



MSc. FOOD INNOVATION AND PRODUCT DESIGN

Advanced Molecular Gastronomy

Module Code: TFCS9025

SWAN LAKE

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Introduction

The following report documents the creative and technical development of a note by note dish inspired by Swan Lake, with a central focus on the symbolic representation of two swans. The project explored the intersection of molecular gastronomy and sustainable culinary practice. The iterative process focused on progressively refining the dish's visual, structural, and conceptual elements through experimentation and critical reflection.

The theoretical foundation of the project is grounded in a comprehensive review of literature related to molecular gastronomy and note by note cooking. Hervé This, who pioneered the note by note movement, advocates constructing dishes from pure chemical compounds rather than traditional ingredients, fostering innovation while addressing sustainability challenges (This, 2013). This methodology formed the backbone of the project and enabled the creation of a dish from the molecular level, providing control over structure, texture, and flavor while minimizing food waste and overreliance on animal and plant resources (This, 2009).

The visual and thematic direction of the dish was inspired as well by the thematic for this year 'Food for the Future' which was addressed by representing five of the United Nations Sustainable Development Goals (SDGs). Each component of the dish carries a reference: the ice represents the fragility of polar environments and the urgent need for climate action (SDG 13); the lake stands for water security and aquatic biodiversity (SDGs 6 and 14); and the two swans embody peace, balance, and partnership (SDG 16). Furthermore, the very use of note by note cooking contributes to responsible consumption and production by reducing food waste, overfishing, and intensive farming (SDG 12).

Beyond the symbolic and environmental considerations, recent literature on food aesthetics and sensory experience was also consulted. Research by Spence (2017) and Piqueras-Fiszman & Spence (2015) highlights how visual design, minimalism, and emotional cues can significantly influence the perceived value and meaning of a dish. These insights informed key design decisions and the visual refinement of each weekly iteration.

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1. Aim

The aim of this assignment is to design, evaluate, and refine a conceptually inspired note by note dish over a four week period, using Swan Lake in “Food for the Future” as the central theme. The project seeks to achieve a visually compelling and sensory-rich final composition by applying molecular gastronomy principles and conducting weekly improvements.

Additionally, the assignment aims to critically document the entire creative process, including the culinary techniques applied, the challenges encountered, and the rationale behind visual and thematic choices. The project also aligns with broader considerations of sustainability by incorporating symbolic references to five United Nations Sustainable Development Goals, highlighting the potential of modern gastronomy to contribute to global awareness and responsible innovation.

2. Materials and Methods

2.1 Ingredients (per element)

2.1.1 Swans

- Ultragel 5 MSK : 5g



Figure 1. MSK Ultragel

- Water: 80g
- Yellow coloring: 0.5 g
- Sugar: 10g



Figure 2. Sugar

- White Powder Food Coloring: 1g



Figure 3. Sosa Natural White Food Coloring

- MSK Apple Pie Flavor: 4 grams



Figure 4. MSK Liquid Apple Pie Flavor (Natural)

2.1.2 Lake

- Water: 400g
- Agar-Agar: 8g



Figure 5. Agar

- Sugar: 40g
- Blueberry Natural MSK liquid flavor: 7 g



Figure 6. Blueberry Natural Liquid Flavor

- Blue food powder coloring: 5g



Figure 7. Sosa Blue Food Coloring Powder

2.1.3 Ice

- Isomalt: 11g
- Water: 2.2 g

2.2 Equipment

- 2 Mixing bowls
- 3 Spatulas
- 1 Scale
- 2 Small Plates
- 1 Square mold
- 3 Pans
- Baking paper
- Oven (DXCQ114418, Broderick's)

2.3 Method (per element)

2.3.1 Swans

- In a bowl, mix Ultrigel 5 MSK with sugar and white food coloring.



Figure 8. Mixture of ingredients

- Heat the mixture over low-medium heat, stirring constantly. Continue stirring until it becomes a thick, smooth gel.



