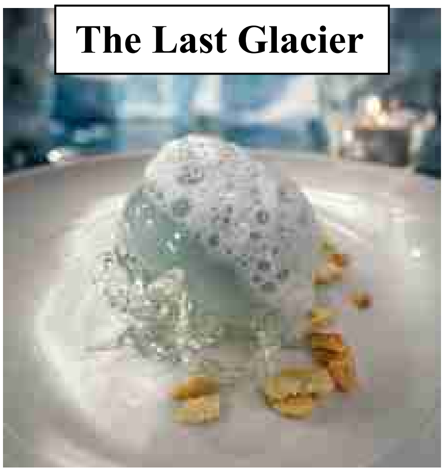
Note-by-Note Recipes

The Last Glacier



Materials and Method

Note-by-note mousse

The mousse was the central element of the plated dessert and was designed to represent the soft texture of melting ice. Ultrawhip was used to create a light and aerated structure, while xanthan gum improved viscosity and agar provided stability during setting.

Equipment for Mousse

Equipment	Specification / Description
Weighing scales	**Digital, 0.01 g accuracy**
Saucepan	**Stainless steel, 2–3 L capacity**
Whisk	**For manual mixing**
Mixing bowl	**For hydration and whipping**
Stainless-steel moulds	**For mousse setting**
Freezer	**For setting and chilling**

Ingredients for note-by-note mousse (Portions: 8)

Ingredient	Quantity	Description
Water	70 g	Ultrawhip hydration base
Ultrawhip	10.5 g	"Msk" chicory root fibre, methylcellulose, xanthan gum 
Water	240 g	Base liquid
Sugar	50 g	Sweetener 
Xanthan gum	1 g	Xanthan gum by "Sosa"

		
Sugar	50 g	Combined with agar 
Agar agar	7.5 g	Agar agar by “En Place” 
Blue food colouring	1 g	Powdered blue colour by “Mallard Ferriere” 
Vanillin	2 g	Vanillin (4-hydroxy-3-methoxybenzaldehyde) by “Mystic Moments”

		
Sotolon aroma	0.3g	Flavour compound (3-Hydroxy-4,5-dimethylfuran-2(5H)-one) by “Kitchen lab food” 
Almond aroma	0.5g	Almond flavour compound (Benzaldehyde) by “Kitchen lab food” 

Method for note-by-note mousse

1. Mix water and Ultrawhip and allow to hydrate for 10 minutes.
2. Blend water, sugar, and xanthan gum until fully dispersed.
3. Heat the mixture to a simmer.
4. Combine sugar and agar separately, then add to the liquid while whisking.
5. Simmer for 1 minute to activate the agar.
6. Add the blue food colouring, vanillin, sotolon aroma, and almond aroma, then mix until evenly dispersed. Allow the mixture to cool to approximately 25°C.
7. Whip the Ultrawhip mixture until aerated.

8. Fold the whipped phase into the liquid mixture.
9. Transfer into moulds.
10. Chill in the freezer until fully set.

Glaze

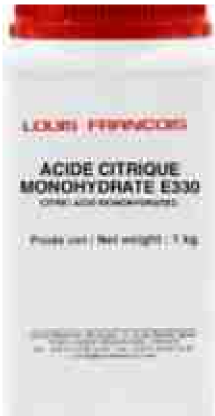
The glaze was developed to provide a glossy surface resembling melting ice. Pectin was used as the main thickening agent because it creates a smooth coating with a soft mouthfeel. Citric acid and aroma compounds were added to support the flavour profile of the final dish.

