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Advanced Molecular Gastronomy

(Module Code: TFCS9025)

Note by Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle and cheddar cheese sauce

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INTRODUCTION

Molecular Gastronomy

Food science and technologies have been applied to food products for a long time, by studying the interaction of physical, chemical, and microbiological aspects, in order to convert raw materials and ingredients to the finished products on an industrial scale (Burke et al., 2016). Although the new development of innovative food products is reinforced by all sectors, there was no one dedicated to exploring the chemical processes of cooking in homes and restaurants.

Eventually, the creation in the discipline of the new science was introduced by Nicholas Kurti, and a French chemist, Hervé This in 1988. Its implementation transforms culinary procedures from an empirical discipline to "real" science as it applies the scientific approach to cooking. This new science was named “molecular gastronomy” which distinguished itself from traditional food science. Molecular gastronomy was focusing on a small-scale food preparation rather than large-scale as well as focusing on the appreciation of consumers during consumption (Guiné et al., 2012). The definition of molecular gastronomy has been debated among scientists and experts, which aims to understand the basic principles of food transformation. Therefore, molecular gastronomy can be defined as a study of the change in physical and chemicals of food during cooking, and the sensory impact on the consumer. It could be considered as a branch of food science and technology because the knowledge from this field is applied to create the dishes and several phenomena that occurred during the preparation can be explained based on the scientific aspect. The molecular gastronomy principle can also be applied in the restaurant kitchen or home cooking as called “molecular cooking” (Caporaso, 2021).

Molecular cooking can be easily differentiated from traditional cooking. It is obviously seen that tools used in this cooking are quite new or may adapt from the tools used in the scientific laboratories. Examples of new tools include siphons that use to make foam, ultrasonic probes that use to make an emulsion, liquid nitrogen that use to make sorbets or other innovative preparation, etc. Considering the ingredients used in molecular cooking, many additives were found in this cooking procedure. For instance, agar agar, carrageenan, sodium alginate, calcium lactate, flavours, and colours. Although it is not commonly seen in the normal kitchen, it is proved to have useful culinary applications (This, 2013; Caporaso, 2021).

With regards to new cooking methods, several innovative products were introduced. Besides, in these days, the science of home and restaurant cooking has newly evolved from the realm of a few enthusiastic amateurs to a genuine scientific undertaking. Several restaurants have applied molecular cooking knowledge in their kitchens, which makes them become the best restaurant in the world (Barham et al., 2010).

Note by note cuisine

An increase in the world population, which is predicted to reach 10 billion people by 2050, might create a food shortage problem worldwide. Meat production might become insufficient in the future. Some new technologies, for example genetically modified organism (GMO), is proposed in order to adequately feed this huge amount of population. Although this technology can increase agricultural productivity, the sustainability aspect of this technology is still discussed.

As well as the problem of if animal consumption becomes socially unacceptable, what can be supplied to feed human beings. In addition, molecular cooking was spreading worldwide including in the professional culinary world. The goal is no longer to introduce new tools but deflect to create the food by playing with the new ingredients (This, 2014).

Note by note cuisine was first proposed by Hervé This in 1994. It is a style of cooking based on molecular gastronomy. Its dishes are made up of compounds, either pure compounds or mixtures obtain by fractionation or cracking plant or animal tissues, instead of using real animals or plant tissues, such as meat, fish, vegetable, or fruits. To easily understand this idea of cooking, thinking of it in a metaphor way, Hervé This said that this cuisine is like a painter using primary colours, or a musician composing the electroacoustic music using the pure waves that are mixed into sounds and music (This, 2013; Gales, 2013). For the several components of the dish in note-by-note cuisine, the attributes of each component such as shapes, colours, tastes, odours, temperatures, textures, and the nutritional aspects should be designed by the cookers themselves (This, 2013).

It seems like note-by-note cuisine is the new creative idea that many creative cooks are looking for, however, several arguments are mentioned about the issue of this cuisine. Inevitable issues which lead to the most consumers concerned are the nutritional issue, as well as the toxicology, feasibility, economics, and political issue. However, this cuisine can avoid those issues and turns them into benefits that can also deal with the problem mentioned above and create the protection for the environment. But unfortunately, note by note cuisine will succeed only if the ‘food neophobia’ of the human species is handled (This, 2013).

Overall, to develop the new idea of making note by note dish within the theme of the contest ‘Savoury dice and fibres’, Carbonara pasta which consists of cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce are made. All the information including the aim, materials and methods adapted from the Molecular Gastronomy discipline, as well as the results and discussions of the product itself, and the sensory analysis by evaluating colleagues will be described in this report.

AIM AND OBJECTIVES

Aim

This project aims to create a Note-by-Note Carbonara pasta which consists of 3 elements; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce. Cheddar spaghetti will contain fibre while truffle cream sauce souffle will be the element that form as a dice shape in order to comply with the theme of the contest, 'Savoury dice, and fibres'. The taste, texture, colour and overall appearance of the product will be optimized during the experimentation. The product should give a different texture in one bite. The texture of cheddar spaghetti should be firm, while the texture of truffle cream sauce souffle should be soft and melted in the mouth. The taste of the product should be closest to the traditional dish. The product recipe will be experimented by adjusting the ingredient through practical experimentation in the kitchen at TU Dublin Grangegorman. The sensory analysis will be performed by colleagues in the kitchen.

Objective

1. To perform the Note-by-Note cooking comply with the theme of 'Savoury dice and fibres'
2. To optimize the taste and texture of cheddar spaghetti
3. To optimize the overall appearance of cheddar spaghetti
4. To optimize the taste and texture of truffle cream sauce souffle
5. To optimize the overall appearance of truffle cream sauce souffle
6. To optimize the taste and texture of cheddar cheese sauce
7. To optimize the overall appearance of cheddar cheese sauce
8. To plate and serve the product and make it looks appetizing
9. To evaluate the sensory analysis of the product

