Advanced Molecular Gastronomy TFCS9025

Report

Dish name: Fragility of Nature

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1. Introduction

Note-by-note cuisine is both a scientific approach and a culinary technique, first introduced in 1994 by Hervé This. In this method, dishes are created exclusively from pure chemical compounds rather than traditional ingredients such as meat, vegetables, fruits, or fish (This, 2013). Unlike molecular gastronomy, whose aim is to develop new food preparation techniques, the objective of note-by-note cuisine is to formulate foods using entirely novel ingredients (This, 2014).

According to Hervé This, the application of pure compounds can reduce food spoilage, enhance food accessibility, and offer a more environmentally sustainable alternative (Columbia University Press, 2014). The first complete note-by-note meal was served in 2010 by chefs from the Cordon Bleu school in Paris. Subsequently, the approach was incorporated into a master's 's-level module in Culinary Arts and led to the establishment of the annual Note-by-Note Cuisine Competition, held since 2014 (Burke & Danaher, 2016).

The dish developed in this project is inspired by the fragility of ecosystems in the context of climate change. It symbolizes the urgent need to care for our planet and explore sustainable alternatives to ensure future food security. The dish aims to represent the entirety of the ecosystem and its delicate balance, while also providing an artistic and sensory experience. Since it is composed solely of pure compounds, food safety is a priority. Therefore, all compounds used comply with the limits established by Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives.

2. Aim of the assignment

To design a dish concept based on the theme of the 13th International Note-by-Note Cuisine Contest (Food for the Future), using exclusively pure compounds to achieve a desirable sensory experience.

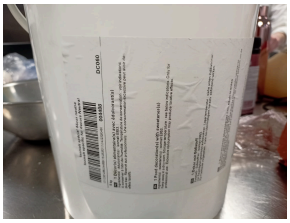
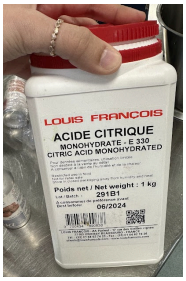
3. Materials and methods

3.1. Final materials

The final dish is presented in Figure 4 and is composed of five distinct elements inspired by nature: soil, grass, water, petals, and an animal element represented by a snail.

3.1.1. Mint Grass

Table 1. Ingredients used for grass preparation

Isomalt	Mint flavor (menta glacial - Sosa)	Green food colorant (Vert Pomme - Mallard Ferrière)	Citric acid
			

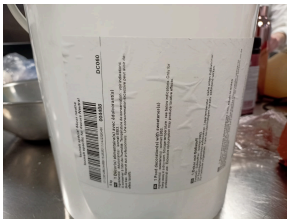
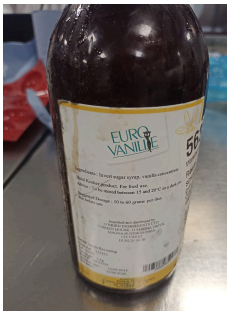
3.1.2. Chocolate soil

Table 2. Ingredients used for soil preparation

Corn flour	Toffee flavor (Sosa)	Cocoa powder
		

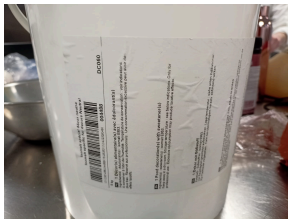
3.1.3. Glass-like vanilla river

Table 3. Ingredients used for water preparation (river)

Isomalt	Vanilla flavor	Blue food colorant Sosa
		

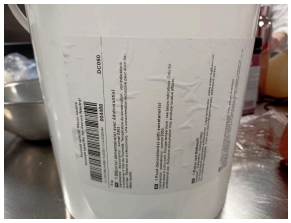
3.1.4. Strawberry snail

Table 4. Ingredients used for the snail preparation

Isomalt	Strawberry flavor (Maduxa Fresa - Sosa)	Red food colorant (Rouge Fraise - Mallard Ferrière)
		

3.1.5. Delicate raspberry petals

Table 5. Ingredients used for the petals preparation

Isomalt	Mango flavor (Mango Madur - Sosa)	Red food colorant (Rouge Fraise - Mallard Ferrière)
		

3.1.6. Equipment and materials used

Table 6. Equipment and materials used for the note-by-note dish preparation

Digital scale	Pot	Bowl	Mold	Baking paper	Tray	Stove	Glass	Therm ometer
								

3.2. Methods

3.2.1. Sharp Mint Grass

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Add 0.1g of citric acid to the mixture.
3. Incorporate 0.1g of green colorant (Pomme Verte)
4. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
5. Once the temperature reaches 170°C, quickly add 0.07g of mint flavoring and mix gently.
6. Remove the pot from the heat and allow it to cool down to 60°C.
7. Pour the mixture on a sheet of baking paper to form thin grass-like structures.
8. Let it cool at room temperature until fully solidified.
9. Once hardened, break into small pieces and arrange them in a wine glass to resemble decorative edible grass

Figure 1. Sharp grass creation

3.2.2. Soil

1. Weigh 50 g of corn flour, 30 g of water, and 3 g of cocoa powder, then add 0.1g of toffee flavoring.
2. Mix all the ingredients thoroughly until fully homogenized.
3. Heat the mixture, stirring continuously, until starch gelatinization occurs and a dough-like mass forms.
4. Spread the mass evenly onto baking paper, forming a thin layer.
5. Place it in a preheated oven at 160°C and bake for 10 minutes.
6. Remove from the oven and allow it to cool completely at room temperature.
7. Once cooled, crumble the layer into small pieces, creating a texture and appearance that resembles soil.

