. We got good results because of using baking soda which helps product rise by the release of carbon dioxide and use of egg white foamy cream like solution. This solution has lot of air bubbles inside and when it was incorporated in dough helped with the air bubbles inside the product. Because of this reason we were able to get fluffy and light product.

Taste: Product was tasted. This week potato powder was added. It did not taste a lot like potato, maybe because of the reason that the potato powder was not much. Tomato flavour was just right in the product. The flavour of coriander and onion was not so overwhelming in the product as they were last week. Both the quantity and the production stage it was added were changed and it resulted in good results. Coriander flavour was still little too much because of the reason that the flavour was very strong and only small amount of it was needed to get the right taste. It was noted for next time. Though The product was also experimented this week with cheese and the cheese flavour could be sensed in the final product. The combination of cheese with other ingredients was good and it was decided to keep this as necessary

ingredient for following weeks. The saltiness of the product was all right. The overall taste of the product was good.

Conclusions

This week second trial was performed. It also went very well. The new ingredients which were experimented with also produced satisfactory results such a baking soda, egg white solution and cheese powder. The taste of the product was good, only the coriander flavour felt too much. Only one thing from baking soda or egg white solution should be used to get the rise texture and appearance of product.

Recommendations for following week.

Following things will be checked.

- Only use of baking soda
- Less use of flavours - coriander
- Experiment with other ingredients and flavours – garlic, red or black pepper
- Development of sauce

Ingredients required for the following 2 weeks.

All of the above, in addition to some extra ingredients e.g., casein, garlic powder, baking soda etc. available in the kitchen for experiment.

WEEK-3

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Zain Ali

FOOD PRODUCT: Potato Cutlets

Practical WEEK NO.: 3

DATE: 4-April-22

Weekly Aims and Objectives

- Run the third trial
- Sensory evaluation
- Production of a sauce
- Record and Analyse of the results

Materials and Method (Ingredients, Equipment and Method)

Equipments used: Small and Large SS Bowl, Spoon, Knife, Small plastic trays, Plate, Deep Pan, Large SS round Non-stick turner, SS whisker, Weight Scale (limit: 1g up to 1kg)

Potato Cutlet Ingredients List		
Name	Quantity	Brand Name
Potato starch	40g	Tersol
Dietary Fibre Cellulose	1g	Nutricology
Cheese Powder	2g	SOSA
Salt	2g	N/A
Baking soda	¼ of teaspoon	Gem
Onium Note – Garlic, Onion and green evocation	2 drops	Iqemus
Yellow gel Colouring	1/2 drop	Cake Decoration
Chilli flavour*	1 drop	SOSA
Cumin flavour*	1 drop	SOSA
Coriander flavour drops	2 drops	SOSA
Ginger Flavour drops	1 drops	MSK
Tomato Powder	2g	SOSA
Water – for dough	30g	N/A
Sunflower Oil	150g	Vita Dior

Coriander Yogurt sauce Ingredients List		
Name	Quantity	Brand Name
Casein*	10g	Pure Series
Skimmed Milk Powder*	5g	Milk Value
Salt	2g	N/A
Water	100g	N/A
Locust Bean Gum*	1g	MSK
Green Colouring	½ drop	Cake decoration

Note: Ingredients with green star * means they are new in this week.

Method:

Cutlet Preparation and Sauce Preparation:

The third week of experiment started by collecting all the ingredients needed. All ingredients were weighed according to the recipe. This week 2 products were made. This week some new ingredients were introduced in the list, some previously used were not used this week because of their unavailability such as potato powder. Our first product was potato cutlet with some changes in the recipe. This week 40g of potato starch was taken in a big bowl. 1g of Dietary fibre was added in it, All other powdered ingredients such as salt, tomato powder, cheese powder, and baking soda were also added according to the recipe mentioned above. Only baking powder was used this week, egg powder solution was not used. Water (30g) was added to the bowl slowly and the ingredients were mixed to make the dough. During the mixing like last week, flavours such as onion, ginger, cumin, chilli and coriander were also added. 1/2 drop of yellow colouring was added