MATERIALS AND METHODS

Ingredients

Truffle cream sauce souffle		
Ingredient	**Quantity**	**Unit**
Water	160	g
Micellar Casein Unflavoured (Bulk)	24	g
Whey protein	6	g
Lactose powder (msk)	10	g
Corn starch (gem)	2	g
Monosodium Glutamate, MSG (Ajinomoto)	1	g
Gelatin (Sosa)	1.5	g
Salt	1	g
Black Truffle flavour (Sosa)	5	drops
Onium notes (Iqemusu)	2	drops
Blue colour concentrated gel (Ilpuntoitaliana)	1	small drop
Red colour concentrated gel (Ilpuntoitaliana)	1	small drop
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar spaghetti		
Ingredient	**Quantity**	**Unit**
Water	200	g
Agar agar (Louis Francois)	5	g
Inulin (Sosa)	10	g
Potato powder (Knorr)	10	g
Cheddar cheese oil soluble flavour (msk)	3	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar cheese sauce		
Ingredient	**Quantity**	**Unit**
Water	50	g
Cheddar cheese powder, En Pols Formatge Tipus Cheddar (Sosa)	3	g
Egg white powder (Sosa)	15	g
Maltodextrin (Sosa)	30	g
Salt	1	g

Figure 1 Micellar Casein Unflavoured

Figure 2 Whey protein

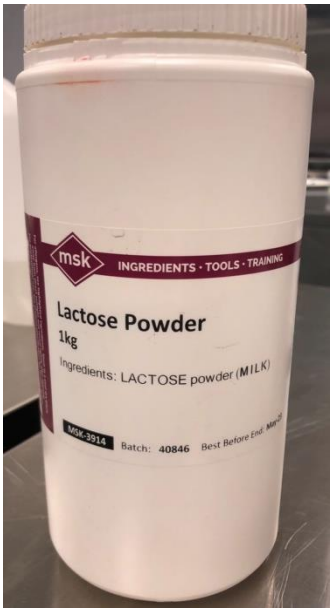

Figure 3 Lactose powder

Figure 4 Corn starch

Figure 5 Black Truffle flavour

Figure 6 Gelatin

Figure 7 Onium notes

Figure 8 Blue colour concentrated gel

Figure 9 Red colour concentrated gel

Figure 10 Yellow colour concentrated gel

Figure 11 Agar agar

Figure 12 Inulin

Figure 13 Potato powder

Figure 14 Cheddar cheese oil soluble flavour

Figure 15 Cheddar cheese powder

Figure 16 Egg white powder

Figure 17 Maltodextrin

Figure 18 Monosodium Glutamate, MSG

Equipment

1. Digital kitchen scale (Soehnle, 1 g graduation)
2. Digital pocket scale (Triton T3, 0.01 g graduation)
3. Stainless steel bowls
4. Stainless steel pot
5. Mold
6. Syringe
7. Silicone tube
8. Ice cold water bath
9. Whisk
10. Blast chiller (Sagi, DFS51M)

Method

Preparing Cheddar spaghetti

1. Weight all of the ingredients.
2. Add agar agar, inulin, and potato powder to the water that is in the stainless-steel pot. Mix it well.
3. Add the yellow colour concentrated gel to the mixture in Number 2. Mix it well until the colour is homogeneous in the mixture.
4. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
5. Let it cool for around 2-3 minutes then mix with the remaining ingredient, a cheddar cheese flavour.
6. Fill syringe with the cheddar cheese mixture, attach to silicone tube and fill the tube with mixture.
7. Let it set a gel in an ice-cold water bath for 1-2 min.
8. Fill a syringe with air and eject spaghetti from a tube.

Preparing Truffle cream sauce souffle

1. Weight all of the ingredients.
2. Add micellar casein unflavoured, whey protein, lactose powder, corn starch, salt, MSG, and gelatin to the water that is in the stainless-steel pot. Mix it well.
3. Make brown colour by mixing yellow, red, and blue colour concentrated gel on the separate plate until it has a brown colour.
4. Add brown colour from Number 3 to the mixture in Number 2. Mix it well until the colour turns light brown and homogeneous in the mixture.
5. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
6. Let it cool for around 2-3 minutes and mix with remaining ingredients, black Truffle flavour, and onium notes.

Preparing Cheddar cheese sauce

1. Weight all of the ingredients.
2. Add cheddar cheese powder, egg white powder, maltodextrin, and salt to the water that is in the stainless-steel bowl.
3. Mix until it is homogeneous.

Making the dice and decorating the plate

1. Pour warm Truffle cream sauce into the mold.
2. Let it set in the blast chiller for 10-20 minutes.
3. Remove it from the mold and place it on the plate.
4. Twirl the cheddar spaghetti to make it like a bird's nest using the fork.
5. Place it on top of the truffle cream sauce dice.
6. Drop the cheddar cheese sauce around the product.

RESULTS

The Note-by-Note Carbonara pasta has been made using several techniques based on the Advanced Molecular Gastronomy discipline. It was made up of the ingredients which are compounds, either pure compounds or mixtures such as gelling agent, flavouring agent, flavour enhancer, and colouring agent. This dish consists of 3 elements which are cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce. Each element will be described in the following section.

For the first element, cheddar spaghetti, agar agar was used as a gelling agent in order to change the liquid mixture to a solid form. To comply with the theme 'Savoury dice and fibres', inulin was used as a source of fibre in spaghetti. However, using only inulin cannot create the opaque spaghetti, it makes the product looks transparent, potato powder was used to enhance the opacity of the spaghetti and make it had the closest texture to real spaghetti. Yellow colouring was added to create the colour of spaghetti, while the cheddar cheese oil-soluble flavour was added to create the cheddar cheese flavour. The appearance of the mixture of cheddar spaghetti is shown in Figure 19. The molecular gastronomy technique was used to form spaghetti shapes by using a syringe and silicone tube which can be called as molecular spaghetti technique. The result of performing this technique is shown in Figure 20. The appearance of the cheddar spaghetti is similar to the real spaghetti, and agar agar can form a perfect shape of spaghetti but the gel has a brittle texture and was easy to cut.

Figure 19 Mixture of cheddar spaghetti

Figure 20 Cheddar spaghetti

Regarding the second element, truffle cream sauce souffle, it is made as a dice shape to make this dish commit to the theme of the contest. To make the cream sauce, whey protein, casein, and lactose powder were used as the representative of the milk and cream used in the traditional dish. To create to flavour of the truffle, black truffle flavour was used as a flavouring agent while monosodium glutamate (MSG) was used as a flavour enhancer to create an umami taste. It is a little bit hard to make brown colour to the product as it does not have the prepared brown colouring agent in the kitchen. Thus, it needed to mix by hand using red, blue, and yellow colouring. The colour of the mixture is presented in Figure 21. To form a dice shape, gelatin was used in the recipe. The mixture was then filled into the mold presented in Figure 22. After the truffle cream sauce forms a gel, it turns soft and elastic, with nearly to the texture of souffle. The taste of this element is obviously perceived as the truffle flavour and the tase of the product is umami as in the traditional dish.