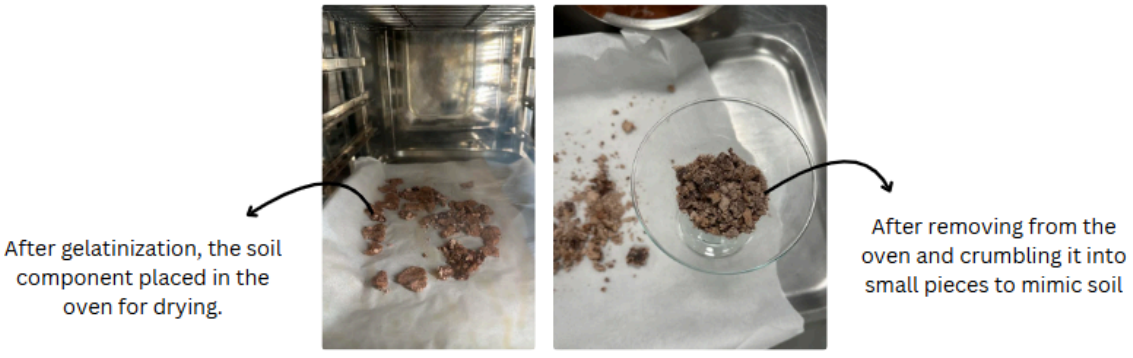


Figure 2. Soil preparation

3.2.3. Glass-like vanilla river

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
3. Once the temperature reaches 170°C, quickly add 0.07g of vanilla flavoring and mix gently.
4. Remove the pot from the heat and allow it to cool down to 60°C.
5. At 60°C, add 0.3 g of blue colorant and mix until evenly distributed.
6. Carefully pour the mixture into the base of the wine glass.

3.2.4. Vulnerable strawberry snail

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Incorporate 0.1g of reed colorant.
3. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
4. Once the temperature reaches 170°C, quickly add 0.07g of strawberry flavoring and mix gently.
5. Remove the pot from the heat and allow it to cool down to 60°C.
6. Pour the mixture on a sheet of baking paper and shape a snail format.
7. Let it cool at room temperature until fully solidified.
8. Once hardened, place it on top of the soil in the wine glass.

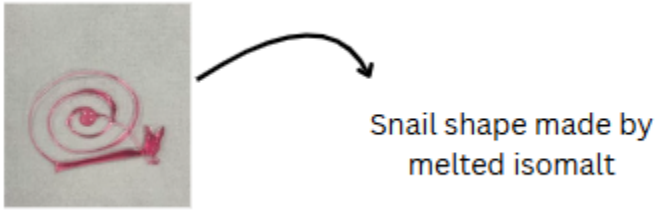


Figure 3. Snail (representing the fauna)

3.2.5. Delicate raspberry petals

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Incorporate 0.1g of reed colorant.
3. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
4. Once the temperature reaches 170°C, quickly add 0.1g of raspberry flavoring and mix gently.
5. Remove the pot from the heat and allow it to cool down to 60°C.
6. Pour the mixture on a sheet of baking paper and shape the petals format.
7. Let it cool at room temperature until fully solidified.
8. Once hardened, place it on top of the soil in the wine glass.

4. Results

4.1. Formulation

Table 7. Final soil formulation

Ingredient	Quantity (g)
Water	30.0
Corn flour	50.0
Cocoa powder	30
Toffee flavor (Sosa)	0.1

Table 8. Final grass formulation

Ingredient	Quantity (g)
Water	20.0
Isomalt	100.0
Mint flavor	0.1
Green food colorant	0.1
Citric acid	0.1

Table 9. Final river formulation

Ingredient	Quantity (g)
Water	20.0
Isomalt	100.0
Vanilla flavor	0.1
Blue food colorant	0.3

Table 10. Final snail formulation

Ingredient	Quantity (g)
Water	20.0
Isomalt	100.0
Strawberry flavor	0.1
Red food colorant	0.1

Table 11. Final petal formulation

Ingredient	Quantity (g)
Water	20.0
Isomalt	100.0
Raspberry flavor	0.1
Red food colorant	0.1

4.2. Plating

A glass of wine or martini was chosen as the serving vessel for the dish in order to elevate the visual presentation and evoke a sense of elegance and refinement, while also highlighting the artistic and conceptual nature of the creation.

