



FOOD FOR THE FUTURE

THE TREE OF HOPE

STEFANIA ORTIZ | ADVANCED MOLECULAR GASTRONOMY TFCS9025



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1. INTRODUCTION



Figure 1. Soil degradation

According to scientists by 2050, 95% of the Earth's soil will be degraded, 24 billion tons of fertile soil is being lost per year because of the unsustainable agriculture practices (Save Soil, 2024). In addition, the urban area is going to increase with the increase of the world population that means a higher demand for food in the areas where land is the hardest to come by. Addressing these problems there is one alternative that is called Vertical farming

Vertical farming is the cultivation of crops in layers or in buildings, using vertically stacked layers. This is a sustainable, efficient and controlled cultivation because there is no pesticide, no nutrient emission, use of 2-4 L of water per kg of vegetables and the reduction of 10-20 times of land required. This is a revolution for fresh vegetables (Wageningen University & Research, 2024). So, how does vertical farming work? The seedlings are planted in a hydroponic system for growth with nutrient enriched water and are not necessarily the soil and is designed to produce the perfect micro-climate and enable farmers to grow their crops year-round (Dupuis, 2024). Based on this solution, I developed my dish as a representation of vertical farming, and I think this is the way people are going to obtain the food in the future in their own homes.

The theme of this year for the Note-by-note contest is Food for the future, the inspiration for the dish "The tree of Hope". This dish combines the concept of note-by-note a revolutionary technique that is the construction of a dish from compounds and how I imagine is going to be the food in the future.



Figure 1. Inspiration for the dish

2. AIM

Develop a note-by-note dish with theme “food for the future” using as possible compounds that has to be tasty and creative.

To achieve this aim and create the tree of hope, objectives were set:

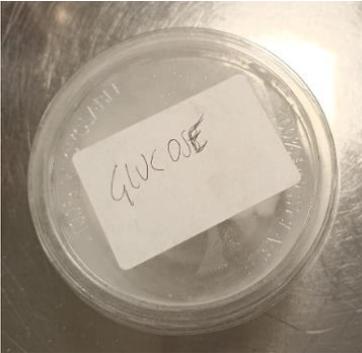
- Produce a savory recipe with different textures
- Elaborate note by note chocolate as a trunk of the tree.
- Using the coral tuile technique for the leaves
- Elaborate the reverse spherification for the apples.

3. MATERIALS AND METHODS

Note-by-note Chocolate: Tree Trunk

INGREDIENTS	Picture	Quantity(g)
Cocoa Butter	Brand: Valrhona 	40
Cocoa Powder	Brand: Citavo 	60

1. In first place, the coca mass was made using: Adding the cocoa butter in a pod under low heating until is completely melted adding the cocoa powder and mixing.

INGREDIENTS	Picture	Quantity(g)
Glucose	<p style="text-align: center;">Brand: El Granero</p> 	14
Fructose	<p style="text-align: center;">Brand: El Granero</p> 	14
Lecithin	<p style="text-align: center;">Brand: Sosa</p> 	1
Vanille extract	<p style="text-align: center;">Brand: Euro Vanille</p> 	1
Chocolate aroma	<p style="text-align: center;">Brand: Sosa</p>	2



Equipment and Material: Stove, pot, spatula, tablespoon, bowl.

2. After, 68 g of the cocoa mass was mixed with sugar (glucose and fructose), lecithin, vanille extract, and chocolate aroma to create the note-by-note chocolate. Keep the mixing under low heating until obtain a homogeneous solution as shown in picture 3.



Figure 3. Note-by-note Chocolate

3. Add the chocolate into a piping bag.
4. Pipe the chocolate into a bowl filled with ice and water to create the trunk tree shape. Allow it to cool and harden completely.



Figure 4. Chocolate tree trunk making

Coral Tuile: Tree leaves

INGREDIENTS	Picture	Quantity(g)
Corn Flour	Brand: Gem 	18
Water	-	60
Sunflower oil	Brand: The King 	65
Salt		2
Mint flavour	Brand: MSK	0,5

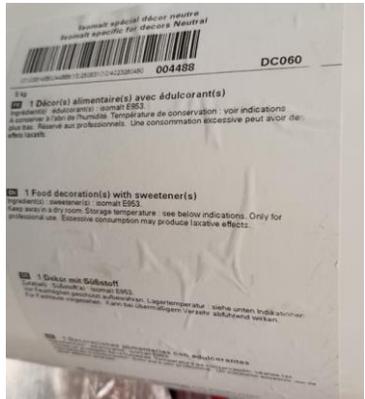
		
Green colorant	Brand: Cake 	0,1

Equipment and Material: Hand blender, stove, pan, spatula, tablespoon, bowl.

