TU Dublin entries for the 2026 NbN Contest

Reduce production costs and time, reduce calories, but mind the flavour.

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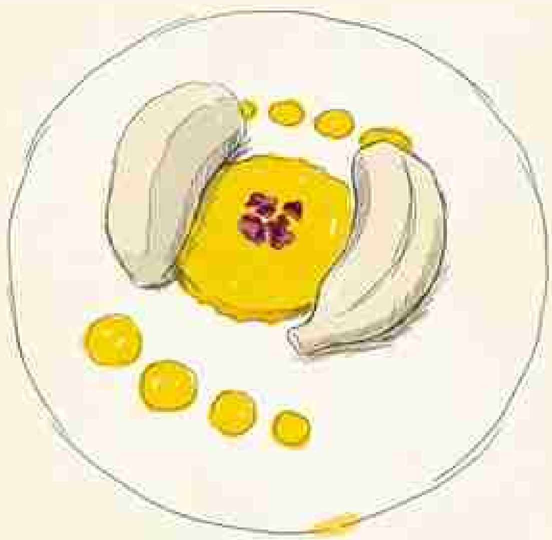
Note by Note by PeDRO PABLO ALVAREZ



Material and methods

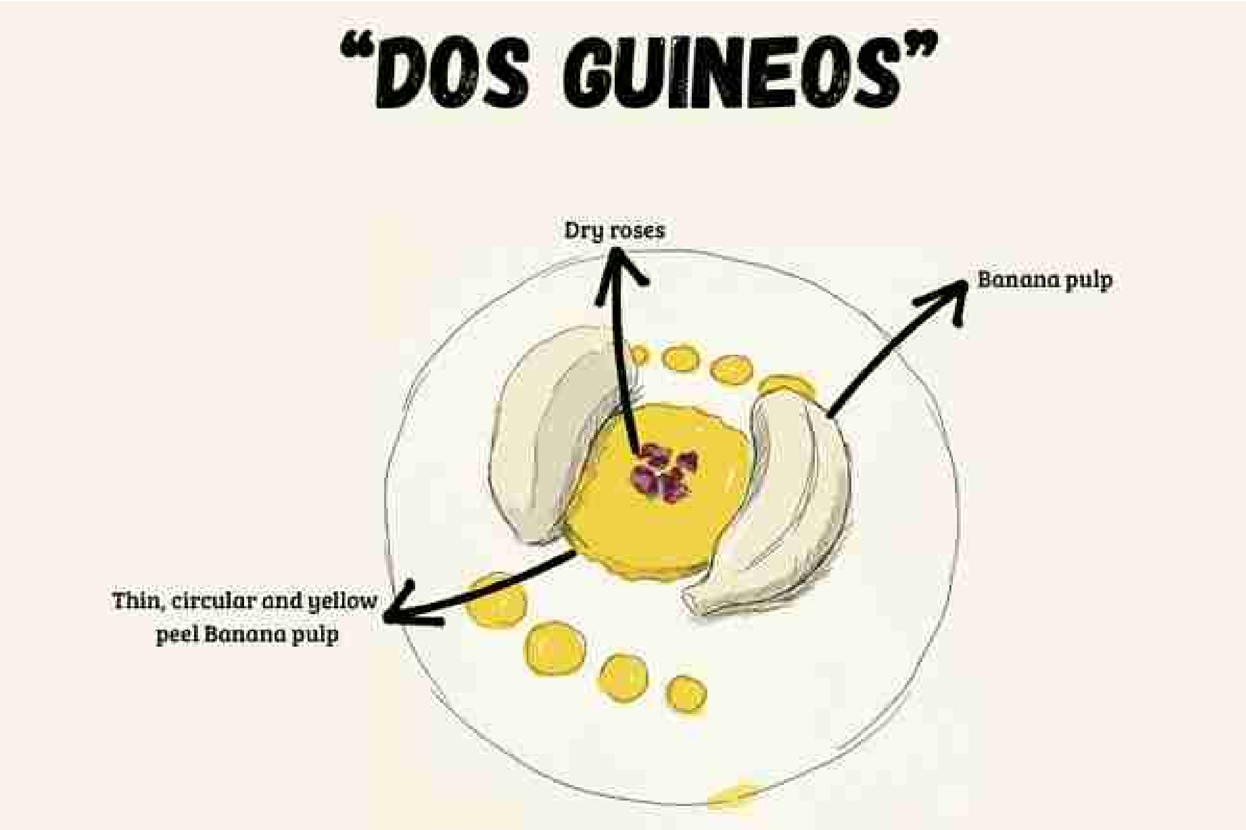


Figure 1 Final dish design

Materials

Table 1. Ingredients list

Banana pulp			Banana peel		
Ingredient	Brand	Percentage	Ingredient	Brand	Percentage
Water	N/A	65%	Water	N/A	79,4%
Potato starch	Family elephant	15%	Whey isolate	myprotein	10.8%
Edulcorant	splenda	1%	Sugar	gem	5.4%
Arabic gum	Special ingredie	0,3%	Cocoa butter	DGF royal	2.7%

	nts				
Cocoa butter	DGF royal	0,3%	LM pectin	SOSA	0.86%
Celulose fiber	Nutri Cology	0,2%	Yellow coloring	Maillard Ferrière	0.37%
Cacao aroma	SOSA	0,1%	Lecithin	SOSA	0.22%
Whey protein	myprotein	0,07%	Calcium chloride	msk	0.22%
Pectin	SOSA	0,05%	Passionfruit flavouring	Special ingredients	0.02%
			Roses flavouring	msk	0.02%

Equipment

-Knife

-Cutting board

-Bowls

-Pot

-Rolling pin

-Refrigerator (Brand: COOL HEAD)

-Hand blender (Brand: Robot coupe , Model: mini M.P. 160 V.V.)

-Scale (Brand: Jadever, Model: JWP)

- Stove (Brand: Electrolux, Model: Gas stove - 4 burner - gas oven.

Methods. Recipe

Banana Pulp

Phase 1 – Hydrate the gum arabic (cold process)

Weigh 30 g of gum arabic.

Weigh 400 g of water (from a total of 618 g to be used later).

Whisk at low speed (avoid creating bubbles).

Let it rest for 30 minutes at room temperature.

Visual check: It should be a liquid gel, with no lumps or specks.

Phase 2 – Prepare the cocoa butter paste with sweetener and whey

Weigh 30 g of cocoa butter.

Weigh sucrose.

Weigh 7 g of whey isolate protein.

Melt the cocoa butter at 40 °C (using a water bath).

Mix the sucrose+ whey (dry blend).

Pour the melted cocoa butter over the dry mixture.

Mix with a spatula until get a thick, smooth, shiny paste.

Phase 3 – Prepare the dry solids

In another dry bowl, weigh:

150 g waxy potato starch

20 g cellulose fiber

5 g pectin

Mix the dry solids well.

Phase 4 – Combine all phases

Take the already hydrated gum arabic (from Phase 1).

Add the remaining cold water:
618 g total – 400 g already used = 218 g cold water.

Add the cocoa butter + sweetener + whey paste (from Phase 2).

Add flavoring and cocoa aroma to taste.

Blend with a hand blender until the paste is completely dissolved.

Phase 5 – Incorporate solids and activate cold thickening

Add the dry solids (from Phase 3) in a rain-like manner, while stirring constantly.

Blend for 2 minutes to ensure the starch is fully hydrated in cold conditions.

Phase 6 – Final heating

Heat the mixture over medium-low heat for approximately 5–8 minutes, until it reaches 75 °C.

Phase 7 – Final texture check

The final texture must be: Thick mass, Heavy, Shiny, Partially releasing from the walls of the pan

Place the batter into the banana-shaped mold

The number of portions for this recipe based on a batch of 400 g. its 11 taking into account that each banana pulp contain approximately 35 g.

Banana Peel

Phase 1 – Hydrate the LM pectin (warm process)

Weigh the sugar and LM pectin.

Weigh the water (from the total water, separated).

Dry-mix the sugar and pectin until uniform.

Heat the water to 40–45°C.

Sprinkle the sugar-pectin mix slowly while whisking gently by hand.

Whisk until slightly viscous and no lumps are visible (2–3 min).

Visual check: Translucent liquid gel, no clumps or granules.

Phase 2 – Hydrate the whey isolate

Weigh the whey isolate.

Weigh the remaining water (from the total).

Heat the water to ~35°C.

Sprinkle the whey slowly while whisking gently.