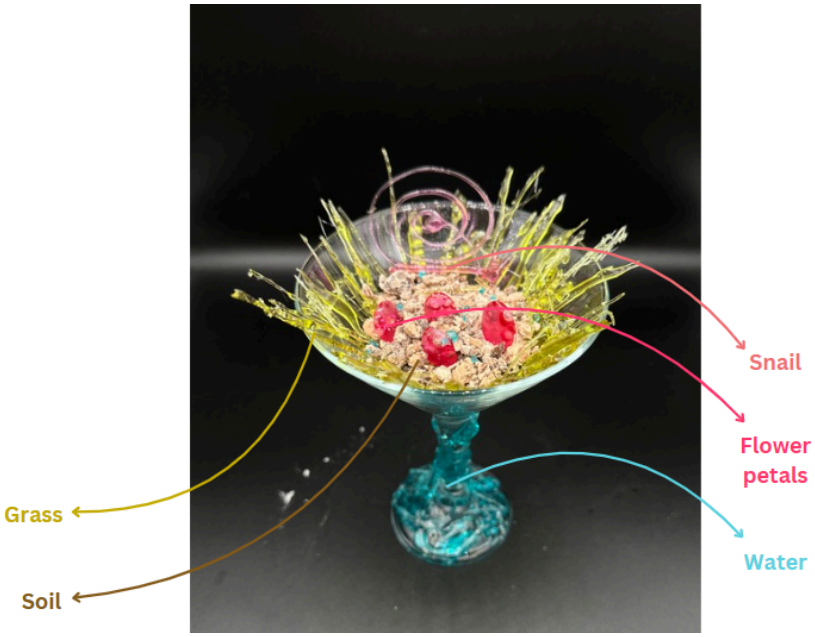


Figure 4. Final dish after plating

4.3. Sensory analysis

The sensory evaluation focused on three attributes: overall appearance, aroma, and color, and a total of twelve participants took part in the sensory analysis of the product. The results indicated that the majority of participants expressed a positive perception of the product (See Figure 5, Figure 6 and Figure 8).

- Overall appearance

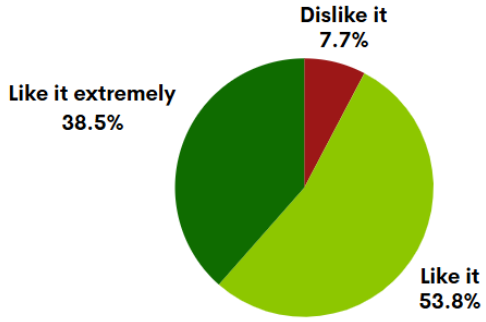


Figure 5. Overall appearance

The participants were asked to evaluate the overall appearance using a hedonic scale. The results showed that 38.5% of the participants liked it extremely, 53.8% liked it, and only 7.7% reported that they disliked it. These findings indicate a generally positive perception of the product's appearance among the panelists.

- Overall aroma

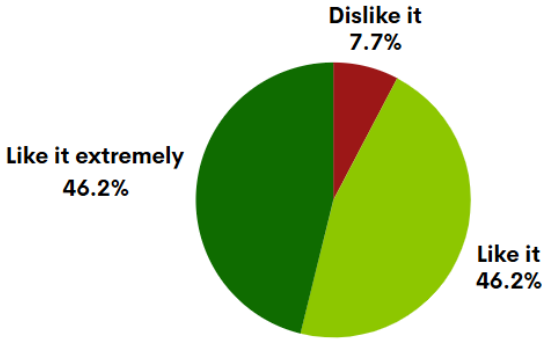


Figure 6. Overall aroma acceptability

Regarding the overall aroma, 46.2% of the participants liked it extremely, 46.2% liked it, and 7.7% disliked it, indicating a high level of acceptance. When asked to identify the predominant aroma, 53.8% of the panelists perceived chocolate, followed by 23.1% who noted caramel, 15.4% who identified strawberry, and 7.7% who mentioned mint. These responses are consistent with the ingredients and flavorings used in the

formulation, which included cocoa powder and natural flavorings designed to evoke these specific aromas.

- Predominant aroma

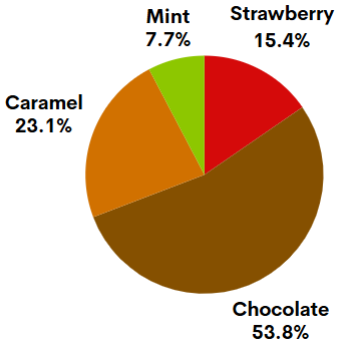


Figure 7. Predominant aroma

Participants were also asked to evaluate the color of the product. The results showed that 53.8% liked it, 23.1% liked it extremely, and 23.1% neither liked nor disliked it. This suggests that the color was generally well accepted, although there may be room for improvement to increase its visual appeal among more participants.