Figure 21 Mixture of truffle cream sauce souffle

Figure 22 Truffle cream sauce souffle in the mold

The last element of this dish is cheddar cheese sauce. Cheddar cheese powder was used to create the cheddar cheese flavour for the plate. This powder has a stronger cheese flavour than the cheddar cheese oil-soluble flavour used in the spaghetti. As a result, it helps to enhance the cheese flavour of the dish. In this element, the colour depicts in Figure 23 comes from the ingredient used in the recipe without using any colouring agents. It shows the white colour, contrast to other elements on the dish. Maltodextrin used in this recipe will make the sauce thicker and more stable. As cheddar cheese powder has already given the salty taste, salt will be slightly used in the recipe.

Figure 23 Mixture of cheddar cheese sauce

After combining all 3 elements mentioned above together, with plating process was performed, the presentation of the final product is shown in Figure 24. The truffle cream sauce souffle will be cut as a dice shape which becomes the base for the cheddar spaghetti. Cheddar spaghetti is twirled as a bird's nest and put on top of the truffle cream sauce souffle. The cheddar cheese sauce was dropped around the dice. The colour of the plate used in the presentation of this food product is black in order to contrast with the product colour which will make the food more outstanding.

Figure 24 Final product of Note-by-Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce

The sensory analysis was made by the colleagues in the kitchen, 5 of them are asked to evaluate the product. The questions in the sensory evaluation were asked about the overall appearance, colour, taste, and texture using a 9-point hedonic scale. The comments on each attribute were asked as well. The spider plot presenting the sensory profile of the product is shown in Figure 25.

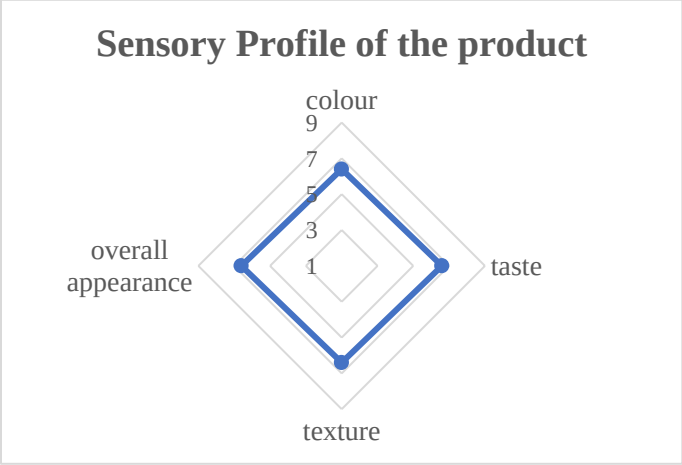

Figure 25 Spider plot showing the sensory profile of Products

From the sensory evaluation's result using a 9-point hedonic scale, it can be seen that all of the attributes, including overall appearance, colour, taste, and texture, received a similar score, with approximately 6 to 7. It means that they were slightly like or moderately like this product. Focusing on the comment they had given, for the overall appearance, the product looks moderately appetizing. It is a good idea to present the product using the black plate as it has colour that contrast to the food which has lighter colour. It had a good combination in the taste of all components. However, the truffle flavour is too strong for people who do not like to eat a mushroom. The salty taste of cheddar cheese sauce creates a good salty taste to the dish when ate together with other elements. Moreover, the dish has an umami flavour which makes this dish taste better. The taste of the product was similar to the traditional one. For the texture of the product, the colleagues said that it has a texture that can be chewed from the cheddar spaghetti, however, the texture of

spaghetti should be a little bit harder. But for truffle cream sauce, it is melted in the mouth as preferred.

From the sensory analysis result, this product can be improved for a future plan regarding the texture of the product. Using added sugar might help to create the firmer or harder spaghetti as sugar has the properties to enhance the texture of the agar gel. Also, locust bean gum can be used to reduce the brittleness of the product (Lersch, 2014). An additional element might be added to the dish to create more texture for the product for example crispy texture from the crispy bacon or chewy texture from the mushroom.

DISCUSSIONS

Most of the components in this note-by-note dish are performed using a gelling agent as an ingredient. Gelling agents are substances that can give a foodstuff texture through the formation of a gel (Food Safety Authority of Ireland, 2015). To comply with the theme of the contest, several gelling agents are used to create the elements in this dish including the dice shape. However, the different gelling agent gives a different texture. Each main ingredient and the reason for its usage will be deeply analysed in the following section.

Cheddar spaghetti

Regarding the ingredients used in the cheddar spaghetti recipe, agar agar is used as a gelling agent to form the spaghetti shape. Agar agar is sourced from red algae or seaweed *Rhodophyceae.* It is insoluble in cold water but dissolves in boiling water. It can form a thermoreversible gel, which can reheat once it is set, but with a higher melting point when compared to gelatin. The melting point of agar agar will be increased when salt is added to the food system. As a firm texture and high melting point are preferred in this molecular spaghetti, agar agar is the option that is chosen. As well as salt, which will be added in the recipe to increase the melting temperature of the mixture and at the same time gives a salty taste. The reason why spaghetti needs to be firm and have a high melting point is that it should give a texture that can be chewed in the mouth to make it have a similar texture as the real spaghetti. Moreover, using 1.5% solution of agar can form a gel on cooling to room temperature which will not melt below 85 ºC. This novel property of agar finds many uses in food applications. The percentage of agar used in this recipe was more than 1.5%, thus, spaghetti will not melt at room temperature or even in the mouth. It is also easy to set the gel during the spaghetti making process using the molecular gastronomy technique because agar agar can rapidly set the gel at the temperature of 35-45 °C (Lersch, 2014). So, only immersing the tube containing agar mixture in the cold water is enough to set the gel. However, there is an issue when using agar agar. As it forms a brittle gel, this makes the spaghetti is easy to cut which is hard to twirl when doing the plating process.