Figure 9. Heating of mixture

- Once the consistency is in gel form, remove from heat and let cool for 3 minutes.
- Add the Apple pie flavor.
- Pour the gel into 2 small plates and let it cool at 4°C for 20 min.



Figure 10. Firm gel

- Shape the swans using a knife.



Figure 11. Swan shaping

2.3.2 Gelatin Lake

- Mix sugar, agar-agar and blue food coloring in a bowl.

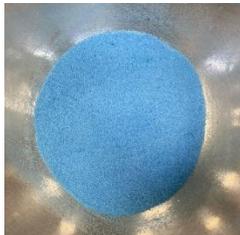


Figure 12. Powder ingredients mixture for lake

- Add to a pan, incorporate water and stir until fully dissolved.



Figure 13. Heating of mixture

- When boiling begins, remove from heat, transfer to a bowl and wait 5 minutes for it to cool.
- Add Blueberry flavor and mix using a spoon



Figure 14. Mixture setting

2.3.3 Ice Setting

- Bring to heat isomalt and water on a saucepan and heat until boiling point.



Figure 15. Boiling isomalt

- Once reached, display it on baking paper and let it cool.
- Crush the product to obtain crystal forms.

2.3.4 Scene Assembling

- Pour a thin layer of blue gelatin (lake) into a square mold.
- Let it partially set for 10–15 min.



Figure 16. Heating of mixture

- Place the white swan pieces onto the first layer.



Figure 17. Swans as second layer

- Add yellow coloring on the bills of the swans



Figure 18. Yellow color used

- Add isomalt crystals



Figure 19. Final product

3. Results

3.1 Sensory Analysis

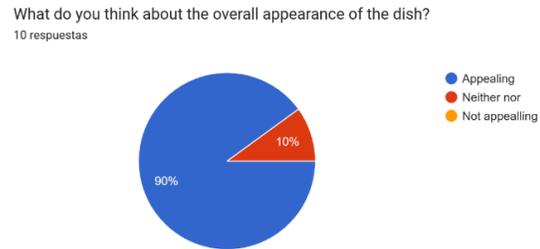


Figure 20. Overall appearance

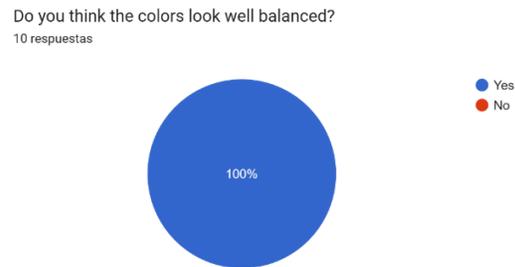


Figure 21. Color balance

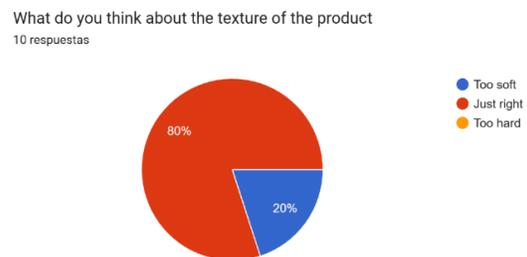


Figure 22. Product texture

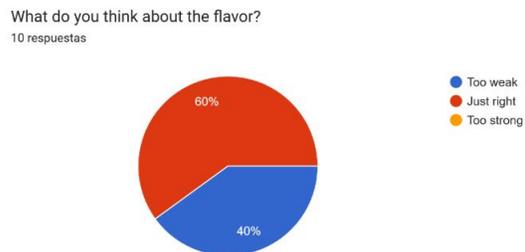


Figure 23. Flavor rating

4. Discussion

The final sensory evaluation of the dish revealed a successful outcome on key parameters such as visual appeal, taste, and uniformity of texture. The color balance and overall appearance were well perceived due to the contrast produced by the blue tones of the lake and crystal ice with white swans. Flavor-wise, the apple pie flavor used on the swans and blueberry flavors in the lake provided were able to complement each other and create synergy.