- Overall color

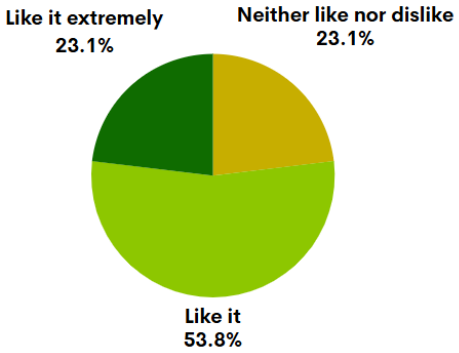


Figure 8. Overall color acceptability

5. Discussion

5.1. Maximum permitted levels in the EU

According to Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives, the maximum permitted levels of

food additives are defined per food category and additive group. In the note-by-note dish developed, which was considered to be under food category 05.4 (Confectionery – Decorations, coatings and fillings, except fruit-based fillings covered by category 4.2.4), the following colorants were used:

- Green colorant (Vert Pomme – Mallard Ferrière): composed of Tartrazine (E102) and Brilliant Blue FCF (E133), recommended dosage by the manufacturer of 0.05 g/kg.
- Red colorant (Rouge Fraise – Mallard Ferrière): composed of Azorubine/Carmoisine (E122), recommended dosage by the manufacturer of 0.49 g/kg.
- Blue colorant is a concentrated spirulina extract, which, according to the manufacturer's recommendation, is used at quantum satis levels (qs), meaning as much as necessary, with no specific numerical limit defined.

All these food colorants are classified as Group III additives, for which the maximum permitted level in category 05.4 is generally 500 mg/kg. Since polyols and spirulina extract are also allowed under quantum satis, their use is acceptable as long as they do not mislead the consumer or pose a health risk, by Article 6 of the same regulation.

All the food colorants in the present project are being used by the Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives.

For the food flavoring, the dose recommended are indicated in the label.

5.2. Ingredients specifications

Available in
50 g

Réf SOSA
38256

Raspberry Aroma

Aroma

- Perfect for adding a raspberry flavor to a wide range of recipes using only a small quantity
- Adds flavor without changing the color or texture

CHARACTERISTICS

Dosage	0,2 g/kg	0,2 g = 6 gouttes environ
Type de base	Aqueous liquids	
Travail	Cold	

Figure 9. Raspberry aroma specification and dose recommended.

MANGO AROMA

Format: 50g **Code** **Packaging** 8u

Format: 1kg **Code** **Packaging** 1u

Aroma de Mango is a water-soluble concentrate in glycerin base that captures the characteristic flavor of this fruit. Its formulation allows optimal integration in both aqueous and fatty bases with up to 95% oil content, making it ideal for adding depth and character to various culinary preparations.

Mode of use

Shake well before use. Dose 2 g per kilogram of preparation (approximately 70 drops) according to the desired intensity. Mix thoroughly in the recipe to ensure an even distribution of the aroma. Do not consume directly; use within the recommended dosage in combination with other ingredients.

Dosage

2g/kg

Figure 10. Mango aroma specification and dose recommended.

NATURAL AROMA RIPE STRAWBERRY

Format: 50g	**Code** 50760	**Packaging** 8u
Format: 1kg	**Code**	**Packaging** 1u

Aroma Natural Strawberry Ripe is a water-soluble concentrate in glycerin base that captures the characteristic sweet and sour flavor of this fruit. Its formulation allows it to be easily integrated in aqueous and fat bases with up to 95% oil content, offering a versatile solution to enhance flavors in both sweet and savory preparations.

Mode of use

Shake well before use. Dose 0.2 g per kilogram of preparation (approximately 6 drops) according to the desired intensity. Incorporate completely in the recipe to achieve a homogeneous distribution of the aroma. Do not consume directly; mix with other foods within the recommended dosage.

Dosage

0.2g/kg

Figure 11. Strawberry aroma specification and dosage

FOOD COLOR BLUE POWDER

Format: 200g	**Code** 48680	**Packaging** 6u
Format: 2,5kg	**Code**	**Packaging** 2u

Natural blue powder colorant, specifically designed for use in modern gastronomy and pastry making. This product belongs to the **food colour** range, an exclusive selection of natural colorants that provide vibrant and authentic results without altering the quality or taste of the preparations. Ideal for applications in confectionery, ice cream and gastronomy, where precision in the color shade of the final products is required.

Mode of use

The recommended dosage varies according to the desired preparation: **Cake:** 30 g/kg **Croissant:** 30 g/kg **Meringue:** 30 g/kg **Macaron:** 44 g/kg **Royal icing:** 20 g/kg **Jelly:** 30 g/kg **Coating:** 50 g/kg **Cocoa butter:** 35 g/kg **Ice cream:** 50 g/kg **Pastry cream:** 20 g/kg Pastry : 40 g/kg

Dosage

quantum satis

Ingredients

maltodextrina, jarabe de azúcar, concentrado (espirulina, manzana), corrector de acidez: ácido cítrico(e330)

Figure 12. Blue food colouring specification and dosage

5.3. Ingredients selection and structure

The dish was divided into two main structures: the “caramel-like” structure and the corn starch gel structure. Although isomalt does not undergo true caramelization, as it is not a sugar, the resulting texture and appearance are similar to those of caramel. This is due to the melting properties of isomalt, a transparent surface, similar to caramelized sugar. The second structure, formed from corn starch, was processed into a gel, which was then dried in the oven, resulting in a hard piece that was then crushed.