Whisk until milky and completely smooth.

Phase 3 – Emulsify the fat phase

Weigh the cocoa butter and lecithin.

Melt the cocoa butter gently at low heat (bain-marie).

Stir in the lecithin until homogeneous.

Phase 4 – Combine base mix

Blend Phase 1 and Phase 2 together.

Add Phase 3 while whisking gently.

Add yellow coloring and passionfruit and roses flavoring.

Whisk until uniform and creamy.

Visual check: Even, creamy emulsion, no oil droplets on surface.

Phase 5 – Calcium gelation

Dissolve calcium chloride in the extra water.

Ensure the base mix is at ~35°C.

Pour the calcium solution in a thin stream while whisking vigorously.

Stop whisking as soon as thickening occurs (about 10 seconds).

Visual check: Soft, uniform gel, no liquid separation.

Phase 6 – Molding and setting

Pour immediately into the flat mold.

Cover with plastic film in contact with the surface.

Refrigerate for at least 4 hours.

Assembly procedure

Remove the banana pulp from the mold. Distribute the material along the periphery of a flat circular plate.

From the pre-chilled mold of the banana peel, obtain circular portions. With a flat spatula, transfer each circular portion and position it at the plate's center.

Place rose petals centrally atop the circular portion.

Figure 2 Final ensembled Dish

Methods. Nutritional calculation Methods

Due to the fact that Nutritics of the leading platforms for immediate nutritional value calculation does not contain data for the majority of additives used in the product under development (*Nutritics | Food Data Management Software*, 2026), a manual approach was adopted. Caloric content and nutritional information for each ingredient were individually sourced from supplier websites. Approximate values were then calculated based on a 100 g serving and the established recipe percentages.

Methods. Costing

The costing methodology was established based on ingredient prices provided by TU Dublin for specific bulk quantities. To determine the final price per portion of 35 grams, proportional cost relationships were adapted to the exact amounts utilized in the formulation. Initially, the final percentage of each ingredient within the recipe was calculated. A standardized batch was subsequently prepared using the indicated quantities, and the total mass yield of this production was measured. This total mass was then divided by the target portion size to ascertain the number of portions obtained per batch. Following this, the cost of the specific quantity of each ingredient used in the batch was correlated against the provided TU Dublin unit prices. Finally, the sum of all proportional ingredient costs was divided by the number of portions yielded from the batch, resulting in the precise cost per individual portion.

Regarding the nutritional score, based on the calculations carried out, the product provides 66 kcal per 100 grams. This energy value comes mainly from carbohydrates, in the form of starch, sugar, and Splenda, while protein is supplied exclusively by Whey Protein and the total fat fraction derives from cocoa butter. Additionally, the product contains fiber, contributed by gum arabic, cellulose, and pectins. Although one of the main objectives was to develop a low-calorie banana alternative with a high protein content, this latter goal was not satisfactorily achieved, as the protein percentage remained around 2.5%, which is rather modest for it to be considered a meaningful source of this macronutrient. However, the energy contribution per serving yielded more favorable results. Each regular 35 g serving contains only 23 kcal, which does meet the goal of offering a reduced-calorie product. In fact, when compared to an actual banana in the same amount, the latter would provide around 31 kcal, representing a 25% increase in energy relative to the developed product (Prescott, 1918).

Regarding the production costs, the total for an 11-serving batch was broken down into its two main components. The pulp, prepared from a 400 g batch, had a cost of 0.81 €, which translates to just 0.07 € cents per serving. On the other hand, the peel turned out to be the most significant factor driving up the overall cost. With a batch of 360 g costing 2.32 €, this was largely due to the inclusion of Whey Protein, which alone accounted for 84% of the peel's price. Despite this, the objective of keeping the product affordable was successfully met. The combined cost of pulp and peel worked out to 0.22 € cents per serving, a figure that remains quite convenient from an economic standpoint.

Flavor, odor & color development

For flavor, odor, and color development, raw cacao flavor was incorporated into the pulp matrix as the principal flavor in this dish. On the other hand, passion fruit flavor was used in the peel. Regarding the latter, passion fruit flavour drop is not a food additive but a flavouring; it has no legal maximum limits under EU Regulation (EC) No 1334/2008, though it must follow Good Manufacturing Practice (GMP), and the manufacturer recommends 0.3%-1.0% for desired taste. This combination exhibits high compatibility due to the passion fruit is dominated by sulfur-containing volatile compounds such as ethyl hexanoate and linalool, alongside high acidity (Narain *et al.*, 2004). Whereas dark cacao contains sharp, fruity, acidic notes derived from acetic, citric, and lactic acids (Santander *et al.*, 2021). Consequently, both matrices share similar volatile aroma compounds. Furthermore, a rose odor was incorporated into the peel. Rose flavour is likewise not a food additive but a flavouring, and under EU Regulation (EC) No 1334/2008 it has no usage limits provided it meets EU safety criteria. Raguso, (2016) demonstrated that adding rose-associated compounds such as linalool and geraniol to passion fruit aroma increases perceived tropical fruit intensity, indicating synergistic olfactory interaction.

In contrast, Banana flavor was deliberately excluded from this flavor and aroma mixture because the initial objective was to retain only its appearance and texture, allowing diners to experience unexpected flavors and odors upon consumption. This decision is further supported by the orthogonal (non-overlapping) nature of their dominant odor profiles: banana’s key aroma molecules such as isoamyl acetate, eugenol (Jordán *et al.*, 2001) do not share chemical receptors or volatile binding sites with passion fruit’s sulfur-containing esters, leading to perceptual segmentation rather than blend integration.

Regarding color, the pulp's white appearance required no added colorants, as the raw materials naturally mimic banana pulp's aspect, while the peel presented a yellow color, thereby preserving the banana's overall structure and appearance. A natural, oil-soluble yellow colouring from Mallard Ferrière was used. It is derived from safflower (*Carthamus tinctorius*) and lemon. As it consists solely of plant-based ingredients processed by physical means, it is not classified as a food additive under EU Regulation 1333/2008. Therefore, it bears no E-number and is not subject to additive usage limits.

Conclusions

A dessert replicating the form and texture of a banana was successfully developed, characterized by a simple assembly process supported by complex food materials science. The formulation required the simultaneous resolution of multiple structural challenges: the engineering of complex multiphase systems, the stabilization of emulsions between immiscible phases, the incorporation of air into the emulsion matrix to modulate texture, and the strategic use of diverse dietary fibers to provide structural integrity. All these elements were arranged with the singular goal of mimicking the rheological properties of banana pulp.

The design process was grounded in the principles of Food materials Structures and technologies. The behavior of constitutive elements was predicted by analyzing the composite food matrix across different observation scales, from the molecular to the macroscopic level. This predictive structural design was informed by an integrated review of scientific literature and fundamental texts in food science and analysis, allowing for an engineered approach to the product's architecture.

The final product achieved the target economic and nutritional profiles, with a cost of €0.22 per 35g banana and a caloric value of 23 kcal per unit, representing a significant calorie reduction compared to a real banana. Furthermore, a precise sensory equilibrium was attained, encapsulating the representative flavors and aromas of Ecuador's primary export raw materials: banana, cocoa, roses, and passion fruit.

Regarding the replication of the banana peel, the theoretical model predicted a fixed, stable gel-like pulp. However, the initial applied technique proved incorrect, as the resulting product exhibited syneresis. Achieving the exact desired texture for the peel will therefore require further experimental sessions. Key processing parameters must be rigorously controlled, including precise pH measurement to manage the isoelectric point of the proteins, regulation of the calcium chloride concentration for ionic cross-linking within the matrix, fine-tuning of the pectin content, and strict temperature precision.

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Irazú Volcano Crater Dish By Veronica ARIAS

Figure 1. Irazú Volcano National Park

Figure 9 illustrates the final assembly [illegible] where all components were combined to recreate the visual and sensory characte[illegible] the Irazú volcanic landscape. All additives used in this dish, namely sodium alginate [illegible]401), calcium gluconolactate (E578), activated charcoal (E153), isomalt (E953), sucrose esters (E473) and the blue colorant, are authorized and used within the permitted levels established under EU Regulation (EC) No 1333/2008.

Irazú Volcano dish.

Materials and Method

Volcanic Ash

Ingredients

Ingredient	Quantity	Description
Glucose powder	20 g	Gem. Glucose, 453 g.
Activated charcoal	1.5 g	Bamboo charcoal powder (Ref: 132), 50 g. Origin: Japan. Imported by: Umami.