Inulin in this recipe is used as a source of fibre to comply with the theme. It is a natural functional dietary fibre that can be found in selected plants for example chicory, garlic, onion, leeks, and asparagus. Chemically, inulin has the linear β (2→1) fructosyl-fructose linkage with a degree of polymerization (DP) > 9 (Illippangama et al., 2022). When inulin is thoroughly mixed with water, it forms a transparent appearance in the mixture, also agar gives a clear or semi-opaque. This makes the spaghetti not look like real spaghetti. Potato powder is therefore added to create the turbidity for the mixture and make the spaghetti looks more similar to the traditional one. Besides, due to the Regulation (EC) No 1924/2006, this product can claim as a source of fibre, because the product contains at least 3g of fibre per 100g of the product.

Cheddar cheese oil-soluble flavour, from the msk company, is used to give the flavour of the cheese in this component. This flavour drop is the natural oil-soluble intense flavour that is perfect for boosting an existing flavour or for adding an extra dimension to the dish. Because it

provides an intense flavour to the product, it is recommended by the supplier to use 1-2 ml per 1 l of base liquid. Therefore, it was used only 3 drops in the recipe.

For the colouring agent, to make a cheddar spaghetti, the yellow colour was used to represent the traditional spaghetti as well as represent the cheese. This colouring agent is a concentrated gel, so using only a very small drop is already given the yellow colour.

Truffle cream sauce souffle

As mentioned, the intention to create this plate is to have the different texture in one bite similar to the traditional dish. The spaghetti should have a firm texture to let the consumer has something to chew, while the sauce should be soft like eating a souffle, which can be easily melted or dissolved in the mouth. Gelatin, therefore, is the best option to create these properties for the truffle cream sauce as it has several properties that this element is looking for. It gives a soft and elastic gel that can be melted in the mouth. It has a lower melting point when compared to agar, with 25-40 °C. Thus, this is the strength of gelatin in this plate. Because of this different melting point, it completely gives a different texture when eating sauce and spaghetti together, which accomplishes the aim of this project. However, the weakness of the gelatin is that it is slow to set a gel. So, it needs to take a longer time to set or needs to be put in the blast chiller to make it quicker and completely set (Lersch, 2014).

Corn starch is used to make the product thicker and opaque. It is a polysaccharide extracted from maize or corn. It is a thermoirreversible thickener that will be thicker when heated to more than 70 °C. Corn starch will give a high viscosity to the mixture when it is fully hydrated. The reason for using this ingredient is to maintain the viscosity of the product once the sauce is melted. The sauce will not turn completely liquid but be able to form like a clot on the plate. Thus, it can be said that corn starch is used as a thickening agent in this plate (Lersch, 2014).

Because note by note cuisine needs to use the pure compound, thus the cream component in this dish will be personally made in the kitchen. To mimic the traditional cream which derives from milk, the milk composition should be studied to understand which ingredient should be used. Milk is a liquid food, which consists of 87% water with an average of 13% total solids and about 9% solids-non-fat. The solid-non-fat contains 3 components. First is protein, which is whey protein and casein in the ratio of 1:4. The second is carbohydrates which primarily is lactose sugar. And the last one is minerals (Davoodi et al., 2016). Therefore, the list of ingredients used to make the cream sauce will be whey protein, casein, and lactose powder. These ingredients are mixed together along with adjusting the amount of each ingredient compared to real milk.

Black truffle flavour and onium notes were used as a flavouring agent. The black truffle flavour from the Sosa company is represented the mushroom flavour. While onium note from the Iqemusu company, which has the major component of the essential oil of *allium savitum*, known as garlic as well as a component of onion, was used to give the onion flavour (Iqemusu, n.d.). Both of the flavours represent the flavour that should be in the traditional truffle cream sauce spaghetti dish, which contains both mushroom and onion.

The ingredients that give a taste to the sauce are monosodium glutamate or MSG. Most commercial foods have used this additive as its functional property is a flavour enhancer. It gives a special aroma known as umami taste (Niaz et al., 2018). Because this sauce is the truffle cream sauce, it should have the flavour and taste that represent mushrooms. According to the research, all mushrooms are a rich source of umami taste, thus MSG was used to mimic the umami taste in mushrooms.

For the colouring agent, brown colour was used to give the colour to truffle cream sauce. In order to make the brown colour, the red, blue, and yellow colour are mixed to create a brown colour. Because these colouring agents are a concentrated gel, they will be used in a small drop.

Cheddar cheese sauce

As the cheddar spaghetti uses a low quantity of cheddar cheese oil-soluble flavour due to the recommendation from the supplier, cheddar cheese sauce is used in the dish to enhance the cheddar cheese flavour of the product. Not only the flavour but also the cheesy taste is created. This sauce is made from cheddar cheese powder without using any gelling agent because it is intended to give the liquid component to the dish.

Maltodextrin, a modified starch, is defined as a product of starch hydrolysis containing a unit of α-D-glucose. It is a white powder that is relatively tasteless and commonly used in a wide range of foods. Maltodextrins are used broadly in the food industry as a moisture conditioner, food plasticizer, crystallization inhibitor, stabilizer, carrier, and bulking agent (Mollan and Çelik, 1996). Because no gelling agent was used to make the cheddar cheese sauce, maltodextrin was used instead which it plays a role to give the bulk and stabilize this component. When maltodextrin is mixed with water, it will form a loose gel that can melt or dissolve (Triyono et al., 2017; Silva, 2018). Thus, the sauce will become thicker but not form a firm gel.

The last main ingredient in the cheddar cheese sauce is egg white powder. The egg white powder contains albumin protein which is a classic foaming material in foods. Its functionality properties are gelling, foaming, coagulating, keeping water, and antioxidant properties (Li et al., 2021). Thus, it is useful to create a foamy texture for the product. It will make the sauce feel soft and light when eating.

Regulations for the food additives

As mentioned, note by note dish is using the compound either pure or mixture, which some are considered as the food additives. Thus, the food additive ingredients used in the recipe should comply with Regulation (EC) No 1333/2008 regarding the amount of usage.

For agar agar (E 406), as the gelling agent, the specific maximum level of the usage is quantum satis. The quantum satis, according to the Regulation (EC) No 1333/2008, means ‘there is no maximum numerical level is specified and substances shall be used in accordance with good manufacturing practice, at a level not higher than is necessary to achieve the intended purpose, and provided the consumer is not misled’.

For monosodium glutamate (E 621), which is a flavour enhancer, the limitation of use in the food is 10 g/kg, individually or in combination, expressed as glutamic acid. However, in this recipe, it was used only 1 g in approximately 200 g of food, so it is still under the specific criteria of the regulation.