The choice of cocoa powder for the “soil” element was driven by its “earthy” flavor and dark color, which visually resembles soil. This helped in creating a realistic appearance and texture, offering both visual and flavor that mimic the soil. Corn flour was selected for its ability to form a dough-like consistency upon gelatinization, which is critical in achieving the desired texture of the “soil.” Starch gelatinization is one of its most important technical and functional properties (Schirmer et al., 2015). The corn starch is composed of a mixture of amylose (linear) and amylopectin (highly branched (Maners, 1989). When in combination with water and heat, the starch forms a gel in the range between 60 - 70ºC (Hoover, 2001). The addition of toffee flavoring was to introduce sweetness and caramel notes, balancing the earthy cocoa and providing a more flavorful experience.

The inclusion of mint flavoring in the Mint Grass was aimed at delivering a fresh and aromatic note that would resonate with the sensory expectation of grass-like elements in the dish. Mint has a strong, refreshing aroma and cooling sensation, which is often associated with natural freshness.

The isomalt, a sugar substitute, was chosen for its ability to create a clear, glass-like texture (Sentko and Willibald-Ettle, 2012). Isomalt is a sugar alcohol that melts around 150ºC and is commonly used in candies, especially in hard candies. For hard candies, it is normal to cook around 165ºC and achieve <2% of water content (Sentko and Willibald-Ettle, 2012). It is resistant to the loss of sweetness during heating, making it suitable for products exposed to high temperatures and it crystallizes more slowly than sucrose, which makes it particularly valuable for creating sugar sculptures and other decorative edible structures. However, unlike other polyols, it does not produce a cooling effect in the mouth (Takatsuka, 2008; Grembecka, 2015).

Green colorant (Pomme Verte) was used to replicate the natural color of grass, enhancing the visual appeal and reinforcing the natural concept. Citric acid was added to slightly balance the sweetness of isomalt, offering a note that complements the mint, providing a more “acidity”.

The isomalt was again used to create the clear, glass-like structure of the “vanilla river.” This choice was essential for achieving a visually delicate, transparent element that contrasts with the more textured components of the dish. The addition of vanilla flavoring provided a subtle, warm aroma and sweetness that complemented the other flavors without overpowering them. Blue colorant was carefully added to evoke the image of water, creating a visual connection to the concept of a river, enhancing both the aesthetic and sensory experience.

The strawberry flavoring was chosen to add a fruity and sweet element, contrasting with the earthiness of the soil and the freshness of the mint grass. The red colorant was chosen to evoke the appearance of a snail’s shell. The choice of isomalt was again crucial for achieving the necessary transparency and delicate texture to mimic the fragile nature of a snail.

Similar to the strawberry snail, the raspberry flavoring contributed a sweet profile that complemented the other fruity elements while offering a refreshing contrast to the richer cocoa earth. The red colorant was used again to create delicate pink flower petals, aligning with the theme of fragility and nature. The isomalt provided the necessary structure and glass-like texture to shape the petals, making them both visually appealing and texturally unique in the context of the dish.

6. Conclusions

The development of the dish Fragility of Nature successfully fulfilled the objectives of the Note-by-Note cuisine challenge by combining scientific techniques with artistic and conceptual expression. The dish conveyed the theme of environmental fragility through its visual elements (such as soil, grass, petals, river, and snail) each of them crafted using pure compounds like isomalt, food colorants, starch, cocoa powder and flavorings.

The sensory analysis supported the technical achievements of the formulation. Among twelve participants, the majority expressed high levels of acceptance, particularly regarding overall appearance (92.3% positive responses) and aroma (92.4% positive responses). While the color was also positively received (76.9% favorable), some responses indicated room for improvement in the visual.

Technologically, the use of isomalt enabled the creation of translucent, delicate structures that mimicked elements found in nature, while the corn starch-based soil added texture and depth. The successful gelatinization of starch at 60–70°C provided the base for a realistic soil component, enhanced with cocoa and toffee notes for sensory complexity. Mint and citric acid added a refreshing note, and the choice of flavors and colors across the components contributed to a multisensory perspective.

Although the dish prioritized appearance and aroma over taste the final result demonstrates the potential of Note-by-Note cuisine to serve as sustainable innovation. For future improvements, texture and mouthfeel should be prioritized.

7. References

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8. Log book

WEEK NO.: 1 (18/03)

Aim: Create a vase and a flower using just pure compounds

Objectives:

- Define the correct amount of each ingredient
- Define the right temperature
- Make the formats of leaves, petals and stem

Ingredients: Isomalt, vanilla flavor, water, corn flour, mango flavouring, yellow colorant, vert pomme colorant, citric acid, mint flavoring, cocoa powder

Equipment: weighing balance, pot and stove, mold

Method:

Flower vase:

1. Combine 100g of isomalt in a pot with 20 mL of water.
2. Heat the mixture while stirring continuously until it reaches 170ºC.
3. At this stage, incorporate 0.1g of the vanilla flavoring.
4. Pour the molten isomalt around a cup to shape the vase and allow it to cool completely.