However, only 60% of participants indicated that the taste was “just right”, indicating that the other 40% found the flavor profile too weak. This feedback highlights an opportunity to enhance the flavor intensity by slightly increasing the quantity of natural flavoring used. As outlined in Appendix 7.3 (Table 1), the flavoring ingredients employed fall under the category of natural flavors and are subject to “quantum satis” regulations, meaning they can be used in quantities sufficient to achieve the desired effect without exceeding any established safety limits. The texture was rated as “just right” by 80% of the participants, implying that the amount of Ultrigel and agar-agar was appropriate.

5. Conclusions

The development of the Swan Lake note by note dish successfully met the creative and technical objectives of the project. Through four weeks of iterative experimentation and refinement, the final composition emerged as a visually compelling. Sensory analysis confirmed that the dish was well rated in key areas, including color harmony, texture, and flavor.

The controlled use of molecular ingredients such as Ultragel, agar-agar, and isomalt, demonstrated the precision and versatility of note by note techniques when applied with careful methodology.

Overall, the project achieved its intended outcomes by integrating molecular gastronomy principles with thematic storytelling and sustainable food design. While the dish performed well across most criteria, minor adjustments in flavor intensity could further enhance the overall sensory profile.

The outcomes also demonstrate the value of note by note cooking as a method that allows for precision, innovation, and alignment with both art and sustainable goals in modern gastronomy.

6. References

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7. Appendices

7.1 Logbooks

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: Jeannette Beatriz Castellanos Cardona

FOOD PRODUCT: SWAN LAKE

WEEK NO: 1

DATE: 18/03/2025

Weekly Aims and Objectives

Aim

To design and create a visually expressive and conceptually rich note by note dish inspired by Swan Lake, symbolizing the grace and duality of two swans through innovative culinary techniques and molecular gastronomy.

Objectives

- To explore the principles of note by note cooking, utilizing pure compounds and molecular ingredients to build textures, structures, and flavors from scratch.
- To translate thematic elements from Swan Lake, such as contrast, harmony, and transformation into edible artistic expression.
- To develop a multi-component dish where each element visually and conceptually contributes to the depiction of two swans.

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Swans

- Ultragel 5 MSK – 5g
- Water: 80g

- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 10drops or 0.5g
- Blue food powder coloring: 5g

Equipment

2 Mixing bowls

3 Spatulas

Scale

2 small plates

1 Square mold

3 pans

Oven

Method

Swans

Hydrate the Starch: In a bowl, sprinkle Ultrigel 5 MSK over cold water while stirring continuously. Let it sit for 5–10 minutes to hydrate properly.

Heat & Thicken: Gently heat the mixture over low-medium heat, stirring constantly.

Continue stirring until it becomes a thick, smooth gel.

Molding the Swans: Pour the thickened gel into a small plate and let it cool at 4°C for 20 min. Then shape the swans using a knife.

Gelatin Lake

Mix sugar, agar-agar and blue food coloring .

Add to a pan, incorporate water and stir until fully dissolved.

Stop when boiling begins.

Scene Assembling

- Pour a thin layer of clear gelatin into a square mold.
- Let it partially set for 10–15 min.
- Add the Swan Shapes
- Place the white swan pieces onto the first layer.

.Results and discussion

The dish successfully achieved the desired coloration, contributing to a visually appealing presentation that aligns with the thematic inspiration of Swan Lake. While the overall aesthetic is pleasing, the scenery remains somewhat simplistic and lacks the depth needed to fully capture the intended dramatic atmosphere. The swan shapes would benefit from further refinement to enhance elegance and expressiveness. On a technical level, the consistency of the components was well-executed, demonstrating good control over the note by note techniques employed.



Conclusions

The intended coloration was successfully achieved, aligning with the visual goals of the dish. However, the overall composition appears overly simplistic and lacks visual impact. The swan shapes require refinement to enhance their aesthetic appeal and better convey elegance. Despite these visual limitations, the textural consistency of the components was appropriate and satisfactory.

Recommendations for following week.

Add more colors to create fuller landscape that includes trees and a sunset.