Equipment

• Scale

• Bowl

• Spoon

Method

1. Mix the glucose powder with the activated charcoal in a bowl.

Crater Lagoon

Ingredients

Ingredient	Quantity*	Description
Water	500 g for alginate bath 100 g for calcium solution	Tap water.
Sodium alginate	3 g	Sosa. Alginato de sodio en polvo (E401), 500 g.
Calcium gluconate	4 g	Sosa. Lactato de calcio (E327), gluconato de calcio (E578), 500 g.
Blue colorant	3 g	Mallard Ferrière. Blue coloring foodstuff lipid-dispersible, 100 g.
Watermelon aroma	3 drops	Sosa. Sandia Aroma, 50 g.

* *This formulation yields approximately 8 spheres of 15 mL.*

Equipment

• Scale

• Bowls

• Hand blender

• Measuring spoon (15 mL)

• Perforated spoon

Method

1. For the sodium alginate bath, mix water and sodium alginate with a hand blender.

2. For the calcium solution, mix water, calcium gluconate, blue colorant, and aroma with a

hand blender.

3. Vacuum both solutions to remove air bubbles. Let them rest for 10 mins.

4. Using a measuring spoon, gently introduce a spoonful of the calcium solution into the

alginate bath and hold for 2 mins.

5. Gently release the sphere into the alginate bath and leave for 5 minutes to complete gel

formation.

6. Transfer the sphere to a clean water bath to rinse off excess alginate and stabilize the

surface before plating.

Vegetation

Ingredients

Ingredient	Quantity	Description
Isomalt	100 g	Isomalt E953, DGF Service, 5 kg.
Water	10 g	Tap water.
Green gel colorant	2 drops	Mallard Ferrière, Il Punto Italiana, Cake Decoration, Concentrated gel, colorant hydrosoluble, Apple Green, 100 g.

Equipment

• Pot

• Silicon spatula

• Silicon mat

• Silicone mould

Method

1. Heat isomalt with water to 160 °C until fully melted.

2. Let it cool to 140 °C, then add colorant and aroma.

3. Pour it into the silicone mold placed on a silicone mat.

4. Let cool completely until hardened and unmold.

Gas Plume Foam

Ingredients

Ingredient	Quantity	Description
Sucrose ester	2 g	Special Ingredients. Sucrose Ester, Emulsifier & Stabilizer, 100 g.
Water	100 g	Tap water.
Pineapple aroma	3 drops	Sosa. Piña Aroma Natural, 50 g.

Equipment

• Plastic bowl

• Microwave

• Deep container

• Hand blender

• Spoon

Method

1. Mix all the ingredients in a plastic bowl.

2. Heat the solution in the microwave for 1:30 mins.

3. Pour it in a deep container and blend for 30 seconds.

4. Let the foam stabilize for 10-15 seconds.

5. Collect the foam with a spoon and plate it.

Nutritional Analysis

The nutritional analysis of the dish was performed using Nutritics software. The total energy per portion was calculated as 282 kcal, and the contribution of each component was determined based on the percentage breakdown provided by the software. The main contributor to the total energy was glucose powder from the volcanic ash (52%, 147 kcal), followed by isomalt from the vegetation component (43%, 121 kcal), and sugar ester from the gas plume foam (5%, 14 kcal) (Table 1). Water provides 0 kcal, and similarly, aroma compounds and colorants do not contribute significantly due to their negligible quantities. Activated charcoal also does not impact on the total energy value, as it is not digested or absorbed in the human body and therefore does not contribute to caloric intake (EFSA, 2012). In a previous formulation, sugar was included in the recipe. However, it was removed in the final version to reduce the overall caloric content of the dish and to moderate sweetness. Overall, the results show that the caloric content of the dish is primarily driven by carbohydrate compounds, with glucose powder and isomalt being the dominant contributors. When compared to traditional desserts, which often exceed 400 kcal per portion, this formulation demonstrates a reduction in overall energy content.

Table 1. Energy Contribution of Each Component per Portion (Nutritics Analysis)

Component	Ingredient	% contribution	kcal
Volcanic Ash	Glucose powder	52%	147
	Activated charcoal	0%	0
Crater Lagoon	Water	0%	0
	Sodium alginate	0%	0
	Calcium gluconolactate	0%	0
	Blue colorant	0%	0
	Watermelon aroma	0%	0
Vegetation	Isomalt	43%	121
	Water	0%	0
	Green gel colorant	0%	0
Gas Plume Foam	Sucrose ester	5%	14
	Water	0%	0
	Pineapple aroma	0%	0
Total		**100%**	**282**

Costs

The cost analysis of the dish indicates a total production cost of approximately €2.33 per

portion, demonstrating that the formulation aligns with the objective of maintaining a low-cost

design. The main contributors to the total cost were isomalt in the vegetation component

(€1.05) and glucose powder in the volcanic ash (€0.86), which together account for most of the expense. Other components, such as sodium alginate, calcium gluconolactate, colorants, and

sucrose esters, contributed minimally due to their low usage quantities. The cost contribution

of aroma compounds was negligible due to the very small quantities used. The results show

that, despite using specialized ingredients associated with molecular gastronomy, the overall

cost can be effectively controlled through careful selection and optimization of quantities.

However, the relatively high contribution of isomalt suggests that further cost reduction could

be achieved by exploring alternative structuring agents. Overall, the formulation demonstrates

that note-by-note cooking can be applied in a cost-efficient manner while maintaining the

desired sensory and conceptual outcomes (Table 2).

Table 2. Ingredient Cost Distribution for the Irazú Volcano Crater Dish.

Component	Ingredient	Cost per g	g in dish	Dish cost
Volcanic Ash	Glucose powder	0,04	20,00	0,86
	Activated charcoal	0,06	1,50	0,09
Crater Lagoon	Sodium alginate	0,12	0,38	0,04
	Calcium gluconolactate	0,07	0,50	0,03
	Blue colorant	0,08	0,38	0,03
	Watermelon aroma	0,70	0,00	0,00
Vegetation	Isomalt	0,01	100,00	1,05
	Green gel colorant	0,07	0,00	0,00
Gas Plume Foam	Sucrose ester	0,12	2,00	0,23
	Pineapple aroma	0,70	0,00	0,00
Total		**1,96**	**124,75**	**2,33**

Conclusion

The objectives of this project were successfully achieved through the development of a note by-note dish inspired by the Irazú Volcano crater landscape of Costa Rica. By using pure

chemical compounds as the main building blocks, the project demonstrated how molecular

gastronomy principles can be applied to construct a complete culinary experience while

controlling texture, flavor, color, and structure at the molecular level.

A balanced sensory experience was obtained through the combination of contrasting

elements, including the powdered volcanic ash, liquid-core crater lagoon, crisp isomalt

vegetation, and aerated gas plume foam. Tropical fruit aromas such as watermelon and

pineapple contributed to the conceptual connection with Costa Rica and were positively

perceived during sensory evaluation. In particular, the visual appearance of the dish received

the highest sensory scores, confirming the successful recreation of the volcanic landscape.

The formulation and preparation process were also optimized to support the objectives of

reducing production time, caloric content, and cost. Simplification of formulations, elimination

of unnecessary ingredients, and the use of rapidly setting systems such as isomalt and hand

blended foam contributed to efficient preparation. The final dish presented a relatively

moderate caloric value of 282 kcal per portion and a production cost of approximately €2.33,

demonstrating that note-by-note cuisine can be developed in a cost-efficient and lower-calorie

manner without compromising creativity or sensory quality.

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Snow Egg by Kruti Anegundi

Equipment:

Name	Quantity
Small pots	x2
Whisks	x1
Immersion blender	x1
Oven	x1
Sphere silicon mould	x1
Microwave	x1
iSI gun	x1
Freezer	x1
3D printer	x1
Silicon Mat	x1
Rotary evaporator	x1
Trays	x2
Slotted spoons	x1
Bowls	x6
Glass (plating)	x1
Precision micro-scale	x1

Recipe and Method

Meringue: *(Burke et al., 2021)*

Ingredients	Quantity	Brand	Composition
Water	100g	Tap water	H_2O
Albumin Powder	10g	Sosa Albuwhip	Albumin (Amino Acid)
Salt	1g	Table salt	Sodium Chloride
Sucrose	0.2g	Bulk Sports supplements	Sucralose (E955)
Flavor	0.15g	Culinaide Banana	Water, Mono Propylene Glycol,

Method:

- In water, add salt, sucrose, and flavor till it dissolves.
- Then add albuwhip powder and start whisking.
- Whisk till it starts to form stiff peaks like meringue.
- Once done, pour into individual moulds and microwave it for 15-20 seconds or double in size.
- Let it cool and then demould for use.