Flower petals:

1. Mix 50 g of corn flour in a stove-heated pan with 25 g of water, stirring continuously until a homogeneous consistency is achieved.
2. Remove the mixture from the heat and incorporate the mango flavoring.
3. Add the yellow colorant and mix until uniform.
4. Mould the flower petals
5. Mold the mixture into petal shapes.
6. Place the petals in an oven at 160ºC for 10 minutes to dry.
7. To stick the petals together: Heat isomalt slightly and apply a thin layer to the petal edges to adhere them together.

- Leaves and stems

1. Combine 100 g of cornstarch, 0.5g of citric acid, and 0.1g of vert pomme food colorant.
2. Dissolve 0.1g of mint flavoring in 50 mL of water and add it to the mixture.
3. Mold the mixture into the desired shapes of leaves and steam.
4. Place the molded pieces in an oven at 160ºC for 10 minutes.

- Soil:

1. Weigh 50 g of corn flour, 30 g of water, and 3 g of cocoa powder, then add 0.1g of toffee flavoring.
2. Mix all the ingredients thoroughly until fully homogenized.
3. Heat the mixture, stirring continuously, until starch gelatinization occurs and a dough-like mass forms.
4. Spread the mass evenly onto baking paper, forming a thin layer.
5. Place it in a preheated oven at 160°C and bake for 10 minutes.
6. Remove from the oven and allow it to cool completely at room temperature.
7. Once cooled, crumble the layer into small pieces, creating a texture and appearance that resembles soil.

Results and discussion

Paper molds were used to shape the flower vase; however, upon demolding, the structure proved too fragile and broke apart. As a result, the flower vase could not be successfully implemented in the final dish. Regarding structure, the flower petals maintained their form, but the texture was unsatisfactory, being overly dry on the exterior and paste-like in the center. The intended texture was crisp and crunchy. A similar issue was observed with the leaves.

The intended flavor for the flower was mango, but an excessive amount of mango compound was incorporated, which negatively impacted both the texture and overall sensory profile.

The stem presented the same textural inconsistencies (dry on the outside and moist internally). Additionally, it was unable to support its own weight, compromising the structural integrity of the composition.

To stick and hold all components together, melted isomalt was used as a “glue”. Among all the elements tested, the soil was the only component that performed as expected, both structurally and in terms of sensory attributes.

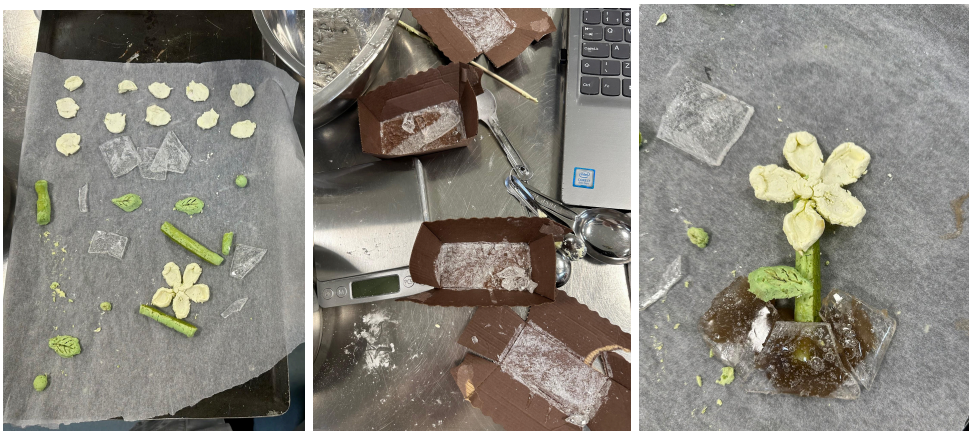

Figure 1. First: broken vase, stem and flower. Second: after unmolding the vase. Third: the first trial

Recommendations for the following week.

- Keep the soil recipe
- Use a wine glass instead of a paper mold for the vase structure
- Make the petals out of fondant instead of corn flour

WEEK NO.: 2 (24/03)

Aim: Create a flower using just pure compounds

Objectives:

- Keep the soil recipe
- Use a wine glass instead of a paper mold for the vase structure
- Make the petals out of fondant instead of corn flour

Ingredients: Pectin, water, corn flour, sorbitol, mango flavoring, red food colorant, isomalt, saccharose, orange sugar paste, green sugar paste, cocoa powder, toffee flavoring, green colorant, mint flavoring

Equipment: weighing balance, pot, thermometer and stove

Method:

First flower petals test)pectin):

1. Disperse 2 g of pectin in 25 g of water and heat the mixture gently until fully hydrated.
2. Add 50 g of cornstarch and 3 g of sorbitol to the mixture, stirring continuously until a homogeneous consistency is achieved.
3. Remove the mixture from the heat and incorporate the mango flavoring, mixing well to ensure uniform distribution.
4. Add 0.07g of red food colorant and stir until the color is evenly distributed.
5. Shape the mixture into petal forms manually
6. Place the molded petals in an oven preheated to 160 °C and allow them to dry for 8 minutes.
7. To stick the petals together: Slightly reheat the isomalt until it becomes fluid, then apply a thin layer to the edges of the petals to adhere them together.