1. In a bowl, mix together the water, oil, corn flour, green colorant and mint flavour using the hand blender.
2. Heat a non-stick pan over medium-high heat and add a little oil.
3. Decrease over low heat and pour 1 tablespoon of the batter into the hot pan. It will immediately start to bubble and form a lace-like pattern.
4. Let it continue cooking without touching it until the bubbling stops, and the tuile will solidify and crisp up. Do not flip it.
5. Remove the coral tuile gently with a spatula and cool.

Method from: (Bavette Gastronomy, 2021)

Isomalt sail

INGREDIENTS	Picture	Quantity (g)
Isomalt	Brand: DC060 	100

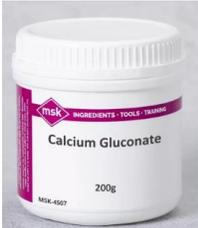
MATERIAL	Picture
Bottle	
Silicon mat	
Pot	
Spatula	

1. Place isomalt crystals in a pot over low heat. Stir occasionally until it melts completely.
2. Allow the isomalt to sit for about 10–15 seconds after melting so it thickens slightly — this helps with shaping.
3. Pour the isomalt melted over the mat and allow it to cool for 15 seconds.
4. Place the silicone mat over the bottle lightly with cooking spray or under it to prevent sticking. Gravity will pull it down into a natural sail-like shape.
5. Let it cool and harden on the bottle
6. Remove gently the isomalt sail off the mat.

Method from: (The Crumb Cake kitchen, 2021)

Apple spheres: Reverse spherification

INGREDIENTS	Picture	Quantity(g)
Sodium alginate	<p>MSK</p> 	5

Fructose	<p>Brand: El Granero</p> 	37,5
Glucose		37,5
Water	-	450
Calcium gluconate	<p>Brand: MSK</p> 	0,5
Red colorant	<p>Brand: Cake Decoration</p> 	0,2
Green Apple flavour		0,4

1. Dissolve 5 g of sodium alginate and 70 g of sugar (35 g fructose and 35 g glucose) into 450 g of water and allow to hydrate for 10 minutes.
2. Add 5 g of calcium gluconate and 5 g of sugar (2,5 g glucose and 2,5 g fructose), red colorant to 70 mL of water and gently heated until dissolve the gluconate.
3. Add to the mixture the green apple flavour.
4. Spoon this mixture into the alginate bath and allow it to set for two minutes before removing and rinsing with water.

(Advanced Molecular Gastronomy Recipes, 2025)

3. RESULTS



Figure 3. Final resultant Note by note: The tree of hope

The final result of the dish *"The Tree of Hope"* was successful in terms of visual appeal and creativity. However, the chocolate trunk revealed some sugar crystals due to the absence of a refining process, that is a crucial step for texture of the chocolate, reducing the particle size of the sugar which would have improved the chocolate trunk. Unfortunately, time constraints did not allow for a full sensory analysis, but visually, the dish was very well received. The coral tuile, isomalt sail, and apple spheres were executed perfectly, contributing to an engaging contrast of textures that captured attention. The overall visual presentation was striking and impactful. In future, I would like to experiment by adding protein to the coral tuile to observe how it affects the texture.

4. DISCUSSION

The three of was composed of four elements: the trunk made by note by note of chocolate, the leaves made by the technique coral tuile, the apples, made by reverse spherification technique and the glass made of isomalt. For the development of the chocolate trunk, it was necessary to research about the composition, according to the Directive 2000/36/EC of the European Parliament the chocolate should contain not less than 35% total dry cocoa solids, including not less than 18% cocoa butter and not less than 14% of dry non-fat cocoa solids. So, using this data, the development of the recipe was done. First, with the cocoa mass (cocoa powder + cocoa butter) and then were added the rest of the ingredients, like emulsifier: soy lecithin that improved the adhesion between sugar and butter (Devos et-al, 2021).