Gel (Yolk): *(Molecular Gastronomy, 2013)*

Ingredients	Quantity	Brand	Composition
Water	100g	Tap water	
Aroma	0.15g	Culinaide Banana	Water, Mono Propylene Glycol,
Color	0.2g <	Mallard Ferriere	Yellow E102, E422, E406
Calcium Lactate	2.5g	MSK ingredients	Lactate
Xanthan Gum	0.4g	En place foods	Xanthan
Alginate bath:			
Water	990g	Tap	H_2O
Sodium Alginate	10g	Sosa	Sodium Alginate (E401)
Sucralose	0.2g	Bulk Sports	Sucralose (E955)

Method:

- Prepare Alginate bath: combine sugar and alginate in water and whisk

Let it sit for 10minutes to hydrate.

- Prepare the Flavored liquid: Heat 100g of water until lukewarm, add calcium lactate, and stir till dissolved. Add xanthan gum and blend till combined. Then add color and aroma. Chill in the fridge for 10 minutes to remove air bubbles.
- Form the yolk: Fill a small spoon full of the flavored liquid (you can use a dropper or a squeeze bottle as well). Gently drop into the alginate bath and hold for a few seconds until it forms a thin solid layer on the surface of the liquid. Remove it with a slotted spoon, then drop it into a bowl of water to wash off the alginate on top of the sphere.

Maltodextrin Soil: *(Lersch, 2015)*

Ingredients	Quantity	Brand	Composition
Coconut oil	20g	KTC Food Group	Lauric acid (C12:0) [45-50%], Myristic acid (C14:0) [16-20%], palmitic acid (C16:0) [8-9%], Capric acid (C10:0)
Coconut natural flavor powder	10g	Culinaide	Natural plant fibers, Mono propylene Glycol (E1520), Natural flavoring substance
Maltodextrin	25g	Sosa	Sodium Carboxymethyl cellulose (E466)

Method:

- In a small bowl, measure out the coconut oil and melt it in the microwave. Then add the coconut-flavored powder to the melted oil. Let it cool to room temperature
- Start whisking maltodextrin into the oil mixture in parts, until it forms a dry soil texture.
- Can be stored in a vacuum-sealed pack for long-lasting texture and smell.

Jasmine Granita: *(This, 2014)*

Ingredients	Quantity	Brand	Composition

Water	100ml	Tap water	H2O
Glucose	10g	DGF Services	Glucose Syrup, Sodium bi-sulphate
Color	0.1g <	Mallard	Pink E129
Flavor	0.12g	Sosa Jasmine	

Method:

- In a pan, heat the water up to 60 degrees and mix the glucose till completely dissolved.
- Remove from the heat and mix the flavor and color. Cool the mixture and then transfer it into small trays.
- Freeze the granita completely. Scrape the granita to form the broken ice texture right before plating.

3D Printed Feather adapted from 3D printed lobster: *(Burke et al., 2021)*

Ingredients	Quantity	Brand	Composition
Corn flour	66g	Gem pack foods ltd	Amylose (25%), Amylopectin (75%)
Sucralose	0.2g	Bulk Sports supplements	Sucralose (E955)
Soy Protein isolate	28g	Bulk UK	Glycinin (11S) [52%], b-conglycinin (7S) [35%]
Salt	1g	Table salt	Sodium Chloride
EV olive oil	14g	Urzante	Olive oil (triglycerides 97%) (Oleic Acid)
Water	120g	Tap water	H2O

Method:

- Measure out all the dry ingredients in a bowl and wet ingredients in a separate bowl. Start pouring the wet ingredients into the flour while slowly mixing it.
- Form a semi-soft dough that resembles the dough of wet sand.
- The cartridge was filled with the piping bag up to the 60 mL mark, taking care to avoid air bubbles. The dosing tip was screwed onto the cartridge. “Pasta” was selected from the food items in the user interface, and the cartridge was inserted into the printer. Decide Dimension, Choose design.

Mousse: *(molecular recipes, 2014) (, 2014)*

Ingredients	**Quantity**	**Brand**	**Composition**
Water	65g	Tap water	H2O
Sucrose	0.1g	Bulk Sports supplements	Sucralose (E955)
Oil	15g	Urzante	Olive oil (triglycerides 97%) (Oleic Acid)
Lecithin	1g	Texturas (Alberty Ferranadria)	Soy lecithin (E322)
Xanthan	0.3g	En place foods	Xanthan
Soy protein Isolate	6g	Bulk UK	Glycinin (11S) [52%], b-conglycinin (7S) [35%]
Aroma	0.2g	Culinaide Banana	Water, Mono Propylene Glycol,

Method:

- Heat water in a pan up to 45 degrees, add soy protein, sucralose, xanthan and blend to lump free

- Combine oil and lecithin in a bowl and start pouring into the above mixture in a thin stream while blending it with a hand blender.
- Once a thin mayonnaise consistency is formed, cool the mixture to room temperature.
- Transfer into the iSI gun and charge it with the nitro cartridge. Shake upside down vigorously right before using.

Curry leaf Aromatizer: *(Shepherd, 2024)*

- Bath temperature: 35-40 °C (gentle, prevents cooking the botanicals)
- Vacuum pressure: 40–80 mbar (low pressure keeps temperature low)
- Rotation speed: 90–120 rpm
- Chiller temperature: –5 to +5 °C. Run the distillation until you collect 200–350 mL of clear, aromatic distillate

Assembly:

Final assembly involved layering the Mousse and Granita in a transparent glass. Once the mousse was aerated in the iSI gun and released, the crushed granita was spread across with a small well in the centre. The two halves of the poached meringue were used as a sandwich for the sphere gel (yolk) and were placed in the created well. After it was positioned, the granita was used to cover the gaps for a seamless finish. The meringue was dusted with the coconut soil to create the illusion of snow. Finally, it was topped with the 3D printed protein crisp, and an aromatizer was sprayed lightly


a

(MasterChef World, 2023)

Cost:

The use of note-by-note cuisine contributed to a reduction in overall production costs by ensuring precise control over quantities and minimizing waste. Sweeteners, proteins, and hydrocolloids were added in small amounts, reducing reliance on traditional ingredients such as eggs, cream, and fruits, which are perishable. Additionally, the modular presentation of the components enabled scaling batches to demand and reduced overproduction and spoilage. The high stability of the ingredients further reduced losses, demonstrating that the molecular structures can confer advantages and improve economic efficiency in professional kitchens.

The total cost per dish for this NBN Snow egg was €2.635, which provides a clear indication of profitability for large-scale production. Here is a clear breakdown of the food cost.

(The estimated quantity per recipe is an average of 4 dishes)

Ingredients		**Quantity**	**Units**	**Cost**
Calcium lactate		2.5	g	0.16
Egg white powder		10	g	0.56
Extra Virgin olive oil		19	ml	0.87
Cornflour		22	g	0.26
Xanthan Gum (E415		0.7	g	0.54
Lecithin E322		1	g	0.043
Maltodextrin		20	g	0.85
Coconut oil		20	g	0.555
Glucose syrup		10	g	0.06
Salt		0.5	g	/
Sodium alginate		10	g	1.29
Soy protein isolate		15	g	0.33
Sucralose		0.3	g	0.02
water		400	ml	/
Aroma (banana)		0.25	ml	0.018
Aroma (jasmine)		0.2	ml	0.46
Curry leaf		40	g	2.99
Vodka		40	ml	1.53
Colour (pink)		0.1		0.0021
Colour (Yellow)		0.1		0.0023
Total Cost (4 plates)				**10.5404**
Per Dish				**2.6351**

Final Results of the Components:

Figure 3 Molecular Yolk

Figure 4 Poached meringue

Figure 5 Banana Mousse

Figure 6 Jasmine Granita

Figure 7 Coconut Soil

Figure 8 3D printed protein crisp aromatizer

Figure 9 Curry leaf

Conclusion

This project showed that note-by-note cooking can be used to reimagine a complicated dessert based on Peter Gilmore's Snow Egg. The dish accomplished structural stability, sensory coherence, and eye appeal by building each part from separate compounds instead of using everyday ingredients like eggs, dairy, or fruit.