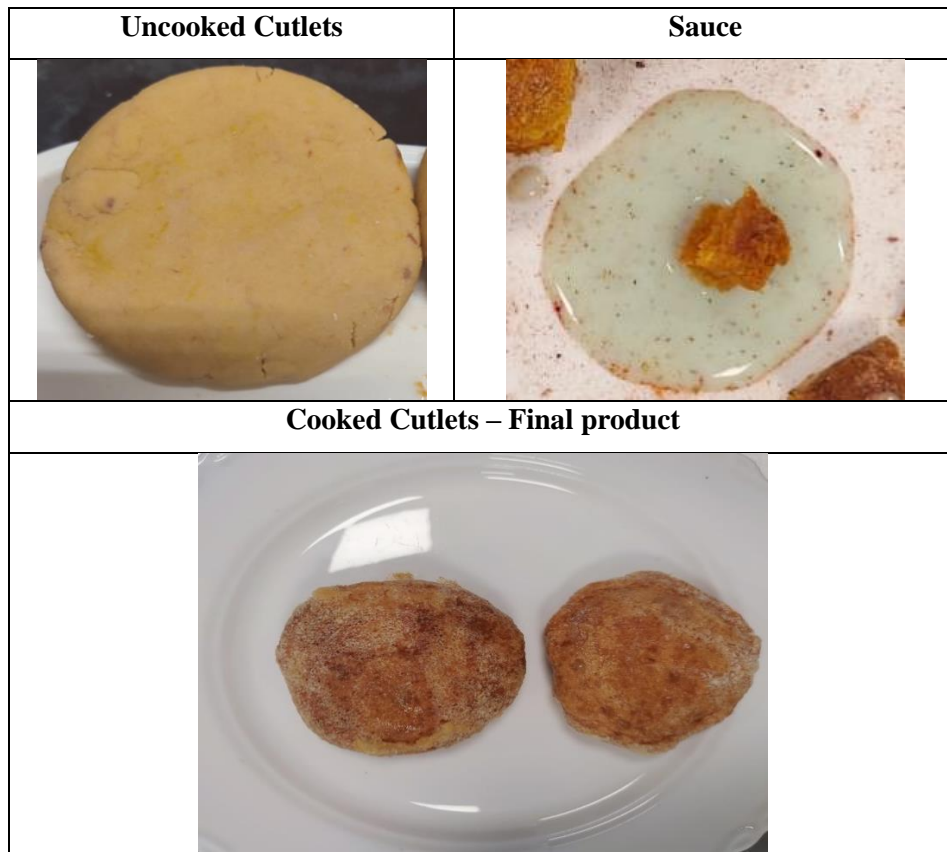
to the dough it became yellowish in colour. Dough was turned into round cutlets of around ½ inch thickness. They were then allowed to rest.

Meanwhile, making of thick creamy yogurt sauce with coriander flavour was started. In a separate bowl, 10g of casein powder was taken. In this 5g of milk powder was also added along with 2g of salt. Now 100g water was added to the bowl and they were whisked with the help of egg whisker. 2 drop of coriander flavour were also dropped in the solution and were mixed again. In the end green colouring was added to give the sauce signature green colour. The sauce was very thin and did not have thick consistency which was required. To make it a bit dense and viscous, 1 gram locust bean gum was added and mixed well with the sauce.

Now the frying part started. 150g of sunflower oil was taken in deep pan and was put on a stove until the oil got hot. The egg white coating from first week was used for the coating of cutlets this week also. The coated cutlets were dropped into the hot oil and were let to be deep fried until the inside of cutlets reached 75 degree Celsius (checked with the help of temperature probe) which indicates that the cutlets were cooked. The frying took 3 minutes on an average.

After the cutlets were cooked, extra surface oil was let to drain by keeping the fried cutlets in Large SS Non-stick round turner. At the end, Cutlets were put into plates and sensory analysis was performed. The cutlets were then cut and made into small cubes with the help of knife.

Results and discussion



Sensory Analysis:

Product was finally tasted. Following parameters were checked, we will discuss each of the parameter also,

Appearance: Visually the product looked very good, according to the set standards. The colour of the cutlets was very appealing, it had right brown and yellow colour with the little thin egg white coating outside. The product looks crispy and an appetizing savoury snack. This week the product was much better looking than previous 2 weeks. Sauce was also made today. The product colour was good, but it should have little granules of black pepper.

Texture: This week the texture of the cutlets was the best in comparison with past two weeks. It was crispy from outside and soft and light with air spaces from inside. The product was easy to cut and turn into cubes. It was proved that a little baking soda works perfectly for the product. The fibre quantity was also right, and product did not feel rubbery and hard to chew. This week egg white foamy solution was not used to avoid the extra rising of product. The texture of the sauce was good, it was grainy and thick enough to be eaten with the cutlets. It also felt creamy which is also a good attribute for a sauce.

Taste: The flavour combination in this week's product worked very well. All the new flavour introduced this week worked very well this week and gave the product extra rich flavour. The only downside for the taste was that some flavours felt artificial. The sauce was also tasted. It tasted little blank, but it did taste like having yogurt or milky flavour. The taste of the sauce needed to be improved with some more improvements for the potato cutlets as well.