Ingredients required for the following 2 weeks

Swans

- Ultrigel 5 MSK – 5g
- Water: 80g
- Sugar: 10g
- White Powder Food Coloring: 1g

- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 10drops or 0.5g
- Blue food powder coloring: 5g

Sunset

- Red food coloring form 5g
- Orange food coloring liquid form: 5g

Trees

- Green Food coloring liquid form: 3g

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: Jeannette Beatriz Castellanos Cardona

FOOD PRODUCT: SWAN LAKE

WEEK NO: 2

DATE: 24/03/2025

Weekly Aims and Objectives

Aim

To design and create a visually expressive and conceptually rich note by note dish inspired by Swan Lake, symbolizing the grace and duality of two swans through innovative culinary techniques and molecular gastronomy.

Objectives

- Explore the use of environmental elements such as trees and a sunset to create a scenic and thematic backdrop that complements the central swan motif.
- Evaluate the visual and symbolic impact of presenting a single swan in the dish, deviating from the original dual-swan concept.

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Swans

- Ultrigel 5 MSK – 5g
- Water: 80g
- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 10drops or 0.5g
- Blue food powder coloring: 5g

Sunset

- Red food coloring form 5g
- Orange food coloring liquid form: 5g

Trees

- Green Food coloring liquid form: 3g

Equipment

- 2 Mixing bowls
- 3 Spatulas
- Scale
- 2 small plates
- Square mold
- 3 pans
- Oven

Method

Swans

- Hydrate the Starch: In a bowl, sprinkle Ultragel 5 MSK over cold water while stirring continuously. Let it sit for 5–10 minutes to hydrate properly.
- Heat & Thicken: Gently heat the mixture over low-medium heat, stirring constantly. Continue stirring until it becomes a thick, smooth gel.

- Molding the Swans: Pour the thickened gel into a small plate and let it cool at 4°C for 20 min. Then shape the swans using a knife.

Gelatin Lake

- Mix sugar, agar-agar and blue food coloring.
- Add to a pan, incorporate water and stir until fully dissolved.
- Stop when boiling begins.

Repeat same process with green and red-orange colors to create the grass/trees and sunset

Scene Assembling

- Pour a thin layer of clear gelatin into a square mold.
- Let it partially set for 10–15 min.
- Add green colored gelatin to each side to create grass illusion.
- Add orange colored gelatin on the top, above the grass to create a sunset.
- Add the Swan Shapes
- Place the white swan pieces onto the first layer.

Results and discussion

In this iteration, a landscape background was introduced, with trees and a sunset to enhance the environmental context of the dish. This addition was meant to give depth and narrative unity to the presentation.

The presence of only one swan, however, diluted the original theme of duality at the center of the Swan Lake inspiration. Additionally, while the idea of a scenic background proved innovative in its thinking, the overall appearance lacked balance and sophistication. The integration of elements lacked cohesion, which detracted from the visual unity of the dish.



Conclusions

The inclusion of landscape elements demonstrated an important progression in the dish's conceptual depth. However, the execution fell short in visual appeal and thematic clarity. Future iterations should focus on restoring the two-swan motif and refining the composition to achieve a more cohesive and elegant presentation that better reflects the grace and emotional tension of Swan Lake.

Recommendations for following week

It is recommended to remove the grass, trees, and sunset elements, as they contribute to a visually heavy and overcrowded composition that detracts from the central focus of the dish. Instead, add a refined and minimalistic element such as representations of ice. These alternatives can enhance the elegance of the presentation while preserving the prominence of the swans as the main visual and thematic focal point.

Ingredients required for the following 2 weeks

Swans

- Ultrigel 5 MSK – 5g
- Water: 80g
- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 10drops or 0.5g
- Blue food powder coloring: 5g

Ice

Isomalt: 5g

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: Jeannette Beatriz Castellanos Cardona

FOOD PRODUCT: SWAN LAKE

WEEK NO: 3

DATE: 31/03/2025

Weekly Aims and Objectives

Aim

To design and create a visually expressive and conceptually rich note by note dish inspired by Swan Lake, symbolizing the grace and duality of two swans through innovative culinary techniques and molecular gastronomy.