The final result showed that judicious use of proteins, hydrocolloids, and aroma compounds can recreate key flavor and texture attributes while also improving production and nutritional efficiency. Sensory evaluation indicated positive acceptance and validated the effectiveness of the molecular design approach.
Did you achieve your aim- reduce production costs, time and calories without compromising the flavour?
Overall, the project supports the use of note-by-note cuisine as a practical and innovative methodology in contemporary gastronomy, offering potential applications in low-calorie dessert design, sustainability-focused cooking, and culturally expressive culinary development.

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Appendices

Picture reference of the final dish:

Figure 10 AI-generated intended outcome

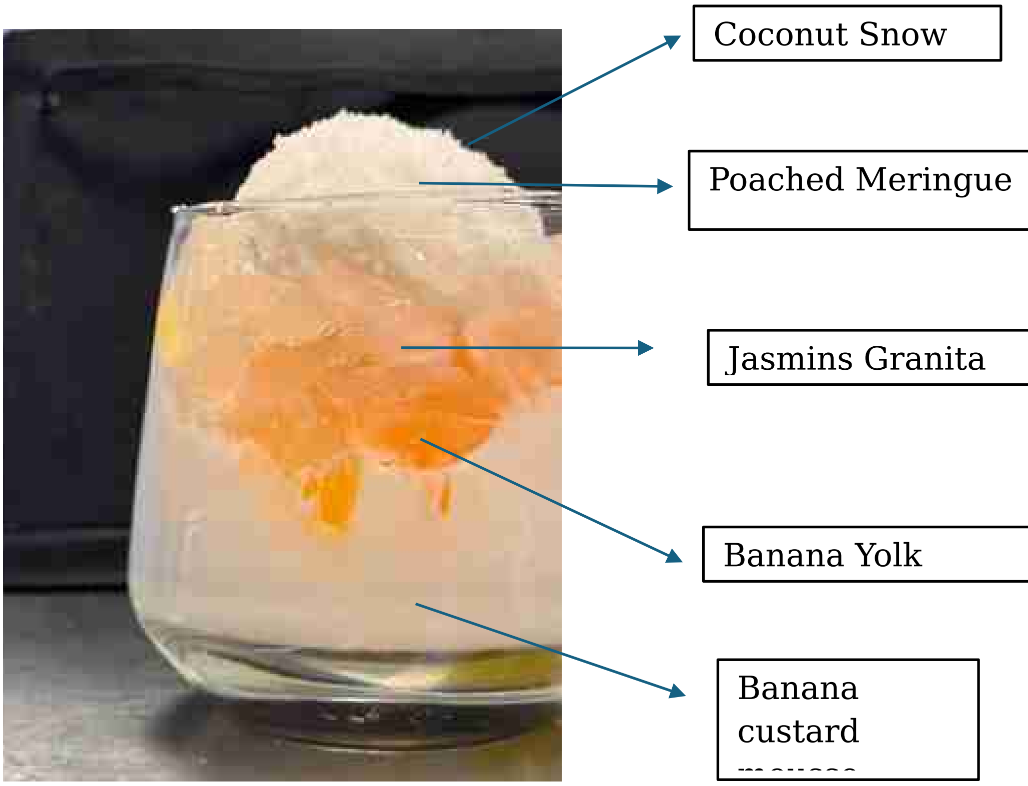


Figure 11 Outcome

Dish name: Oasis in the Desert by Shahanas Asharaf.

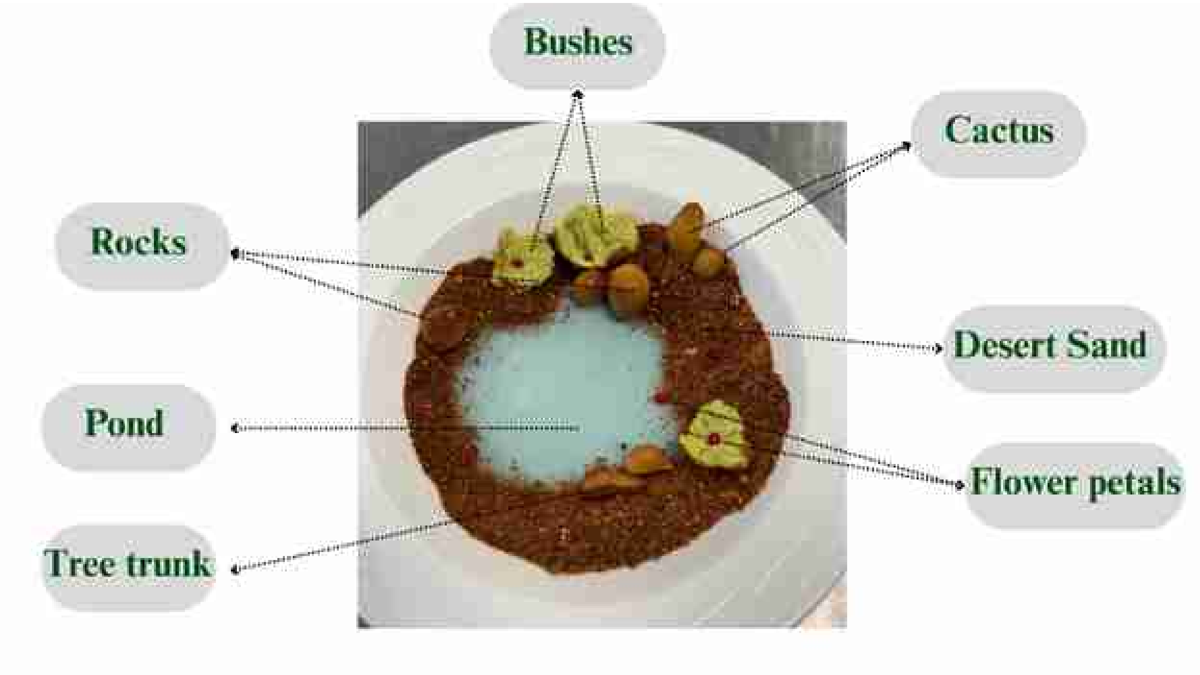


Figure 1. Final presentation of dish with all five components

Materials and Methods

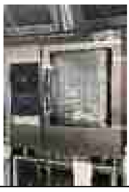
The note-by-note dish, ‘Oasis in the Desert’ consist of five components, each created entirely from pure compounds. The ingredients and formulations presented below is the final, refined versions after five laboratory sessions. Each component is designed to contribute specific visual and sensory experience to the overall dish.

Component 1: Desert Sand (Coffee and Caramel flavoured)

The desert sand is created as a dry, granular, golden-brown crumb that would cover the sides of the serving plate and imply the visual texture of desert sand. The flavour profile is designed to be warm, roasted, using coffee and caramel flavour compounds, also to evoke the earthy, sun-baked impact of a desert landscape.

Equipment

Digital weighing scales, mixing bowls, saucepan, spoons, whisk, silicone mat, silicone round mould, baking tray, oven, gas stove, thermo-mix.

Digital weighing scales	
Mixing bowls	
Silicone mat	
Silicone round mould	
Saucepan	
Baking tray	
Oven	

Gas stove	
Thermomix	

Table 1. List of equipment

Ingredients

Ingredient	Amount (g)	Supplier	Description/Function
Inulin (from chicory roots)	15	Sosa Ingredients 	Prebiotic fibre, bulking agents, adds sandy/ crumb texture
Whey protein isolate Protein Blend (**Milk**) (**Whey** Protein Isolate, **Whey** Protein Concentrate, Hydrolysed **Whey** Protein Isolate, Emulsifier: **SOY** Lecithin). May Contain**: Gluten, Egg, Nuts and Peanuts**.	6.25	Optimum Nutrition (Gold standard) 	Protein matrix, provide structure and binding during baking
Erythritol (E968)	4	Pure Via 	Zero-calorie sweetener (E968), adds mild sweetness
Soy lecithin (E322)	0.25	Sosa Ingredients 	Emulsifier (E322) improves texture and binding of dry matrix.
Caramel flavour (flavour, invert	1	Sosa Ingredients	Adds warm, sweet roasted notes

sugar, emulsifier: glycerine (E422))			
Coffee aroma	0.5	Proprietary aroma compound (No.12) 	Provides roasted, earthy aroma
Water	15	Tap water	Hydrate the mixture form a paste before baking

Table 2. List of ingredients of component 1: Desert sand

Method

1. Combine inulin, whey protein isolate, erythritol and soy lecithin in a stainless-steel bowl and whisk dry to combine well.
2. Add caramel and coffee flavourings. Mix thoroughly.
3. Gradually add water while stirring continuously until smooth, thick paste forms.
4. Spread the mixture thinly in a silicone mat.
5. Bake at 160℃ for 20 minutes in a pre-heated oven until dry and crisp.
6. Allow to cool completely and crush into coarse, sandy crumbs using Thermomix.
7. Store in an airtight container until plating.