Gelatin, on the other hand, is not considered to be a food additive because it is a protein obtained from collagen in animals. So, it is a natural ingredient that has no limitations for use. Whey protein, casein, lactose powder, maltodextrin, inulin, and egg white powder, which come from the natural ingredients, are not considered to be food additives as well. They are also not mentioned the limitation of use in the regulation.

The specific flavouring agents, for example, black truffle flavour, onium notes and cheddar cheese flavour, cannot be found in the EU Regulation, as it needs the technical specifications of those flavours from the company to ensure the component. However, all of these flavouring agents were used in a small quantity in accordance with the recommendation from the suppliers and they are also natural flavours.

For the colouring agent, the ingredients in the blue colour concentrated gel are water, corn glucose syrup, sugar, agar (E406), vegetable glycerin (E422), potassium sorbate (E202), citric acid (E330), color (E133 brilliant blue FCF). According to Regulation (EC) No 1333/2008 and the specification from the company, the maximum level of usage should not exceed 15 g per kg of the product. For the red colouring, it consists of water, corn glucose syrup, sugar, agar (E406), vegetable glycerin (E422), potassium sorbate (E202), citric acid (E330), dye (E129 allura red AC) - E129. The maximum dosage that can be used is 3 g per kg of product. Lastly, the yellow colouring consists of water, corn glucose syrup, sugar, agar (E406), vegetable glycerin (E422), potassium sorbate (E202), citric acid (E330), dye (E102 tartrazine) - E102. The maximum dosage that can be used is 5 g per kg of product (il Punto Italiana Shop, n.d.). However, as mentioned in the list of the ingredients, all of the colouring agents were used in a very small drop, so they will not be exceeded the maximum amount requirements of the use.

CONCLUSION

Several disciplines in food science and technologies have been applied to food products for many years, which mainly focus on the industrial scale. Molecular gastronomy, on the other hand, is focused on the chemical transformation that occurs during culinary processes in domestic and restaurant cooking. As a result, several innovative products were introduced. Also, several restaurants have applied molecular cooking knowledge in their kitchens. While molecular cooking was developing all over the world, a next culinary trend was proposed under the name of 'note-by-note cuisine'. This cuisine focuses on the ingredients used in the dishes. Instead of using the raw material from plants and animals, its dishes are made up of compounds, either pure compounds or mixtures. To comply with the theme 'Savoury dice and fibres' of the note-by-note contest in this year. Therefore, Carbonara pasta which consists of 3 elements; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce, was introduced. The main ingredient that was used to create the dice shape in truffle cream sauce souffle is gelatin. Black truffle flavour and onium notes were used to create the flavour of the plate. At the same time, the cheddar spaghetti was made with the cheddar cheese oil-soluble flavour, by using agar agar to form a gel. The fibre was added in the spaghetti using inulin as an ingredient. The cheddar cheese sauce was made with the cheddar cheese powder to boost the cheese flavour of the plate. As a result, the product gave the preferred texture and flavour, with the firm cheddar spaghetti but soft texture for the truffle cream sauce which can be melted in the mouth. The taste of the product was similar to the traditional dish as wanted. Once the dish is completely cooked, the sensory analysis is performed by colleagues. All of the ingredients used in the recipe are complied with Regulation (EC) No 1333/2008.

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LOGBOOK

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Natchaya Hanprerakriengkrai

FOOD PRODUCT: Note by Note Cheddar spaghetti dice with Pesto sauce

WEEK NO.: 1 **DATE:** 28/03/22

Weekly Aims and Objectives

Aim

Creating Note be Note Cheddar spaghetti dice with Pesto sauce containing fibres. The taste, texture, colour and overall appearance of the product will be optimized during the experimentation. The product recipe will be experimented by adjusting the ingredient through practical experimentation in the kitchen at TU Dublin Grangegorman.

Objectives

1. To experiment and perform pesto sauce by using the reverse spherification technique
2. To optimize the flavour and texture of the sauce

Materials and Method (Ingredients, Equipment, and Method)

Ingredients

Cheddar spaghetti dice		
Ingredient	**Quantity**	**Unit**
Water	200	g
Agar agar (Louis Francois)	5	g
Cheddar cheese oil-soluble flavour (msk)	2	drops
Berthome notes (Iqemusu)	1	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	Small drop

Sodium Alginate solution		
Ingredient	**Quantity**	**Unit**
Water	500	g
Sodium Alginate (Sosa)	2.5	g
Sugar	1	g

Pesto sauce sphere		
Ingredient	**Quantity**	**Unit**
Water	200	g
Dietary fibre cellulose (Nutri Cology)	10	g
Olive oil (Basso)	20	g
Basil aroma natural liposoluble (Sosa)	5	drops
Garlic flavor (Sosa)	5	drops
Salt	1	g
Calcium gluconate (msk)	2	g
Xanthan gum (Enplace)	1	g
Green watercolour (Wonder)	20	drops
Black Fat-soluble powder colour (msk)	0.25	g

Equipment

1. Digital kitchen scale (Soehnle, 1 g graduation)
2. Digital pocket scale (Triton T3, 0.01 g graduation)
3. Stainless steel bowls
4. Stainless steel slotted spoon
5. Measuring spoon
6. Whisk
7. Thermomix

Method

Preparing Sodium Alginate solution

1. Weight all of the ingredients.
2. Add sodium alginate and sugar to water in the stainless-steel bowl.
3. Mix until it is homogeneously dissolved.

Preparing Pesto sauce sphere

1. Weight all of the ingredients.
2. Add dietary fibre, salt, and sodium gluconate to water that is in the stainless-steel bowl. Mix it well.
3. Add basil aroma and garlic flavour to the mixture in Number 2. Mix it well.
4. Add green colour and black colour to the mixture in Number 3. Mix it well.
5. Add xanthan gum into the mixture in Number 4 and mix it in the Thermomix for 1 minute.
6. Pour the mixture from the Thermomix into the stainless-steel bowl.
7. Add olive oil to the mixture. Then, mix it with the whisk.

Spherification Technique

1. Scoop the pesto sauce using a measuring spoon.
2. Gently immerse the sauce in the measuring spoon in the alginate solution.
3. Cover gently with the slotted spoon to ensure that the sphere is completely immersed.
4. After 2 minutes remove and rinse in a water bath.
5. Remove from water bath and serve.