Conclusions

This week a new product i.e. sauce was developed with the intent to be consumed with cutlet. Sauce taste needs to be improved a bit. The cutlets from this week were the best in comparison with last 2 weeks in terms of taste, texture and appearance. Some little improvements can be made in cutlets as well.

Recommendations for following week.

Following things will be checked.

- Improve taste of sauce
- Use natural ground chilli
- Experiment with other ingredients in kitchen
- Improve the cutlets recipe
- Showcase preparation

Ingredients required for the following 2 weeks.

All of the above, in addition to some extra ingredients which could make the product even better.

WEEK-4

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Zain Ali

FOOD PRODUCT: Potato Cutlets

Practical WEEK NO.: 4 - Final

DATE: 25-April-22

Weekly Aims and Objectives

- Run the third trial
- Sensory evaluation
- Production of a sauce
- Record and Analyse the results

Materials and Method (Ingredients, Equipment and Method)

Equipments used: Small and Large SS Bowl, Spoon, Knife, Small plastic trays, Plate, Deep Pan, Large SS round Non-stick turner, SS whisker, Weight Scale (limit: 1g up to 1kg)

Potato Cutlet Ingredients List		
Name	Quantity	Brand Name
Potato starch	40g	Tersol
Dietary Fibre Cellulose	1g	Nutricology
Cheese Powder	3g	SOSA
Mashed Potato powder*	10g	Knorr
Salt	2g	N/A
Ground Red Chilli*	¼ of teaspoon	Kania
Black ground Pepper*	¼ of teaspoon	Kania
Garlic Powder*	1g	Musgrave excellence
Baking soda	¼ of teaspoon	Gem
Onium Note – Garlic, Onion and green evocation	2 drops	Iqemus
Yellow gel Colouring	1/2 drop	Cake Decoration
Cumin flavour	1 drop	SOSA
Coriander flavour drops	2 drops	SOSA
Ginger Flavour drops	1 drops	MSK
Tomato Powder	2g	SOSA
Water – for dough	30g	N/A
Sunflower Oil	150g	Vita Dior

Note: Ingredients with green star * means they are new in this week.

Method:

Cutlet Preparation and Sauce Preparation:

This was the final week of experiments and final products were to present before Judges and sensory evaluation by panellists needed to be performed. All ingredients were weighed according to the recipe. Along with the Potato cutlet, the sauce from last week was also improved. This week some new ingredients were introduced in the list such as red chilli powder, black pepper ground, mashed potatoes powder and garlic powder). Some previously used ingredients were not used this week.

Potato cutlet was first prepared. Forty grams of potato starch was taken in a big bowl. All other powdered ingredients such as dietary fibre, salt, tomato powder, cheese powder, and baking soda, red chilli powder, black pepper ground, mashed potatoes powder and garlic powder were also added according to the recipe mentioned in the table above. Also flavours such as onion, ginger, cumin, coriander were also added. Water (45g) was used to mix ingredients together and make the dough. During the mixing, 1/2 drop of yellow colouring was also added to the dough to give it yellow colour. Dough was turned into round cutlets of around 1/2 inch thickness. They were then allowed to rest.

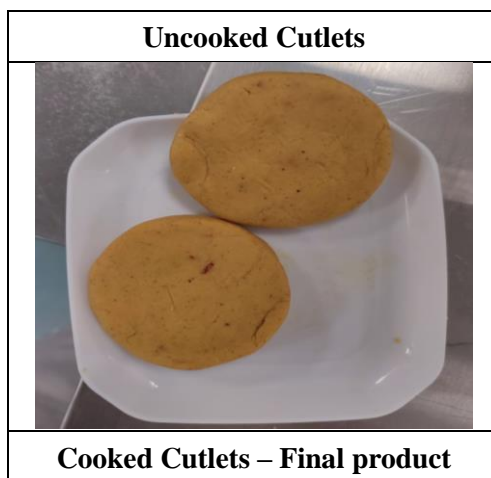
Meanwhile, Sauce from last week was improved a bit by the addition of 2g of ground black pepper in it. The sauce was missing the flavour, therefore needed adjustment.

Now the frying part as usual started. 150g of sunflower oil was taken in deep pan and was put on a stove until the oil got hot. The egg white coating from first week was used for the coating of cutlets this week also. The coated cutlets were dropped into the hot oil and were let to be deep friend until the inside of cutlets reached 75 degrees Celsius (checked with the help of temperature probe) which indicates that the cutlets were cooked. The frying took 3 minutes on an average.

After the cutlets were cooked, extra surface oil was let to drain by keeping the fried cutlets in Large SS Non-stick round turner. The cutlets were then cut and made into small cubes with the help of knife.