Component 2: Pond (Vanilla flavoured)

The pond is designed as a smooth blue gel placed at the centre of the serving plate, indicating the oasis water source. Agar-agar is selected as the gelling agent in accordance with its ability to form clear gels at ambient temperature. The vanilla and pistachio flavour profile are used to impart a refreshing sensory experience.

Equipment

Digital weighing scales, stainless steel saucepan, whisk, spoons, shallow plate/serving plate, gas stove, toothpick.

Ingredients

Ingredient	Amount(g)	Supplier	Description/Function
Water	60	Tap water	Aqueous solvent base for the gel
Erythritol (E968)	3	Pure Via	Zero-calorie sweetener (E968)

			
Agar-agar (E406)	0.75	En Place/ In Place 	Polysaccharide gelling agent (E406), sets the gel at room temperature
Vanilla flavour [Invert sugar, Bourbon vanilla concentrate, caramel (sugar, water), spent vanilla beans]	2	Euro Vanille Natural Vanilla Flavouring 	Synthetic vanilla flavour, warm aromatic note
Pistachio aroma	0.5	Food-grade aroma 	Adds freshness
Blue colouring (Spirulina and apple) Reference no. 13648	0.5	Mallard Ferriere 	natural blue colour, visual water effect

Table 3. List of ingredients of component 2: Pond

Method

1. Combine water agar and erythritol in a saucepan. Whisk thoroughly to disperse the agar powder.
2. Place on the stove and bring to boil while stirring continuously. Maintain at boiling for 1 minute to hydrate and activate the agar.
3. Remove from heat and add vanillin, pistachio aroma and blue colouring (Mix the blue colouring powder with 1 ml of water then add to the agar mixture). Stir gently.
4. Pour into a shallow round serving plate and allow to rest at room temperature.

Component 3: Tree trunks, Cactus and Rocks (Chocolate flavoured)

This component serves as structural and visual effect for the dish. The tree trunks, cactus and rocks are mould into definite shapes by hand from a protein-rich dough which is then baked to achieve a firm, dry texture. Methylcellulose is used to provide the thermo-reversible binding properties required to hold the shapes during forming. A green colour spray is applied, and lines/dots are drawn on the cactus using a toothpick.

Equipment

Digital weighing scales, mixing bowls, spoon, cling wrap, parchment paper, baking tray, toothpick, fan oven, refrigerator

Ingredients

Ingredient	Amount(g)	Supplier	Description/Function
Whey protein isolate [Protein Blend (**Milk**) (**Whey** Protein Isolate, **Whey** Protein Concentrate, Hydrolysed **Whey** Protein Isolate, Emulsifier: **SOY** Lecithin). May Contain**:** **Gluten, Egg, Nuts and Peanuts**.]	6	Optimum Nutrition (Gold standard) 	Primary structural protein, provides body and binding to dough
Mannitol Sweetener: Mannitol (E421)	1.9	Sosa Ingredients 	Sweetener (E421), provides bulk, adds mild sweetness
Micellar casein **(Milk)**	1.25	Bulk ™ 	Milk protein, contributes density and chewiness to structure
Methylcellulose (Metilgel) [Thickener: Methylcellulose (E461)	0.16	Sosa Ingredients 	Hydrocolloid (E461), gels on heating to hold shape during baking
Soy lecithin (E322)	0.13	Sosa Ingredients	Emulsifier (E322), helps in moisture distribution in the dough

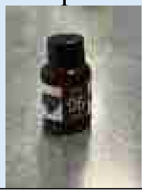
			
Chocolate flavour (Cocoa No.6)	0.1	Proprietary aroma compound 	Earthy, woody, cocoa aroma
Brown colouring	0.08	Punta Italiana 	Gel colouring, gives brown/earthy appearance
Water	3.2	Tap water	Hydrates the proteins and hydrocolloid matrix to form a workable dough

Table 4. List of ingredients of component 3: Tree trunks, Cacti and Rocks

Method

1. Combine whey protein isolate, micellar casein, mannitol, methylcellulose and soy lecithin in a mixing bowl. Whisk thoroughly.
2. Add brown colouring and cocoa flavour to the dry ingredient mixture and combine well using a whisk.
3. Add water gradually and knead the mixture to form a semi-solid dough.
4. Cover with cling wrap and refrigerate for 10 minutes for proper hydration.
5. After removing from the refrigerator, wet the hands with tap water slightly and mould into desired shapes for tree trunks, cactus and rocks. Draw lines/dots on the cactus with a toothpick.
6. Place the shapes on a parchment-lined baking tray. Bake at 160℃ for 20-25 minutes in a pre-heated oven.
7. Allow to cool completely
8. Spray the cactus with green colouring spray.

Component 4: Bushes (Pistachio flavoured)

The bushes were the most challenging element of the dish as it required multiple reformulations throughout the development process. The final recipe was successful using egg white powder as the primary foaming and structural protein. When whipped, the egg white proteins denatured to form a stable foam network producing a light meringue-like structure when baked. Erythritol and soy lecithin provides sweetness and emulsification respectively, and the green colouring and pistachio flavour imparts the bush-like appearance and flavour.

Equipment

Digital weighing scales, mixing bowls, whisk, spoons, electric mixer, silicone round mould, oven.

Ingredients

Ingredient	Amount(g)	Supplier	Description/Function
Egg white powder [Powdered hen's **egg** albumin, Stabilizer: E461, Acidifier: E330, Expansion agent: E1505]	5	Louis Francois 	Albumen protein, primary foam forming and structuring agent
Erythritol (E968)	2	Pure Via 	Zero-calorie sweetener (E968), contributes to meringue-like texture
Pistachio Flavour natural flavour **(nuts),** invert sugar syrup, emulsifier: glycerine (E422)]	0.5	Sosa Ingredients 	Provides flavour for bushes
Soy lecithin (E322)	0.25	Sosa Ingredients 	Emulsifier (E322), aids stability of foams
Green colouring [Carthame (safflower), Spirulina]	0.25	Mallard Ferriere	Provides the bush visual appearance

Reference no. 13649			
Salt (sodium chloride)	0.0005	Table salt	Enhances flavour
Natural vanilla flavouring [Invert sugar, Bourbon vanilla concentrate, caramel (sugar, water), spent vanilla beans]	0.5	Euro Vanille Natural Vanilla Flavouring 	Synthetic vanilla flavour, warm aromatic note
Water	16.5	Tap water	Reconstitutes egg white powder and forms the aqueous phase for the forms

Table 5. List of ingredients of component 4: Bushes

Method

1. Combine egg white powder, erythritol, soy lecithin, green colouring, salt and pistachio flavouring in a bowl. Whisk thoroughly to distribute evenly.
2. Add water gradually and allow the mixture to hydrate for 5 minutes.
3. Using an electric hand mixer, whip the batter on high speed until stiff peaks are formed
4. Using a spoon or piping bag, pour the whipped batter to each rounded silicone mould. (Two round moulds).
5. Bake at 120℃ for 35 minutes until set and lightly dried outside
6. Allow to cool completely.

Component 5: Flowers

The flowers serve to provide a contrast-coloured visual final appearance to the dish. They are made from melting isomalt and with an addition of red colouring. When isomalt is melted and cooled, it forms a transparent glass-like structure that can be shaped to petals. The low hygroscopicity of isomalt makes it suitable for decorative sugar works as it absorbs minimal moisture from the atmosphere and hence retains its shape *(K. McNutt, 2003).*

Equipment

Digital weighing scales, small stainless-steel saucepan, gas stove, thermometer, silicone mat and toothpick.

Ingredients

Ingredient	Amount(g)	Supplier	Description/Function
Isomalt E 953	1.8	Louis Francois 	Disaccharide polyol (E953), forms clear, stable sugar glass for petals
Red colouring [Extracts from radish, blackcurrant, apple and paprika oil] Reference no. 13645	0.08	Mallard Ferriere 	Red colouring for the visual appearance of flower

Table 6. List of ingredients of component 5: flower petals

Method

1. Heat the isomalt in a small saucepan over medium heat, stirring gently until completely melted and clear.
2. Remove from heat and add red colouring. Stir gently to incorporate.
3. Pour small portions to silicone mat and make flower metals using hand and toothpick.
4. Allow to cool and set completely.