Results and discussion

After today's experiment, only pesto sauce was performed as there is not enough time to do the cheddar spaghetti dice. Pesto sauce gave a very strong garlic flavour and there was no taste at all. The sauce gives a sandiness mouthfeel due to the dietary fibre, which is not soluble in water. The colour of the sauce is presented in Figure 26. For the spherification technique, it was hard to make the sauce as a sphere shape. The sphere always breaks before being removed from the alginate solution, which might be because the sauce was too liquid.

Figure 26 Pesto sauce

Conclusions

Using dietary fibre in the sauce was not a good idea because it will cause a sandiness mouthfeel in the product. The Spherification technique might not be a good idea in this product as it cannot make the sauce form perfectly before removing from the alginate solution. Also, the taste of the product is too bland and the garlic flavour is too strong.

Recommendations for the following week.

1. Change the product to Note by Note Carbonara pasta consists of cheddar spaghetti and truffle cream sauce souffle.
2. Use dietary fibre in the spaghetti instead of sauce.

Ingredients required for the following 2 weeks.

1. Chole notes
2. Black truffle flavour
3. Micellar Casein Unflavoured

4. Whey Protein
5. Lactose powder
6. Onium notes
7. Gelatin
8. Corn starch
9. Red colouring

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Natchaya Hanprerakriengkrai

FOOD PRODUCT: Note by Note Carbonara pasta; cheddar spaghetti and truffle cream sauce souffle.

WEEK NO.: 2 **DATE:** 01/04/22

Weekly Aims and Objectives

Aim

Creating Note by Note Carbonara pasta which consist of cheddar spaghetti containing fibres, and truffle cream sauce souffle dice. The taste, texture, colour and overall appearance of the product will be optimized during the experimentation. The product recipe will be experimented by adjusting the ingredient through practical experimentation in the kitchen at TU Dublin Grangegorman.

Objectives

1. To experiment and perform cheddar spaghetti by using the molecular gastronomy technique.
2. To experiment and perform truffle cream sauce souffle by using gelatin to obtain the perfect dice.
3. To optimize the flavour and texture of the product by using the dietary fibre in the spaghetti instead of using it in the sauce.

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Truffle cream sauce souffle		
Ingredient	**Quantity**	**Unit**
Water	160	g
Micellar Casein Unflavoured (Bulk)	24	g
Whey protein	6	g
Lactose powder (msk)	10	g
Corn starch (gem)	2	g
Gelatin (Sosa)	1	g
Salt	1	g
Black Truffle flavor (Sosa)	8	drops
Chole notes (Iqemusu)	1	drops
Onium notes (Iqemusu)	2	drops
Green watercolour (Wonder)	20	drops
Red watercolour (Wonder)	2	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar spaghetti		
Ingredient	**Quantity**	**Unit**
Water	200	g
Agar agar (Louis Francois)	5	g
Dietary fibre cellulose (Nutri Cology)	10	g
Cheddar cheese oil soluble flavour (msk)	2	drops
Berthome notes (Iqemusu)	1	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Equipment

1. Digital kitchen scale (Soehnle, 1 g graduation)
2. Digital pocket scale (Triton T3, 0.01 g graduation)
3. Stainless steel bowls
4. Stainless steel pot
5. Mold
6. Syringe
7. Silicone tube
8. Ice cold water bath
9. Whisk
10. Blast chiller (Sagi, DFS51M)

Method

Preparing Cheddar spaghetti

1. Weight all of the ingredients.
2. Add agar agar and dietary fibre to the water that is in the stainless-steel pot. Mix it well.
3. Add the yellow colour concentrated gel to the mixture in Number 2. Mix it well until the colour is homogeneous in the mixture.
4. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
5. Let it cool for around 2-3 minutes and mix with the remaining ingredients, cheddar cheese flavour, and berthome notes.
6. Fill syringe with the cheddar cheese mixture, attach to silicone tube and fill the tube with mixture.
7. Let it set a gel in an ice-cold water bath for 1-2 min.
8. Fill the syringe with air and eject spaghetti from the tube.

Preparing Truffle cream sauce souffle

1. Weight all of the ingredients.
2. Add micellar casein unflavoured, whey protein, lactose powder, corn starch, salt, and gelatin to the water that is in the stainless-steel pot. Mix it well.

3. Add the green watercolour, red watercolour and yellow colour concentrated gel to the mixture in Number 2. Mix it well until the colour turns light brown and homogeneous in the mixture.
4. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
5. Let it cool for around 2-3 minutes and mix with remaining ingredients, black truffle flavour, chole notes, and onium notes.

Making the dice and decorating the plate

1. Fill cheddar spaghetti at the bottom of the mold.
2. Pour warm truffle cream sauce on the top of the spaghetti.
3. Let it set in the blast chiller for 10-20 minutes.
4. Remove it from the mold and place it on the plate.

Results and discussion

After today's experiment, cheddar spaghetti gave a good appearance as shown in Figure 27. However, the taste of cheddar cheese flavour is too low, also the texture of spaghetti gave a sandiness mouthfeel due to the dietary fibre that is not soluble in water. For the truffle cream sauce (Figure 28), it was hard to obtain brown colour with trial and error by dropping colour little by little until the sauce was getting brown. Although the sauce is already had brown shade colour, it didn't look appetizing. Moreover, it was hard to obtain the same colour when repeating the recipe. The taste of the sauce was too bland, not has enough umami taste, and not taste like truffle cream sauce that much.

Figure 27 Cheddar spaghetti using dietary fibre

Figure 28 Truffle cream sauce (week 2)

All of the components, spaghetti and sauce, were combined in the mold to create a dice shape. The picture of the final product is depicted in Figure 29. The spaghetti was not melting while putting the sauce on top because of the difference in the melting point of agar agar and gelatin. However, when tasted everything together in 1 bite, the mushroom flavour, from black truffle flavour and chole notes, was too strong which covered all of the cheddar flavour from spaghetti.

Figure 29 Final product of Note by Note Carbonara pasta; cheddar spaghetti and truffle cream sauce souffle. (Week 2)

Conclusions

This product, Cheddar spaghetti with Truffle cream sauce, was feasible to cook and use as a base recipe for the next following experiment. However, some changes need to be adjusted, such as the texture and flavour. Besides, only the dice placing alone on the plate was not looked appetizing. Perhaps, making another component, such as cheddar cheese sauce served around the dice, might be a good idea to make the plate have more dimensions when tasting and cheese flavour can be increased.

Recommendations for following week.