Objectives

- Simplify the background by removing excess visual elements, creating a cleaner and more focused composition centered around the swans.
- Experiment with isomalt as a medium to represent ice, adding a refined, minimalistic element that enhances visual elegance without overwhelming the design.

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Swans

- Ultrigel 5 MSK – 5g
- Water: 80g
- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 0.5g
- Blue food powder coloring: 5g

Ice

- Isomalt: 11g
- Water: 2.2 g

Equipment

- 2 Mixing bowls
- 3 Spatulas
- Scale
- 2 small plates
- Square mold
- 3 pans
- 1 Thermometer
- Baking paper
- Oven

Method

Swans

- Hydrate the Starch: In a bowl, sprinkle Ultrigel 5 MSK over cold water while stirring continuously. Let it sit for 5–10 minutes to hydrate properly.
- Heat & Thicken: Gently heat the mixture over low-medium heat, stirring constantly. Continue stirring until it becomes a thick, smooth gel.

- Molding the Swans: Pour the thickened gel into a small plate and let it cool at 4°C for 20 min. Then shape the swans using a knife.

Gelatin Lake

- Mix sugar, agar-agar and blue food coloring.
- Add to a pan, incorporate water and stir until fully dissolved.
- Stop when boiling begins.

Scene Assembling

- Pour a thin layer of clear gelatin into a square mold.
- Let it partially set for 10–15 min.
- Add green colored gelatin to each side to create grass illusion.
- Add orange colored gelatin on the top, above the grass to create a sunset.
- Add the Swan Shapes
- Place the white swan pieces onto the first layer.

Ice Setting

- Bring to heat isomalt and water on a saucepan and warm until 170°C.
- Once temperature is reached, display it on baking paper and let it cool.
- Crush the product to obtain crystal forms.

Results and discussion

This version represented a significant improvement both in terms of visual clarity and thematic realization. By removing the trees and sunset that were featured in the previous version, the design was simplified and allowed the principal elements: the lake and the two swans to become graphically dominant.

Also, the addition of isomalt to create ice illusion formations beneath the swans added a minimalistic touch, which helped in adding to the unearthly atmosphere of the setting. The blue lake provided a clean and serene background that gelled with the icy formations, resulting in a more balanced and pleasing exhibit.



Conclusions

The simplification of the landscape and reintroduction of key thematic components significantly improved the dish's aesthetic impact and conceptual clarity. The use of isomalt ice successfully contributed to the elegance and coherence of the composition without distracting from the swans. This version demonstrated a strong alignment between visual storytelling and technical execution, representing a mature stage in the dish's development.

Recommendations for following week

Add coloring to the bills of the swans to make them appear more realistic.

Ingredients required for the following 2 weeks

Swans

- Ultragel 5 MSK – 5g
- Water: 80g

- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Liquid yellow coloring: 1g

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 10drops or 0.5g
- Blue food powder coloring: 5g

Ice

Isomalt: 5g

MODULE CODE: TFCS9025

MODULE TITLE: Advanced Molecular Gastronomy

STUDENT NAME: Jeannette Beatriz Castellanos Cardona

FOOD PRODUCT: SWAN LAKE

WEEK NO: 4

DATE: 07/04/2025

Weekly Aims and Objectives

Aim

To design and create a visually expressive and conceptually rich note by note dish inspired by Swan Lake, symbolizing the grace and duality of two swans through innovative culinary techniques and molecular gastronomy.

Objectives

- Enhance the visual realism and anatomical accuracy of the swans by incorporating yellow coloring onto their bills, thereby improving the overall lifelike quality and detail of the dish's central visual elements.