Second flower petals test (fondant recipe)

1. Combine 50 g of saccharose with 300 mL of water in a pot.
2. Heat the mixture until it reaches 115°C, ensuring constant monitoring with a thermometer.
3. Once the temperature is reached, carefully transfer the solution to a bowl
4. Allow the mixture to cool down to 50°C.
5. As soon as it reaches 50°C, beat as fast as possible until it thickens and forms a homogeneous mass

Third flower petals test (sugar paste):

1. Weigh 3 g of ready-to-use orange sugar paste for each petal.
2. Repeat the process to obtain a total of six petals.
3. Shape each portion into a petal using the hands
4. Set the petals aside to dry slightly before assembly.

Leaves and stem:

1. Weigh 10 g of ready-to-use green sugar paste.
2. Roll the sugar paste between your hands to form a stem-like shape.
3. Attach the petals to the stem.
4. Allow the assembled flower to set and dry before handling.

Soil:

1. Weigh 50 g of corn flour, 30 g of water, and 3 g of cocoa powder, then add 0.1g of toffee flavoring.
2. Mix all the ingredients thoroughly until fully homogenized.
3. Heat the mixture, stirring continuously, until starch gelatinization occurs and a dough-like mass forms.
4. Spread the mass evenly onto baking paper, forming a thin layer.
5. Place it in a preheated oven at 160°C and bake for 10 minutes.
6. Remove from the oven and allow it to cool completely at room temperature
7. Once cooled, crumble the layer into small pieces, creating a texture and appearance that resembles soil.

Grass:

1. Combine 100 g of isomalt with 20 mL of water in a pot.
2. Heat the mixture over medium heat, stirring continuously, until it reaches 170 °C.
3. Once the temperature is reached, add green food coloring and mix well until the color is evenly distributed.
4. Incorporate the mint flavoring and stir to combine.
5. Pour the mixture in a baking paper and shape it into grass-like forms using a fork
6. Wait iit until it cool down and then break into smaller pieces of grass.

Results and discussion

The first two attempts to create the flower were unsuccessful. In the first trial, pectin was used with the intention of producing a more consistent petal; however, it did not solidify. In the second attempt, the goal was to prepare fondant, but once again, it failed to solidify. As a result, the petals remained too soft and did not dry sufficiently to adhere to each other. Ultimately, the approach was ineffective.

The third attempt was to use the sugar as a suggestion from the professors and it is presented in the Figure 1 bellow:

Figure 1. note by note ready to use sugar paste

The sugar paste used contained the following ingredients: sugar, glucose syrup, palm oil, humectant (E422), emulsifier (E471), colourants (E160a, E129), stabilisers (E415, E466), preservative (E202), and flavouring (see Figure 1). As all components are individual compounds commonly used in note-by-note cooking, the use of this product was considered acceptable within the framework of the project.

Figure 2. Results in the end of the kitchen session

Recommendations for the following week.

- Melt isomalt and use as a glue for the petals and steam
- Use sugar paste as an alternative material for improved texture and workability.
- Increase the size of the grass elements to enhance visual impact and structural balance.

WEEK NO.: 3

DATE: 31/03

Aim: Create a fauna ecosystem (soil, flower petals, steam and leaves)

Objectives:

- Melt isomalt and use as a glue for the petals and steam
- Use sugar paste as an alternative material for improved texture and workability.
- Increase the size of the grass elements to enhance visual impact and structural balance.

Ingredients: Isomalt, water, citric acid, green food colorant, mint flavouring, corn flour, cocoa powder, toffee flavoring orange sugar paste, green sugar paste.

Materials: weighing balance, pot, thermometer and stove

Grass

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Add 0.1g of citric acid to the mixture.
3. Incorporate 0.1g of green colorant (Pomme Verte)
4. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
5. Once the temperature reaches 170°C, quickly add 0.07g of mint flavoring and mix gently.
6. Remove the pot from the heat and allow it to cool down to 60°C.
7. Pour the mixture on a sheet of baking paper to form thin grass-like structures.
8. Let it cool at room temperature until fully solidified.
9. Once hardened, break into small pieces and arrange them in a wine glass to resemble decorative edible grass

Soil

1. Weigh 50 g of corn flour, 30 g of water, and 3 g of cocoa powder, then add 0.1g of toffee flavoring.
2. Mix all the ingredients thoroughly until fully homogenized.
3. Heat the mixture, stirring continuously, until starch gelatinization occurs and a dough-like mass forms.
4. Spread the mass evenly onto baking paper, forming a thin layer.
5. Place it in a preheated oven at 160°C and bake for 10 minutes.
6. Remove from the oven and allow it to cool completely at room temperature.
7. Once cooled, crumble the layer into small pieces, creating a texture and appearance that resembles soil.