The principal ingredient of chocolate is cocoa butter, which is the most influential component on the appearance and texture of the chocolate. It is important because it can crystallize in six different polymorphic forms, but only one of these is what will give it the shine and fine texture characteristic of chocolate (Devos et-al, 2021). In the elaboration of the chocolate, mixtures of sugar and cocoa butter are refined to particle size <30 μm typically by combination of two- and five-roll refiners, this improves the chocolate texture (Afoakwa, 2009). For this reason, the texture of the chocolate trunk was not right it was necessary to eliminate the grainy or crystal-like sensation in chocolate and achieve a smooth, refined texture, through refining.

In the case of coral tuile, this is an emulsion, adding corn flour helped to stabilize the mix. When it is heating, the water starts to evaporate, resulting in bubble formation, and the starch from the corn flour starts to gelatinize around the bubbles because of the increase of the temperature. The corn flour also contributes to the crisp texture of the coral tuile.

The apple spheres demonstrate the use of reverse spherification, where the gel forms exclusively on the surface of the sphere when the solution containing calcium gluconate is introduced into a sodium alginate bath. This interaction at the interface creates a thicker and stronger membrane around the sphere, which effectively retains the liquid interior. Because there is no sodium alginate inside the sphere, the gelling process is halted, preserving the fluid and resulting in a stable structure. (Burke et-al, 2021).

And finally the glass, using isomalt that is a sugar alcohol and is derived from beet sugar. It has half sweetness of sucrose and is extremely heat stable. Isomalt has a very low glycemic and insulinemic effect and compared to an energy value of 4 kcal/g for sugars and carbohydrates, in Europe isomalt is counted with an energy value of 2.4 kcal/g (European Association of Polyol Producers, 2025). A key aspect of isomalt is that it does not caramelize easily for this reason it can keep a clear glossy appearance when it is heated, that's why is popular used in cake decorations. When it melts you can shape it and when it cools the texture is similar like a glass, so this was the last element of the tree of hope used to represent the layer of vertical farming.

5. CONCLUSIONS

A creative note-by-note dish was created composed of four elements: the trunk made by note by note of chocolate, the leaves made by the technique coral tuile, the apples, made by reverse spherification technique and the glass made of isomalt. The concept behind the dish was to represent a solution to soil degradation through vertical farming. It aims to raise awareness about this critical issue and encourage people to consider how we might source food in the future if we don't act now to protect our soils. By showcasing sustainable farming techniques, the dish emphasizes the urgent need for action to ensure food security in the years to come. The dish complies with the European regulations of the components, and it is visually striking, but it is necessary to continue working in terms of texture and flavour profile of the elements and together.

As a recommendation of the dish, it is necessary to incorporate the step of refining in the note-by-note of the chocolate, in order to improve the texture and the quality of the element. Also, it could improve the formulation of the coral tuile adding protein to see the difference in texture and shape.

Note-by-note is a revolutionary technique that helps me to realize the importance of components and ingredients in the formulation of how they can affect and how they react. Also, through this project, I could think outside the box and let fly my imagination and I really like the result of my dish, it is what I have in mind.

6. REFERENCES

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6. APPENDIX

LOG BOOK

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: STEFANIA ORTIZ

DISH: FOOD FOR THE FUTURE

WEEK NO.: 1

DATE:18/03/2025

Weekly Aims and Objectives

-Develop note-by-note rice milk and try the technique of coral tuile

Materials and Method (Ingredients, Equipment and Method)

Note by Note: Rice (Burke et-al, 2021)

INGREDIENTS	QUANTITY (G)
Water	200
Agar-agar	12
Tartaric acid	0,5
Glucose	3
Monosodium glutamate	2
Xanthan gum	2
Corn starch	5
Vanille flavour	0,5

Note by Note: Milk

INGREDIENTS	QUANTITY (G)
Water	50
Caseina	3
Whey protein	0,8
Lactose powder	5
Sunflower oil	5
Cinnamon flavour	0,5

Glucose	0,5
Fructose	0,5

Coral Tuile

INGREDIENTS	QUANTITY (G)
Corn starch	20
Sunflower oil	10
Green colorant	0,2
Water	5

UTENSILS	PICTURE
Bowls, pan, pot, stove	
Spatulas	

METHODOLOGY:

Note-by-note rice (Burke et-al, 2021)

1. Mix all the ingredients in a pot
2. Bring to a boil the mix
3. Let it cool
4. Pour into the siphon the mix
5. Spray the rice in a trail

Note-by-note milk

1. Weight the ingredients
2. Mix all the ingredients in a bowl

Coral tuile

1. Weight the ingredients
2. Mix the cornstarch, oil and water until well combined
3. Heat a non-stick pan over high-heat with a little oil.
4. Pour a small amount of the mixture into the hot pan and spread it out.
5. Cook the tuile until the bubbling stops
6. Remove carefully the coral tuile with a spatula and let it cool.