Equipment for Glaze

Equipment	Specification / Description
Weighing scales	Digital (0.01 g accuracy)
Bowl	Stainless steel bowl for mixing
Saucepan	Stainless steel (2–3 L)
Whisk	Manual mixing
Pouring jug	For controlled glazing

Ingredients for note-by-note glaze (Portions: 48)

Ingredient	Quantity	Description
Water	600 g	Base liquid
Sugar	300 g	Sweetener 
Pectin	50 g	Pectin by “Sosa”

		
Citric acid	12 g	Citric acid Monohydrated E330 by “Louis Francois” 
Blue food colouring	1.5 g	Powdered blue colour by “Mallard Ferriere” 
Floral aroma	0.3 g	Flavour compound (Linalool) by “Kitchen lab food” 
Peach aroma	1.4 g	Flavour compound (Gamma-Undecalactone) by “Kitchen lab food”

		
Lemon cola aroma	0.8 g	Flavour compound (Citral) by “Kitchen lab food” 

Method for note-by-note glaze

1. Heat water, citric acid, and flavour compounds together.
2. Mix sugar and pectin separately.
3. Gradually add the sugar–pectin mixture while whisking continuously.
4. Simmer for 1 minute to activate the pectin.
5. Add the blue food colouring and mix until evenly dispersed, then allow the mixture to cool to approximately 25°C.

Soy Lecithin Foam

The foam component was included to provide lightness and increase aromatic release during consumption. Soy lecithin was selected for its emulsifying properties and ability to stabilise air bubbles, creating a delicate foam applied immediately before serving.

Equipment for note-by-note foam

Equipment	**Specification / Description**
Weighing scales	Digital (0.01 g accuracy)
Mixing container	Deep vessel for blending
Hand blender	For foam generation
Spoon	For foam transfer

Ingredients for note-by-note foam (Portions: 36)

Ingredient	Quantity	Description
Water or flavoured liquid	250 g	Foam base
Soy lecithin	5 g	Soy lecithin by “Sosa” 
Peach aroma	1 g	Flavour compound (Gamma-Undecalactone) by “Kitchen lab food” 

Method for note-by-note foam

1. Combine the liquid base with flavour compounds.
2. Add soy lecithin and blend briefly until dispersed.
3. Allow the mixture to rest for 2–3 minutes to hydrate.
4. Blend at the liquid surface using a hand blender to generate foam.
5. Spoon the foam onto the plated dish immediately before serving.

Maltodextrin Crumb (exposed ground)

The crunch component was designed to provide textural contrast and visually represent fragmented earth surrounding a melting glacier. Maltodextrin and albumin powder were used to create a dry, sand-like texture that contributed both crispness and visual structure to the plated concept.

Equipment for maltodextrin crumb

The crunchy component was included to provide textural contrast and improve mouthfeel variation. Maltodextrin and albumin powder were used to create a toasted sand-like structure.

Equipment	Specification / Description
Weighing scales	Digital (0.01 g accuracy)
Mixing bowl	For dry blending
Spoon or spatula	For mixing
Baking tray	Oven-safe tray
Oven	Temperature controlled
Sieve	For particle sizing

Ingredients for maltodextrin crumb (Portions: 21)

Ingredient	Quantity	Description
Albumin powder	40 g	Egg white powder by “Louis Francois” 
Maltodextrin	25 g	Maltodextrin 12DE by “Sosa”

		
Dextrose	3 g	Sweetener
Salt	2 g	Flavour enhancer
Water	13 g	Granulation aid
Sugar	3 g	Caramelisation support 

Method for note-by-note maltodextrin crumb (Exposed Ground)

1. Combine albumen powder, maltodextrin, dextrose, salt, and sugar in a bowl.
2. Mix thoroughly until evenly distributed.
3. Gradually add a small amount of water while mixing to form irregular crumbs.
4. Spread the crumbs evenly onto a baking tray.
5. Bake at 150°C for 12 minutes, stirring once halfway through baking.
6. Remove from the oven and allow to cool completely.
7. Break gently and sieve into varied particle sizes for plating.
8. Use as a crunchy garnish to provide contrast to the mousse and foam components.

Isomalt glacier

The glacier was developed to symbolise a melting glacier and reinforce the environmental theme of global warming. Produced from isomalt, the component created a transparent, glass-like structure that visually resembled fractured ice while adding crisp textural contrast to the softer elements of the dessert.