Materials and Method (Ingredients, Equipment and Method)

Ingredients

Swans

- Ultrigel 5 MSK – 5g
- Water: 80g
- Sugar: 10g
- White Powder Food Coloring: 1g
- Apple Pie Flavor: 4 grams

Lake

- Water: 400g
- Agar-Agar: 8g
- Sugar: 40g
- Blueberry Natural MSK: 0.5g
- Blue food powder coloring: 5g

Ice

- Isomalt: 11g
- Water: 2.2 g

Equipment

2 Mixing bowls

3 Spatulas

Scale

2 small plates

Square mold

3 pans

1 Thermometer

Baking paper

Oven

Method

Swans

- Hydrate the Starch: In a bowl, sprinkle Ultragel 5 MSK over cold water while stirring continuously. Let it sit for 5–10 minutes to hydrate properly.
- Heat & Thicken: Gently heat the mixture over low-medium heat, stirring constantly. Continue stirring until it becomes a thick, smooth gel.
- Molding the Swans: Pour the thickened gel into a small plate and let it cool at 4°C for 20 min. Then shape the swans using a knife.

Gelatin Lake

- Mix sugar, agar-agar and blue food coloring.
- Add to a pan, incorporate water and stir until fully dissolved.
- Stop when boiling begins.

Scene Assembling

- Add the Swan Shapes
- Place the white swan pieces onto the first layer.

Ice Setting

- Bring to heat isomalt and water on a saucepan and warm until 170°C.
- Once temperature is reached, display it on baking paper and let it cool.
- Crush the product to obtain crystal forms.

Results and discussion



Conclusions

The addition of yellow coloring to the swans' bills contributed to a more realistic and anatomically accurate representation, reinforcing the visual clarity and refinement of the final presentation. This subtle yet effective adjustment strengthened the recognizability of the swan figures and supported the overall aesthetic coherence of the dish without disrupting its minimalistic balance.

The final sensory assessment indicated positive results across key attributes, including appearance, flavour, and textural consistency. The visual composition was particularly well received, with the interplay between the white swans and the blue hues of the lake and crystalline ice creating a strong and appealing contrast. In terms of taste, the combination of apple pie flavour in the swans and blueberry notes in the lake worked harmoniously, offering a complementary flavour profile that demonstrated balance and cohesion.

7.2 Presentation



Ingredients and Preparation

Swan

- Ultragel 5 MSK: 5 g
- Water: 80 g
- Sugar: 10 g
- White Powder Coloring: 1 g
- Apple Pie Flavor: 1 g



Gefatin Lake

- Water: 400 g
- Sugar: 40 g
- Agar-Agar: 8 g
- Blue color powder: 7g
- Blueberry flavor: 1 g



Ice

- Isomalt: 11.1 g
- Water: 2.2 g





7.3 Maximum Permitted Levels

Table 1. Maximum Permitted level of Ingredients excluding water and sugar.

Ingredient	Additive (E number)	MPL (mg/kg)
Ultragel 5 MSK	Gelling agent derived from marine algae (E406)	<i>Quantum satis</i>
White powder food coloring	Calcium Carbonate E170	<i>Quantum satis</i>
Apple Pie Flavor	Natural flavors	<i>Quantum satis</i>
Agar-Agar	E406	<i>Quantum satis</i>
Blueberry Natural MSK	Natural flavor	<i>Quantum satis</i>
Blue food coloring	See table 2.	<i>Quantum satis</i>
Isomalt	E953	<i>Quantum satis</i>

Table 2. MPL of Blue Food Coloring Components

Component	Function	E number	MPL
Maltodextrin	Carrier/bulking agent	Not considered an additive	No MPL (standard food ingredient)
Sugar syrup	Sugar syrup	Standard food ingredient	No MPL
Spirulina concentrate	Natural colorant	Considered a food, not additive	No MPL (used as color source)
Apple concentrate	Flavoring and color aid	Considered a food, not additive	No MPL
Citric acid (E330)	Acidity regulator	Approved additive	Quantum satis

Note: In regulatory terms, *Quantum satis* implies that there is no specific maximum limit set for the use of a substance, as long as it is used at the lowest effective quantity, and in a way that does not mislead the consumer or pose a health risk (European Parliament and Council, 2008).