Results and discussion

In the Figure 4, the result of the first week is shown. The note by note of milk preparation was successful, however the amount of lactose available was not going to be enough for the four weeks. On the other hand, the note by note of the rice, recipe taken from the Handbook of Molecular Gastronomy, was not a successful, it had sticky texture and the flavour It was unpleasant. Additionally, the coral tuile did not turn out well, due to an unbalanced formulation, between the quantity of starch, water and oil, the insufficient amount of water prevented evaporation and bubble formation, resulting in the gelatinization of the starch but around the bubbles that creates the characteristic shape of the coral tuile shape.



Figure 4. Dish: Food for the future

Conclusions

- The note-by-note of the milk was successful
- The note-by-note rice, despite following a reference recipe, failed to meet texture and flavor expectations
- The failure of the coral tuile highlights the importance of precise ingredient ratios in molecular gastronomy

Recommendations for following week.

- Change the idea of the idea note-by-note rice with milk

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: STEFANIA ORTIZ

DISH: FOOD FOR THE FUTURE

WEEK NO.: 2

DATE:24/03/2025

Weekly Aims and Objectives

- Develop the note by note of the chocolate and elaborate the tree trunk with it.
- Develop the coral tuile as leaves for the tree

Materials and Method (Ingredients, Equipment and Method)

Note by Note: Chocolate

INGREDIENTS	QUANTITY (G)
Cocoa powder	60
Cocoa butter	40

fructose	15
Glucose	15
Lecithin	1
Vanille extract	0,5

Coral Tuile

INGREDIENTS	QUANTITY (G)
Corn starch	20
Sunflower oil	20
Green colorant	0,2
Water	15

Equipment and Material: Stove, pot, spatula, tablespoon, bowl, mat, pan.

METHODOLOGY:

Note-by-note chocolate

1. First, the cocoa mass was made using: Adding the cocoa butter in a pot under low heating until it is completely melted adding the cocoa powder and mixing.
2. After, 68 g of the cocoa mass was mixed with sugar (glucose and fructose), lecithin, vanille extract, create the note-by-note chocolate. Keep the mixing under low heating until obtain an homogeneous.
3. Add the chocolate into a piping bag.
4. Pipe the chocolate into a mat to create the trunk tree shape. Allow it to cool and harden completely.

Coral tuile

1. Weight the ingredients
2. Mix the cornstarch, oil, water, and green colorant until well combined
3. Heat a non-stick pan over high-heat with a little oil.
4. Pour a small amount of the mixture into the hot pan and spread it out.
5. Cook the tuile until the bubbling stops
6. Remove carefully the coral tuile with a spatula and let it cool.

Results and discussion

The results from the second week are shown in Figure 5. The note-by-note chocolate preparation was successful in terms of formulation and flavor, however, due to time constraints, it did not have enough time to set properly, causing the tree trunk structure to break. In contrast, the coral tuile was again unsuccessful. This was due to both an unbalanced ratio of starch, water, and oil, and the excessive amount of mixture poured into the heated pan. The resulting layer was too thick, which caused the ingredients to clump together, preventing the formation of the delicate, lacy structure characteristic of a proper coral tuile.



Figure 5. Dish: Food for the future

Conclusions

- The note-by-note chocolate showed promise but requires sufficient setting time to maintain structural integrity.
- The coral tuile failed again due to incorrect ingredient ratios and excessive mixture, emphasizing the need for precise - technique and portion control.

Recommendations for following week.

- Develop another method to set the chocolate because of the time.
- Reformulate The coral tuile ad pour a little quantity of the mixture into the hot pan.