Equipment for Glacier

Equipment	Specification / Description
Stainless steel saucepan	Heat resistant
Spatula	Heat resistant

Ingredients for Glacier (Portions: 10)

Ingredient	Quantity	Description
Isomalt	100 g	Sugar substitute (E953) by " Louis Francois" 
Water	10 g	Dissolution medium
Ice	200g	Bowl of ice 

Method for Glacier

1. Add isomalt and water to a 2–3 L stainless steel saucepan

2. Heat for approximately 5 minutes on medium heat while stirring until fully dissolved and clear

3. Pour the mixture into a bowl of ice to create the glacier shape

4. Allow it to cool for 1 minute, then carefully remove the set isomalt garnish from the ice.

Nutritional calculation method

Calorie content was estimated from the plated amount of each ingredient in one final dessert portion. Energy values were calculated using supplier information where available and standard energy values for carbohydrates and proteins. Water, colourings, and aroma compounds used in very small amounts were treated as negligible.

Costing method

Ingredient cost was estimated by dividing the purchase price of each ingredient by the pack size to calculate an approximate cost per gram. The cost per portion was then calculated based on how much of each ingredient was used in one plated dessert. When a full recipe made several portions, the total ingredient cost was divided by the number of portions. Labour, electricity, equipment, water, ice, and very small aroma additions were not included.

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The final dessert combined several contrasting elements to communicate the concept of a melting glacier. As shown in Figure 6, the dish was built around a blue mousse, glossy glaze, soy lecithin foam, isomalt glacier garnish, and crunch crumbs. Each component had both a visual and sensory function within the final plate.

The mousse formed the central structure of the dessert, while the glaze created a glossy meltwater effect across the surface. The foam added lightness and a temporary, unstable visual effect, supporting the idea of melting and disappearance. The isomalt garnish added height and transparency, while the crunch crumbs provided dryness and crispness. Together, these components created a layered composition with contrasts in softness, gloss, crispness, dryness, and aeration.

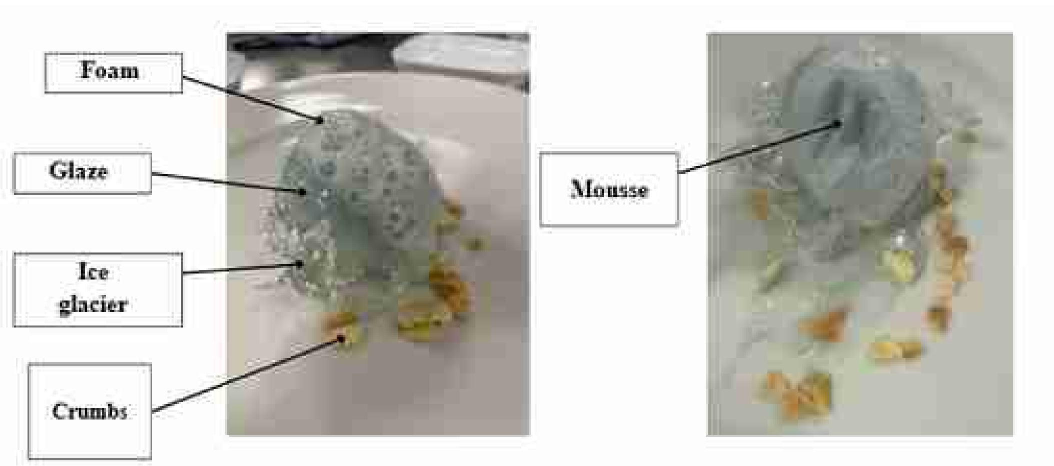

Figure 6. Final Dish Concept

The main limitation was flavour balance, especially the relationship between acidity, sweetness, and aroma intensity. Future trials should reduce the citric acid level in the glaze and adjust sweetness and aroma concentration to create a smoother and more balanced flavour profile. The final dish successfully communicated the melting glacier concept, but further refinement would improve the eating experience as well as the visual impact.

Calories

The 14th International Contest for Note-by-Note Cuisine focuses on reducing production costs, preparation time, and calorie content while maintaining flavour (International Centre of Molecular and Physical Gastronomy, 2026). Note-by-note cuisine involves constructing dishes from pure compounds or mixtures of compounds, allowing properties such as flavour, odour, colour, shape, and texture to be controlled separately (This, 2014).