Flower:

1. Weigh 3 g of ready-to-use orange sugar paste for each petal.
2. Repeat the process to obtain a total of six petals.
3. Shape each portion into a petal using the hands
4. Set the petals aside to dry slightly before assembly.

Leaves and stem:

1. Weigh 10 g of ready-to-use green sugar paste.
2. Roll the sugar paste between your hands to form a stem-like shape.
3. Attach the petals to the stem using melted isomalt as an adhesive.
4. Allow the assembled flower to set and dry before handling.

Results

In this class, to assemble the dish and adhere the sugar paste components, a glue made from melted isomalt was prepared, as shown in Figure 1 below. However, the final aesthetic did not meet the desired esthetics expectations.

Figure 1. Melted isomalt behind the flower to help to stick all the elements together

Also, this week, the grass elements were made larger and achieved the desired appearance. So far, both the grass and the soil components are suitable for the final dish presentation. Additionally, a wine/martini glass was used to arrange and display the elements (see Figure 2).

Figure 2. Glass-like grass and soil inside a wine glass

Bringing all the elements together, the final dish presentation is shown in Figure 3.

Figure 3. Final dish display of week 3

Recommendations for next week:

- Replace the sugar paste with melted isomalt for the flower and stem
- To represent the fauna, create a snail using melted isomalt infused with raspberry aroma.
- Create a river at the base of the glass using melted isomalt.

WEEK NO (07/04)

Aim: Create a flora and fauna ecosystem (soil, flower petals, steam, animal and leaves)

Objectives:

- Replace the sugar paste with melted isomalt for the flower and stem
- To represent the fauna, create a snail using melted isomalt infused with raspberry aroma.
- Create a river at the base of the glass using melted isomalt.

Ingredients: Isomalt, mint flavor, green food colorant, citric acid, corn flour, toffee flavor, cocoa powder, vanilla flavor, blue food colorant, strawberry flavor, red food colorant, mango flavor,

Materials: Alpina digital scale, pot, bowl, baking paper, stove, glass, thermometer and tray

Grass:

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Add 0.1g of citric acid to the mixture.
3. Incorporate 0.1g of green colorant (Pomme Verte)
4. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
5. Once the temperature reaches 170°C, quickly add 0.07g of mint flavoring and mix gently.
6. Remove the pot from the heat and allow it to cool down to 60°C.
7. Pour the mixture on a sheet of baking paper to form thin grass-like structures.
8. Let it cool at room temperature until fully solidified.
9. Once hardened, break into small pieces and arrange them in a wine glass to resemble decorative edible grass

Soil:

1. Weigh 50 g of corn flour, 30 g of water, and 3 g of cocoa powder, then add 0.1g of toffee flavoring.
2. Mix all the ingredients thoroughly until fully homogenized.
3. Heat the mixture, stirring continuously, until starch gelatinization occurs and a dough-like mass forms.
4. Spread the mass evenly onto baking paper, forming a thin layer.
5. Place it in a preheated oven at 160°C and bake for 10 minutes.
6. Remove from the oven and allow it to cool completely at room temperature.
7. Once cooled, crumble the layer into small pieces, creating a texture and appearance that resembles soil.

Vanilla river

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
3. Once the temperature reaches 170°C, quickly add 0.07g of vanilla flavoring and mix gently.
4. Remove the pot from the heat and allow it to cool down to 60°C.
5. At 60°C, add 0.3 g of blue colorant and mix until evenly distributed.
6. Carefully pour the mixture into the base of the wine glass.

Strawberry snail

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Incorporate 0.1g of reed colorant.
3. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
4. Once the temperature reaches 170°C, quickly add 0.07g of strawberry flavoring and mix gently.
5. Remove the pot from the heat and allow it to cool down to 60°C.
6. Pour the mixture on a sheet of baking paper and shape a snail format.
7. Let it cool at room temperature until fully solidified.
8. Once hardened, place it on top of the soil in the wine glass.

Raspberry petals

1. Weigh 100 g of isomalt and measure 20 mL of water, then combine them in a small pot.
2. Incorporate 0.1g of reed colorant.
3. Heat the mixture on the stove until it reaches 170°C, allowing the isomalt to fully melt.
4. Once the temperature reaches 170°C, quickly add 0.1g of raspberry flavoring and mix gently.

5. Remove the pot from the heat and allow it to cool down to 60°C.
6. Pour the mixture on a sheet of baking paper and shape the petals format.
7. Let it cool at room temperature until fully solidified.
8. Once hardened, place it on top of the soil in the wine glass.

Results

The desired final dish was achieved in the last class session, and a sensory analysis was conducted with 12 panelists. The results are discussed in items 4 and 5 of the Note-by-Note report.