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: STEFANIA ORTIZ

DISH: THE TREE OF HOPE

WEEK NO.: 3

DATE:31/03/2025

Weekly Aims and Objectives

- Improve the tree trunk changing the method of setting
- Improve the coral tuile texture
- Develop the isomalt sail

Materials and Method (Ingredients, Equipment and Method)

Note by Note: Chocolate

INGREDIENTS	QUANTITY (G)
Cocoa powder	60
Cocoa butter	40
fructose	15

Glucose	15
Lecithin	1
Vanille extract	0,5

Coral Tuile

INGREDIENTS	QUANTITY (G)
Corn starch	20
Sunflower oil	60
Green colorant	0,3
Water	55

Isomalt Sail

INGREDIENTS	QUANTITY (G)
Isomalt	50

Apple Spheres

INGREDIENTS	QUANTITY (G)
Sodium alginate	5
Fructose	37.5
Glucose	37.5
Water	450
Calcium gluconate	0,5
Red colorant	0,2

Equipment and Material: Stove, pot, spatula, tablespoon, bowl, mat, bottle, bowl, pan

METHODOLOGY:

Note-by-note chocolate

1. First, the coca mass was made using: Adding the cocoa butter in a pod under low heating until it is completely melted adding the cocoa powder and mixing.
2. After, 68 g of the cocoa mass was mixed with sugar (glucose and fructose), lecithin, vanille extract, and chocolate aroma to create the note-by-note chocolate. Keep the mixing under low heating until obtain a homogeneous solution.
3. Add the chocolate into a piping bag.
4. Pipe the chocolate into a bowl filled with ice and water to create the trunk tree shape. Allow it to cool and harden completely.

Coral tuile

1. Weight the ingredients
2. Mix the cornstarch, oil and water, green colorant until well combined using a hand blender
3. Heat a non-stick pan over high-heat with a little oil.
4. Decrease over low heat and pour 1 tablespoon of the mixture into the hot pan and spread it out.
5. Cook the tuile until the bubbling stops
6. Remove carefully the coral tuile with a spatula and let it cool.

Isomalt sail

1. Place isomalt crystals in a pot over low heat. Stir occasionally until it melts completely.
2. Allow the isomalt to sit for about 20 seconds after melting so it thickens slightly — this helps with shaping.
3. Pour the isomalt melted over the mat and allow it to cool for 15 seconds.
4. Place the silicone mat over the bottle lightly with cooking spray or under it to prevent sticking. Gravity will pull it down into a natural sail-like shape.
5. Let it cool and harden on the bottle
6. Remove gently the isomalt sail off the mat.

Apple spheres:

1. Dissolve 5 g of sodium alginate and 70 g of sugar (35 g fructose and 35 g glucose) into 450 g of water and allow to hydrate for 10 minutes.
2. Add 5 g of calcium gluconate and 5 g of sugar (2,5 g glucose and 2,5 g fructose), red colorant to 70 mL of water and gently heated until dissolve the gluconate.
3. Spoon this mixture into the alginate bath and allow it to set for two minutes before removing and rinsing with water.

Results and discussion

The results from the third week are shown in Figure 6. The note-by-note chocolate preparation was successful in terms of formulation and flavor, by using a bowl with water and ice, the chocolate tree was set within minutes, resulting in a stable and well-defined structure of the tree trunk. The coral tuile was successful with the change of the recipe and the technique just one teaspoon of the mixture spread into a thin layer in the pan, waiting for the time to cook and until bubbling ceased the result was excellent. In the case of isomalt sail it did not meet expectations, only 50 g were used which was not insufficient to achieve the glass effect intended. Finally, adding the apple spheres introduced a vibrant pop of color, visually enhancing the dish.



Figure 6. Dish: The tree of hope

Conclusions

-The final result of this week was spectacular, I really like the result, the only thing to improve is increase the quantity of isomalt to create a better glass container. The dish successfully met the initial expectations. The note-by-note chocolate preparation yielded both a flavorful and structurally sound component, while the technique for the coral tuile produced a visually appealing and texturally crisp element. Altogether, the composition demonstrated a strong balance of innovation, technique, and aesthetics, making it an excellent result.

Recommendations for following week.

- Increase the quantity of isomalt to 100 g
- Add flavour to the chocolate tree trunk and coral tuile

Week 4:

For the week 4, the ingredients, methods and results are presented in this report.