The relatively low energy content of approximately 118 kcal per portion was mainly achieved by replacing fat-rich ingredients with water-based systems structured using hydrocolloids. Hydrocolloids can provide viscosity, gelation, and stability at low concentrations, which makes them useful for building texture without adding large amounts of fat or solids (Phillips and Williams, 2009; Saha and Bhattacharya, 2010).

Most of the calories came from sugar in the mousse and glaze, together with the isomalt glacier and the crunch component. The mousse contributed the most energy, at approximately 53.3 kcal, mainly due to its sugar content. The glaze contributed around 27.3 kcal, while the isomalt glacier added 24 kcal. In contrast, the foam contributed only about 1.2 kcal, because it consisted mainly of water with a small amount of soy lecithin.

The use of individual aroma compounds also helped support calorie reduction. Instead of using fruit purées, cream-based flavourings, or nut pastes, the flavour profile was built from small quantities of aroma compounds such as vanillin, sotolon, benzaldehyde, linalool, gamma-undecalactone, and citral. As a result, flavour complexity could be introduced without adding a significant amount of calories.

Overall, the results in Table 1 show that the dessert met the calorie-reduction aim of the competition while still containing several contrasting components. The main limitation is that sugar still represented the largest source of energy, especially in the mousse and glaze. Future reformulation could therefore explore reducing sucrose levels, replacing part of the sugar with lower-calorie sweeteners, or decreasing the amount of isomalt used in the garnish while maintaining the same visual effect.

Table 1. Calories of the final glacier

Recipe	Weight in grams	Calories
Mousse (50 g plated)		
Water	35.81	0
Sugar	11.55	46.2
Ultrawhip (Sosa/MSK)	1.21	0.69
Xanthan gum (Sosa)	0.12	0.20
Agar agar (En Place)	0.87	6.19

Blue food colouring	0.12	~0
Vanillin	0.23	~0
Sotolon aroma	0.03	~0
Almond aroma / benzaldehyde	0.06	~0
Mousse subtotal	**50.00 g**	**~53.3 kcal**
Glaze (20 g plated)		
Water	12.42	0
Sugar	6.21	24.8
Pectin (Sosa)	1.04	1.66
Citric acid (Louis François)	0.25	0.81
Blue food colouring	0.03	~0
Floral aroma / linalool	0.01	~0
Peach aroma / gamma-undecalactone	0.03	~0
Lemon cola aroma / citral	0.02	~0
Glaze subtotal	**20.00 g**	**~27.3 kcal**
Foam (~7 g plated)		
Water	6.84	0
Soy lecithin (Sosa)	0.14	1.24
Peach aroma / gamma-undecalactone	0.03	~0
Foam subtotal	**7.00 g**	**~1.2 kcal**
Crunch crumbs (4 g plated)		
Albumin powder (Louis François)	1.86	6.42
Maltodextrin 12DE (Sosa)	1.16	4.41
Dextrose	0.14	0.56
Sugar	0.14	0.56
Salt	0.09	0
Water	0.60	0
Crumb subtotal	**4.00 g**	**~12.0 kcal**
Glacier (10 g plated)		
Isomalt (Louis François)	10.00	24.0
Glacier subtotal	**10.00 g**	**24.0 kcal**
Total calories per dessert	**91.00 g**	**~118 kcal**

Production cost

Production cost was evaluated because the competition specifically asks competitors to reduce production costs while maintaining flavour (International Centre of Molecular and Physical Gastronomy, 2026). As shown in Table 2, the estimated ingredient cost of The Last Glacier was approximately €0.59 per portion (see appendix B for cost list). This was mainly achieved by using water, sugar, and small amounts of functional ingredients. Although ingredients such as Ultrawhip, pectin, lecithin, and isomalt are specialised, only low quantities were needed per portion. The mousse was the most expensive component, while the foam had the lowest cost. However, this calculation only includes ingredient cost and does not include labour, electricity, or equipment.