Nutritional Analysis

A full nutritional analysis of the complete dish was conducted yielding one serving with a total weight of 148g and a caloric content of 139kcal per serving (74 kcal per 100g).

Nutrient	Per 100g	% RI (per 100g)	Per 148g serving	% RI (per serving)
Energy (kJ)	391 kJ	5%	579 kJ	7%
Energy (kcal)	94 kcal	5%	139 kcal	7%
Fat	0.5g	1%	0.7g	1%
of which saturates	0g	0%	0.1g	1%

Carbohydrates	10g	4%	15g	6%
of which sugars	1g	1%	1.5g	2%
Fibre	9.5g	38%	14g	56%
Protein	10g	20%	15g	30%
Salt	0.28g	5%	0.42g	7%

Table 7. Nutritional Information of the note-by-note dish, Oasis in the Desert'.(Generated using 'Nutritics')

The dish constitutes **30% of calories derived from protein** and only 5.6% from fat. The dominance of protein is the attracting outcome of the note-by-note design philosophy, where whey protein isolate, micellar casein and egg white powder from the structural bases of three components. The protein-to-calorie ratio of 14.3g per 100kcal exceeds the ratio of conventional meals, which typically provides 6-7g of protein per 100kcal *(USDA,2023). Paddon Jones et al., (2009)* mentions that 25-30g of protein per meal is sufficient to maximize satiety; indicating that the dish provides 15g of protein per serving, showing strong satiety per calorie consumed.

The fibre content per serving is also significant where it contributes **56% of total calories with 9.5g per 100g.** It is predominantly provided by inulin (15g per serving), which is a non-digestible fructo-oligosaccharide that functions as a prebiotic selectively stimulating Bifidobacterium and Lactobacillus growth in colon *(R. L. Hughes et al., 2022).* The low sugar content of 1g per 100g is achieved by the substitution of sucrose with erythritol (E968), which is a zero-glycaemic polyol that does not raise blood glucose or insulin levels *(Q.-Y. Hong et al., 2025)*, supporting the metabolic suitability of this dish for people with type 2 diabetes and obesity. The dish represents a Nutri-score of 'A' and a negative HFSS rating (-8), confirming its classification as a nutritionally favourable food under EU regulatory framework.

Cost Analysis per Serving

A cost per serving analysis was conducted based on the actual ingredient prices sourced from university and retail market estimates.

Ingredient	Quantity used (g)	Unit Price (€)	Cost per serving €
Whey protein isolate	12.30	€0.052	€0.64
Inulin	15	€0.028	€0.41
Erythritol	9	€0.016	€0.14
Agar-agar	0.75	€0.090	€0.07
Micellar casein	1.30	€0.039	€0.05
Methylcellulose (E461)	1	€0.124	€0.12
Isomalt (E953)	1.8	€0.011	€0.02
Soy lecithin	0.63	€0.043	€0.03
Dried egg white powder	5	€0.040	€0.20
Mannitol (E421)	1.9	€0.050	€0.10
Blue colouring	0.5	€0.118	€0.12

Red colouring	0.08	€0.016	€0.001
Green colouring	0.25	€0.010	€0.003
Brown colour	0.25	€0.016	€0.001
Caramel flavouring	1	€0.015	€0.02
Vanilla flavour	2.5	€0.010	€0.03
Pistachio aroma	0.5	€0.160	€0.016
Cocoa/coffee/pistachio aroma	1	€0.189	€0.189
Water	95	€0.0	€0.0
Salt/sodium bicarbonate	Trace	€0.001	€0.001

Estimated total ingredient cost per serving: €2.04

The estimated ingredient cost of approximately €2.04 is exceptionally low when compared to a conventional dish of this complexity and nutritional quality, and illustrating one of the most compelling arguments for note-by-note cooking. The cost is predominantly contributed by whey protein isolate and inulin, which are highly produced in the industrial scale and the prices are expected to decrease when note-by-note cooking method rise demand. The structural compounds like methylcellulose, agar, isomalt and casein together account for only approximately €0.26, and the flavours and colouring contribute less than €0.25 in total. The cost profile significantly contrasts the pricing of conventional dessert or appetizer of comparable ingredients and nutritional profile due to fresh produce, dairy and protein-rich ingredients. **This finding supports the aspect of *This (2014)* that the note-by-note cooking has the potential to reduce the economic cost of high-quality, nutritionally designed food.**

Plating and Presentation

The note-by-note dish, 'Oasis in the Desert' was assembled in a white shallow ceramic plate, chosen exclusively to maximize the visual contrast between white background and the vivid colours of the five components. The assembly began with the pond, placed at the centre of the plate, followed by desert sand arranged around covering the surrounding surface of the pond. A generous amount of sand was piled on one side to suggest a raised dune, while the opposite carried a thinner, scattered layer. Into the deeper sand sections, cacti were pressed gently, rocks and tree trunks were placed beside it. The bushes were teared to half, and folded upside down to present the inside airy texture and placed near the rocks and opposite side of the dunes. The flower petals were scattered above the bushes, sand and some on the pond.

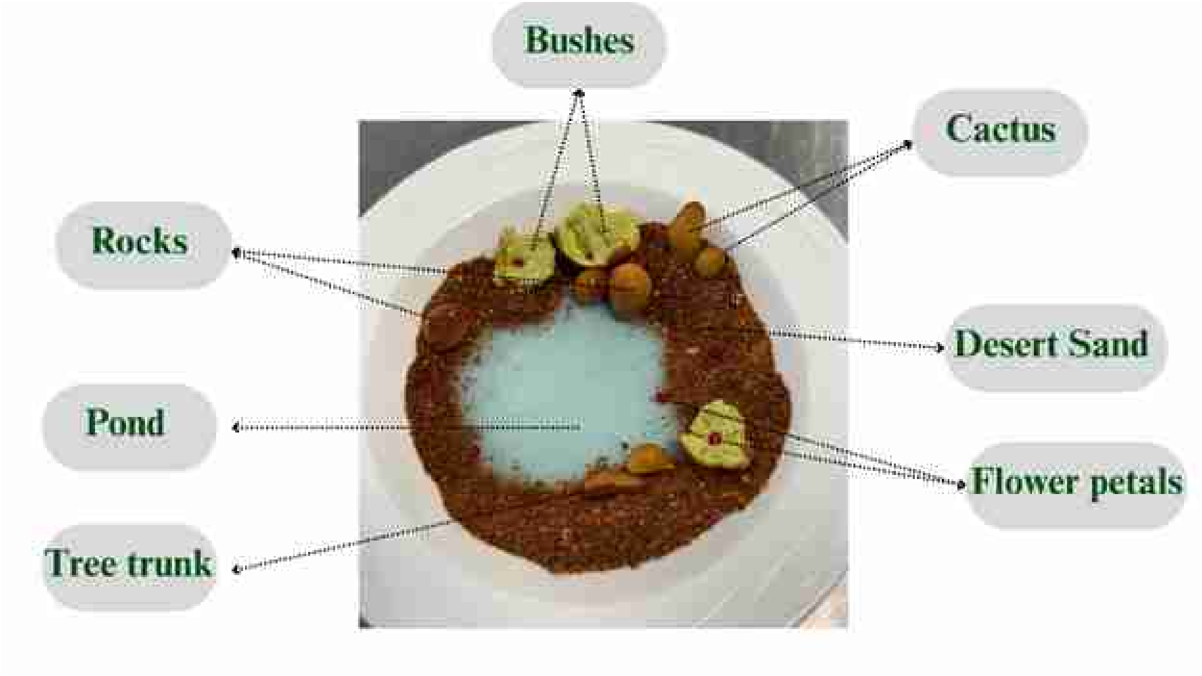


Figure 12. Final presentation of dish with all five components

Conclusion

The dish, 'Oasis in the Desert' is more than an academic work in the culinary science; it is symbol of the potential of note-by-note cooking method, first proposed by Herve This in 1994 and developed in the decades through the work of researchers including Burke et al., (2021), **to produce food that is equally visually appealing, sensory-rich, nutritionally designed and aligned with the urgent demand of the changing world.**

After five weeks of iterative kitchen development, five distinct components were created from pure food-grade compound ingredients, each selected for its specific functional, structural, sensory, and nutritional contribution. Agar-agar formed a thermostable blue gel through hydrogen-bonded double helix junction zone formation; methylcellulose provided a thermo-reversible structural framework for protein-based sculptural forms; whey protein isolate and micellar casein contributed to the complementary denaturation mechanism to produce dense, shapeable baked structures; egg white albumin proteins formed and stabilized an aerated foam network that set up into gentle sponge-like texture; and isomalt solidified into an amorphous glass forms with exceptional stability and low calorie contributions.