1. Use inulin instead of dietary fibre as a source of fibre to reduce sandiness mouthfeel.
2. Mix all colour on a separate plate to obtain brown colour before mixing in the sauce mixture.
3. Reduce the amount of mushroom flavour in the sauce and increase cheese flavour in spaghetti.
4. Making cheddar cheese sauce to make the product has more dimensions
5. Using Monosodium Glutamate (MSG) to make sauce has a more umami taste

Ingredients required for the following 2 weeks.

1. Cheddar powder (En Pols Formatge Tipus Cheddar)
2. Egg white powder
3. Maltodextrin
4. Monosodium Glutamate (MSG)

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Natchaya Hanprerakriengkrai

FOOD PRODUCT: Note by Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce.

WEEK NO.: 3 **DATE:** 04/04/22

Weekly Aims and Objectives

Aim

Creating Note by Note Carbonara pasta which consist of cheddar spaghetti containing fibres, truffle cream sauce souffle dice, and cheddar cheese sauce. The taste, texture, colour and overall appearance of the product will be optimized during the experimentation. The product recipe will be experimented by adjusting the ingredient through practical experimentation in the kitchen at TU Dublin Grangegorman.

Objectives

1. To optimize the texture of Cheddar spaghetti by using inulin instead of dietary fibre
2. To optimize the flavour of the product by using MSG, reducing the amount of mushroom flavour in the sauce, and increasing cheese flavour in spaghetti
3. To create a cheddar cheese sauce

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Truffle cream sauce souffle		
Ingredient	**Quantity**	**Unit**
Water	160	g
Micellar Casein Unflavoured (Bulk)	24	g
Whey protein	6	g
Lactose powder (msk)	10	g
Corn starch (gem)	2	g
Monosodium Glutamate, MSG (Ajinomoto)	1	g
Gelatin (Sosa)	1	g
Salt	1	g
Black Truffle flavour (Sosa)	5	drops
Onium notes (Iqemusu)	2	drops
Blue colour concentrated gel (Ilpuntoitaliana)	1	small drop
Red colour concentrated gel (Ilpuntoitaliana)	1	small drop
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar spaghetti		
Ingredient	**Quantity**	**Unit**
Water	200	g
Agar agar (Louis Francois)	5	g
Inulin (Sosa)	10	g
Potato powder (Knorr)	10	g
Cheddar cheese oil soluble flavour (msk)	3	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar cheese sauce		
Ingredient	**Quantity**	**Unit**
Water	50	g
Cheddar cheese powder, En Pols Formatge Tipus Cheddar (Sosa)	3	g
Egg white powder (Sosa)	15	g
Maltodextrin (Sosa)	30	g
Salt	1	g

Equipment

1. Digital kitchen scale (Soehnle, 1 g graduation)
2. Digital pocket scale (Triton T3, 0.01 g graduation)
3. Stainless steel bowls
4. Stainless steel pot
5. Mold
6. Syringe
7. Silicone tube
8. Ice cold water bath
9. Whisk
10. Blast chiller (Sagi, DFS51M)

Method

<u>Preparing Cheddar spaghetti</u>

1. Weight all of the ingredients.
2. Add agar agar, inulin, and potato powder to the water that is in the stainless-steel pot. Mix it well.
3. Add the yellow colour concentrated gel to the mixture in Number 2. Mix it well until the colour is homogeneous in the mixture.
4. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
5. Let it cool for around 2-3 minutes and mix with remaining ingredients, a cheddar cheese flavour.

6. Fill syringe with the cheddar cheese mixture, attach to silicone tube and fill the tube with mixture.
7. Let it set a gel in an ice-cold water bath for 1-2 min.
8. Fill the syringe with air and eject spaghetti from the tube.

Preparing Truffle cream sauce souffle

1. Weight all of the ingredients.
2. Add micellar casein unflavoured, whey protein, lactose powder, corn starch, salt, MSG, and gelatin to the water that is in the stainless-steel pot. Mix it well.
3. Make brown colour by mixing yellow, red, and blue colour concentrated gel on the separate plate until it has a brown colour.
4. Add brown colour from Number 3 to the mixture in Number 2. Mix it well until the colour turns light brown and homogeneous in the mixture.
5. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
6. Let it cool for around 2-3 minutes and mix with remaining ingredients, black truffle flavour, and onium notes.

Preparing Cheddar cheese sauce

1. Weight all of the ingredients.
2. Add cheddar cheese powder, egg white powder, maltodextrin, and salt to the water that is in the stainless-steel bowl.
3. Mix until it is homogeneous.

Making the dice and decorating the plate

1. Fill cheddar spaghetti at the bottom of the mold.
2. Pour warm truffle cream sauce on the top of the spaghetti.
3. Let it set in the blast chiller for 10-20 minutes.
4. Remove it from the mold and place it on the plate.
5. Decorate the plate and surround the product with cheddar cheese sauce.

Results and discussion

After today's experiment, for the cheddar spaghetti, berthome notes was removed from the previous week's recipe, while cheddar cheese flavour was used in place of missing berthome notes to create a stronger cheddar cheese flavour. For the texture of spaghetti, using inulin can reduce the sandiness mouthfeel, however, it gave a transparent spaghetti, which means that it was not similar to the traditional spaghetti that is more turbid. Potato powder, therefore, was used to create the opacity for the spaghetti to make it looks similar to the real spaghetti. The picture of the spaghetti is shown in Figure 30.

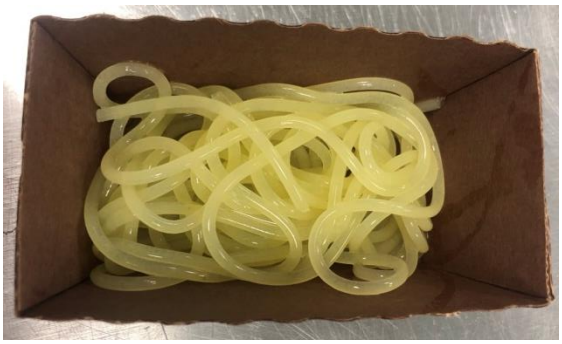

Figure 30 Cheddar spaghetti using inulin and potato powder

For truffle cream sauce (Figure 31), the colour of the sauce looks better than the previous week but the texture of the sauce was too soft. It was hard to remove the product from the mold and remain in the good form of the dice shape. So, gelatin might be increased to create a good dice. The black truffle flavour was reduced and chole notes was removed to optimize the mushroom flavour. Besides, after using MSG, truffle cream sauce tastes better as it had more umami flavour.