Table 2. Production cost of the final glacier

Component	Simple calculation	Approx. cost (€)	Comment
Mousse (50 g)	Sugar + agar agar + Ultrawhip + xanthan gum per portion	~0.28	Main costs came from agar agar and Ultrawhip. Aroma compounds and colour were negligible.
Glaze (20 g)	Sugar + pectin + citric acid per portion	~0.09	Pectin was the main cost contributor. Aroma compounds and colour were negligible.
Foam (~7 g)	5 g soy lecithin ÷ 36 portions	~0.01	Water cost was negligible.
Crunch crumbs (4 g)	Albumin powder + maltodextrin + dextrose per portion	~0.10	Albumin powder and maltodextrin were the main cost contributors.
Glacier (10 g)	100 g isomalt ÷ 10 portions	~0.11	Based mainly on isomalt cost. Water cost was negligible.
Total dessert cost	0.28 + 0.09 + 0.01 + 0.10 + 0.11	**~0.59**	**Approximate ingredient cost per plated dessert.**

Production time

Production time was important because the competition rewards dishes that can be presented efficiently during the final stage (International Centre of Molecular and Physical Gastronomy, 2026). As shown in Table 3, the full preparation time was approximately 96 minutes when steps were overlapped. The mousse and maltodextrin crumb required the longest preparation time, while the glacier and foam were faster components. Final plating took approximately 1 minute, since the main components could be prepared in advance. This makes the dish suitable for fast final assembly, although the foam still needs to be produced immediately before serving because of its limited stability.

Table 3. Production time of the final glacier

Component	Time
Mousse	60 min
Glaze	25 min
Foam	10 min
Maltodextrin crumb	35 min
Glacier / sugar glass	10 min
Plating	1 min
Total with overlapping steps	**96 min / 1 h 36 min**

Feasibility and Reproducibility

The dish was practical to produce using standard kitchen equipment, including scales, saucepans, moulds, a hand blender, an oven, and a freezer. Most of the preparation steps were straightforward and reproducible, such as mixing, heating, whipping, cooling, baking, and plating.

The main limitation was the need for precision. Small amounts of aroma compounds, hydrocolloids, citric acid, and colourings were used, meaning that minor weighing errors could affect the flavour, texture, acidity, or colour of the final dish. The foam also needed to be prepared close to serving, as it lost stability over time. The isomalt garnish was less predictable in shape, although this variation supported the fractured glacier appearance. The dish was feasible to make, but accurate weighing and careful timing were important for consistent results.

Conclusion

In conclusion, this project showed that note-by-note cuisine can be used to create a plated dessert that responds to the brief of reducing cost, time, and calories while still maintaining flavour, texture, and visual appeal. Over the development process, The Last Glacier was created as a plated dessert inspired by melting glaciers and climate change. The dish used selected compounds and functional ingredients to build the main sensory elements of a dessert, including structure, aroma, colour, mouthfeel, and contrast.

The final dessert contained approximately 118 kcal per portion and had an estimated ingredient cost of approximately €0.59. These results were mainly achieved by using water-based systems structured with small amounts of hydrocolloids instead of relying on traditional high-fat dessert ingredients such as cream, butter, or large amounts of chocolate. The preparation time was approximately 96 minutes when steps were overlapped, while final plating took around 1 minute, as most components could be prepared in advance.

The dish was successful in creating a strong visual and textural experience through the soft mousse, glossy glaze, light foam, dry maltodextrin crumb and transparent isomalt glacier. These elements helped communicate the idea of a melting glacier while also showing how note-by-note cuisine can be used creatively to design food from functional components rather than conventional recipes.

However, some improvements could still be made. The acidity of the glaze could be reduced to create a more balanced flavour, and the soy lecithin foam could be further stabilised to improve its consistency during service. The Last Glacier demonstrates the potential of note-by-note cuisine as a future-focused approach to dessert design. It shows that lower-calorie and low-cost desserts can still be creative, flavourful, efficient, and visually meaningful.

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