The final product was then presented in a plate with the sauce before judges and students. At the end Acceptance test was performed for the product and students' feedback was also gathered.

Results and discussion





Sensory Analysis:

Product was first evaluated before presenting to Judges and students. Following parameters were checked, we will discuss each of the parameter also,

Appearance: Visually the product looked very good and appetizing. The colour of the cutlets was very appealing, it was not neither too light nor too dark or burnt. The product had right brown and yellow colour with the little thin egg white coating outside. The product look like savoury snack and that was the main purpose of this project. This week the product was much better looking than previous 3 weeks. Sauce was also improved. The sauce was shiny, light green colour with small granules of black pepper.

Texture: This week the texture of the cutlets was same as the 3rd week. It had crispy outer layer and soft inside with air spaces. The product was easy to cut and turn into cubes. The fibre quantity was also right, and product did not feel rubbery and hard to chew. The texture of the sauce was good, it was grainy and thick enough to be combined with the cutlets. It also felt creamy which is also a good attribute for a sauce.

Taste: The flavour combination in this week's product worked very well. The product from last week lacked the garlic flavour and natural black pepper and red chilli flavour. Because of these natural ingredients used in their raw form, they worked than using flavour only. Product got extra rich flavour this week. The sauce was also tasted. It tasted better than before, but it did taste like having yogurt or milky flavour. It did not taste great in combination with cutlets but was acceptable. Because of time restraints no more improvements could be made for the sauce.

Actual consumers, i.e., students from class were asked to perform the sensory analysis for the product.

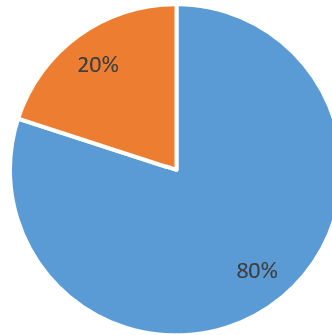
Sensory Evaluation test: Acceptance Test

Total No. of Participants: 5 – Because of time constraints, not many participants could be gathered.

Participants were asked following questions,

Rate the Taste of the product from 1 to 10?

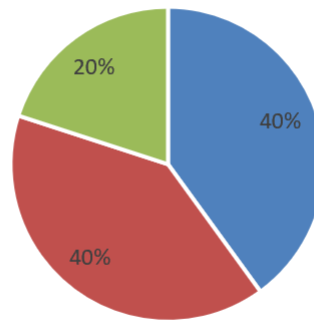
Taste



■ 7 out of 10 ■ 5 out of 10

Rate the Appearance of product from 1 to 10?

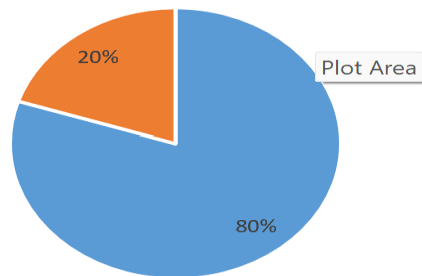
Appearance



■ 7 out of 10 ■ 6 out of 10 ■ 5 out of 10

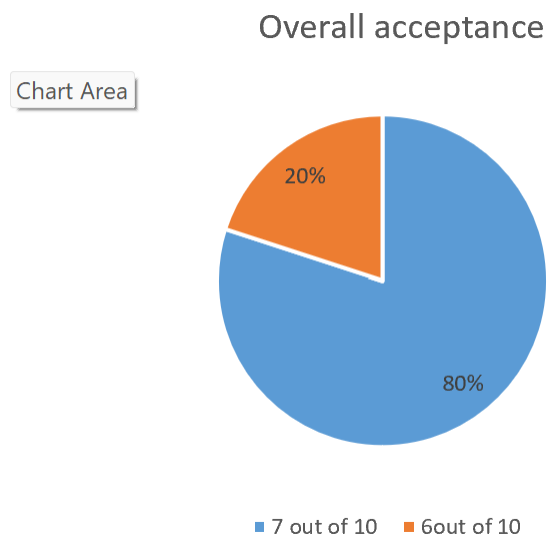
Rate the Texture of the product from 1 to 10?

Texture



■ 7 out of 10 ■ 8 out of 10

Rate the overall acceptance of the product?



Conclusions

This was the final week of experiments. Product was made and presented before judges. The product taste and quality were up to expectations. Sauce was not very good. Overall Consumer liked the product and appreciated the concept. Although, there is room for improvement always, but due to time limits, it was not possible.

Recommendations for following week.

Following things will be checked.

- Report preparation

Ingredients required for the following 2 weeks: None