Figure 31 Truffle cream sauce (week 3)

Although the cheddar cheese sauce (Figure 32) had a strong cheese flavour when tasting alone, it showed a good combination in each component when eating together. This means that the product was good in overall taste. The picture of the final product is shown in Figure 33.

Figure 32 Cheddar cheese sauce

Figure 33 Final product of Note-by-Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce. (Week 3)

Conclusions

The product was already had a good result in overall flavour and texture, however, the texture of the sauce should be adjusted a little bit more to make it can form a good dice. Besides, the plating step should be rearranged to make the plate look more appetizing.

Recommendations for following week.

1. Increase the quantity of gelatin to make the sauce firmer.
2. Rearrange the plating of the product to make it more appetizing.

Ingredients required for the following 2 weeks.

N/A

MODULE CODE: TFCS9025

MODULE TITLE: Advance Molecular Gastronomy

STUDENT NAME: Natchaya Hanprerakriengkrai

FOOD PRODUCT: Note by Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce.

WEEK NO.: 4 **DATE:** 25/04/22

Weekly Aims and Objectives

Aim

Creating Note by Note Carbonara pasta which consist of cheddar spaghetti containing fibres, truffle cream sauce souffle dice, and cheddar cheese sauce. The taste, texture, colour and overall appearance of the product will be optimized during the experimentation. The product recipe will be experimented by adjusting the ingredient through practical experimentation in the kitchen at TU Dublin Grangegorman. The sensory analysis will be performed by colleagues in the kitchen.

Objectives

1. To optimize the texture of truffle cream sauce souffle by increasing the quantity of gelatin
2. To rearrange the plating process to make it more appetizing.
3. To perform sensory analysis by colleagues.

Materials and Method (Ingredients, Equipment, and Method)

Ingredients

Truffle cream sauce souffle		
Ingredient	**Quantity**	**Unit**
Water	160	g
Micellar Casein Unflavoured (Bulk)	24	g
Whey protein	6	g
Lactose powder (msk)	10	g
Corn starch (gem)	2	g
Monosodium Glutamate, MSG (Ajinomoto)	1	g
Gelatin (Sosa)	1.5	g
Salt	1	g
Black Truffle flavour (Sosa)	5	drops
Onium notes (Iqemusu)	2	drops
Blue colour concentrated gel (Ilpuntoitaliana)	1	small drop
Red colour concentrated gel (Ilpuntoitaliana)	1	small drop
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar spaghetti		
Ingredient	**Quantity**	**Unit**
Water	200	g
Agar agar (Louis Francois)	5	g
Inulin (Sosa)	10	g
Potato powder (Knorr)	10	g
Cheddar cheese oil-soluble flavour (msk)	3	drops
Yellow colour concentrated gel (Ilpuntoitaliana)	1	small drop

Cheddar cheese sauce		
Ingredient	**Quantity**	**Unit**
Water	50	g
Cheddar cheese powder, En Pols Formatge Tipus Cheddar (Sosa)	3	g
Egg white powder (Sosa)	15	g
Maltodextrin (Sosa)	30	g
Salt	1	g

Equipment

1. Digital kitchen scale (Soehnle, 1 g graduation)
2. Digital pocket scale (Triton T3, 0.01 g graduation)
3. Stainless steel bowls
4. Stainless steel pot
5. Mold
6. Syringe
7. Silicone tube
8. Ice cold water bath
9. Whisk
10. Blast chiller (Sagi, DFS51M)

Method

Preparing Cheddar spaghetti

1. Weight all of the ingredients.
2. Add agar agar, inulin, and potato powder to the water that is in the stainless-steel pot. Mix it well.
3. Add the yellow colour concentrated gel to the mixture in Number 2. Mix it well until the colour is homogeneous in the mixture.
4. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
5. Let it cool for around 2-3 minutes and mix with the remaining ingredients, a cheddar cheese flavour.
6. Fill syringe with the cheddar cheese mixture, attach to silicone tube and fill the tube with mixture.

7. Let it set a gel in an ice-cold water bath for 1-2 min.
8. Fill the syringe with air and eject spaghetti from the tube.

Preparing Truffle cream sauce souffle

1. Weight all of the ingredients.
2. Add micellar casein unflavoured, whey protein, lactose powder, corn starch, salt, MSG, and gelatin to the water that is in the stainless-steel pot. Mix it well.
3. Make brown colour by mixing yellow, red, and blue colour concentrated gel on the separate plate until it has a brown colour.
4. Add brown colour from Number 3 to the mixture in Number 2. Mix it well until the colour turns light brown and homogeneous in the mixture.
5. Boil the mixture on the stove for around 2 minutes until it becomes thicker.
6. Let it cool for around 2-3 minutes and mix with remaining ingredients, black truffle flavour, and onium notes.

Preparing Cheddar cheese sauce

1. Weight all of the ingredients.
2. Add cheddar cheese powder, egg white powder, maltodextrin, and salt to the water that is in the stainless-steel bowl.
3. Mix until it is homogeneous.

Making the dice and decorating the plate

1. Pour warm truffle cream sauce into the mold.
2. Let it set in the blast chiller for 10-20 minutes.
3. Remove it from the mold and place it on the plate.
4. Twirl the cheddar spaghetti to make it like a bird's nest using the fork.
5. Place it on top of the truffle cream sauce dice.
6. Drop the cheddar cheese sauce around the product.

Results and discussion

According to today’s experiment, the truffle cream sauce recipe was adapted, with an increase in the quantity of gelatin from 1 g to 1.5 g. The result shows that the truffle cream sauce souffle can form a better dice shape as it was firmer when compared to the week 3 experiment. For the plating process, cheddar spaghetti was changed to put on top of the truffle cream sauce souffle, by twirling it as a bird’s nest, instead of putting them together in the mold. The product was plated on a black plate to create a contrast to the food. Besides, cheddar cheese sauce was dropped around the product as shown in Figure 34.

Figure 34 Final product of Note-by-Note Carbonara pasta; cheddar spaghetti, truffle cream sauce souffle, and cheddar cheese sauce. (Week 4)

Conclusions

Truffle cream sauce souffle was firmer when increasing the quantity of gelatin. Also, when changing the way to plate the product, it looked more appetizing.

Recommendations for following week.

N/A

Ingredients required for the following 2 weeks.

N/A