The nutritional profile of 'Oasis in the Desert' is one f the most promising outcomes of the note-by-note design process. The dish constitutes a Nutri-score of 'A' an HFSS rating of -8, qualifying as a nutritionally favourable food under EU regulatory frameworks. Per 100g, the dish provides 10g of protein, qualifying as high-in-protein, 9.5 g of fibre per 100g (high in fibre), low in fat (1%), and low sugar (1%), meeting the threshold for all four EU regulated nutrition claims under Regulation (EC) N0 1924/2006. **At 139 kcal per 148g serving, the dish signifies that note0by-note cooking can produce food that is not only visually and sensorially appealing, but also nutritionally significant; a combination that conventional cooking rarely achieves with the same degree of precision and control.**

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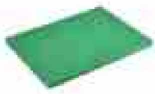
Beetroot Tartar Dish by Niamh Barry

Materials and Methods

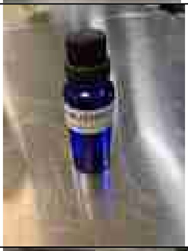
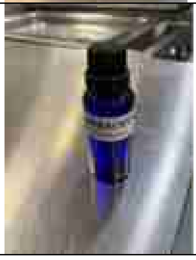
Materials

Equipment	Brand/Model	Picture
Saucepan x 2	Medium, Heavy Based	
Whisk x 2	Nisbet, Stainless Steel	

Spatula x 2	Vogue High heat	
Microscales x 1	Onebalance CH-1000-BK	
Baking Mat	Silicon	
Mixing Bowls x4	Stainless Steel	
Measuring Jug	Stainless Steel	
Thermomix	Vorwerk TM5-1	

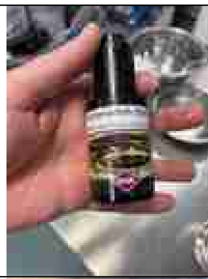
Oven	Electrolux Commercial	
Baking Tray x 3	Standard, Non-Stick	
Clingfilm x 1	PVC, Catering Roll	
Chopping Knife	Dick Knives	
Chopping Board	Genware, High Density	
Slotted Spoon	Molecular Stainless Steel Spherification Spoon	
Pipet	Plastic	
Fryer	GGM Commercial	

Ingredients

Ingredient	Brand/ Contents	Picture
Water	Tap Water	
Beetroot Powder	Beetroot juice (55%) Maltodextrin (SOSA)	
Rain Flavor	Kitchen Laboratory No.14	
Mushroom Flavor	Kitchen Laboratory No. 09	
Herbaceous Flavor	Kitchen Laboratory No. 05	

Salt	Fine, Sea Salt	
Sugar	Gem Sucrose Caster sugar	
Agar	Louis Francois, E406 Agar Gum	
Umami Vegetal	SOSA, yeast extract, maltodextrin	
Potato Starch	Family Elephant 25% Amylose, 75% Amylopectin	
Sodium Alginate	Sosa Ingredients	

Extra Virgin Olive Oil	Oleic Acid 80%	
Citric Acid	TRS Citric Acid	
Orange Coloring	Gel Cake Coloring	
Xanthan Gum	Special Ingredients Xanthan Gum	
Calcium Chloride	MSK Ingredients	
Green Coloring	Gel Cake Coloring	

Horseradish Flavor	MSK Natural Flavor Non-GMO Vegetable Oil	
Yellow Coloring	Gel Cake Coloring	
Rice Flour	Starch Amylopectin and Amylose	
Spirulina	Gamma Linolenic acid Oleic Acid Glycolipids	

Recipes & Costing

Beetroot Tartar

Approx. 8 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost per Recipe
600	Water	Tap Water	-	-

25	Beetroot Powder	Beetroot juice (55%) Maltodextrin (SOSA)	3.50	0.87
0.25	Rain Flavor	No. 14 Kitchen laboratory	43.00	0.10
0.15	Mushroom Flavor	No.9 Kitchen laboratory	43.00	0.06
0.15	Herbaceous Flavor	No.5 Kitchen laboratory	43.00	0.06
8	Salt	Fine sea salt	0.49	0.04
25	Sugar	Gem Caster Sugar	0.19	0.05
6	Agar	Louis Francois, E406 Agar Gum	8.96	0.54
				€1.72

Method:

1. Bring water, sugar, salt, and agar to the boil and whisk well for 90 seconds.
2. Remove from the heat and add beetroot powder and all 3 flavorings.
3. Whisk well and pour into a squared container.
4. Set for 2 hours.
5. Once set, turn out onto a chopping board and dice into cubes for tartar.

Glass Potato Crisps

Approx. 15 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost Per Recipe
50	Potato Starch	Family Elephant 25% Amylose, 75% Amylopectin	0.36	0.18
3	Salt	Fine Sea Salt	0.49	0.02
800	Water	Tap Water	-	-
1	Umami Vegetal	SOSA, yeast extract, maltodextrin	0.23	0.01
				€0.22

Method:

1. Bring water to the boil and add potato starch as a slurry. Whisk in salt and vegetal.
2. Continue whisking and cook until mixture has thickened.
3. Remove from heat and cool.
4. Once cooled, spread on a silicon mat and place on a baking tray.
5. Bake at 150C, fan low for 30 minutes.
6. Once baked, it should lift from the baking mat.
7. Deep fry at 170C for 3-4 mins until golden.
8. Drain on paper and serve.

Egg Yolk (Tartar Dressing)

Approx. 20 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost Per Recipe
475	Water	Tap water	-	-
3	Salt	Fine Sea Salt	0.49	0.01
3.8	Sodium Alginate	Sosa Ingredients	12.93	0.49
50	Olive Oil	Oleic Acid 80%	1.45	2.90
1	Citric Acid	TSR Citric Acid	2.00	0.02
0.2	Herbaceous Flavor	No.5 Kitchen Laboratory	43.00	0.08
2	Orange Coloring	Gel Coloring	1.00	0.02
1.5	Xanthan Gum	Special Ingredients Xanthan Gum	5.40	0.08
500	Water	Tap Water	-	-
3.5	Calcium Chloride	MSK Ingredients	26.50	0.92
				€4.52

Method:

1. Blend 500g of water and calcium chloride and leave to chill.
2. Blend 475g of water, sodium alginate, salt, oil, color, xanthan gum and flavorings and place in the fridge to chill.
3. Place a dosing spoon full of egg yolk, mix into a calcium chloride bath and hold for 30 seconds.
4. Remove and rinse with cold water.
5. Serve on top of tartar as dressing/egg yolk imitation.

Caper Pearls

Approx. 20 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost Per Recipe
300	Water	Tap water	-	-
3	Sodium Alginate	Sosa Ingredients	12.93	0.39
1	Citric Acid	TSR Citric Acid	2.00	0.02
.2	Herbaceous Flavor	No.5 Kitchen Laboratory	43.00	0.08
2	Green Coloring	Gel Colouring	1.00	0.02
500	Water	Tap Water	-	-
5	Calcium Chloride	MSK Ingredients	26.50	1.32
				€1.83

Method:

1. Blend calcium chloride in 500ml water and refrigerate until use.
2. Blend 300ml of water, sodium alginate, citric acid, flavor and color and leave to hydrate.

3. Drop the sodium alginate mix using a dropper into the calcium chloride bath.
4. Leave for 45 seconds then lift out and rinse with water.

Horseradish 'Mustard Seeds'

Approx. 25 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost Per Recipe
5	Agar	Louis Francois, E406 Agar Gum	8.96	0.45
3	Salt	Fine Sea Salt	0.49	0.01
300ml	Water	Tap Water	-	-
2.5	Horseradish Flavor	MSK Natural Flavor Non-GMO Vegetable Oil	79.96	1.99
1	Yellow Coloring	Gel Coloring	1.00	0.01
				€2.46

Method:

1. Bring water to the boil and whisk in agar, salt, and coloring.
2. Continue whisking and boil for 90 seconds.
3. Remove from heat and add horseradish flavor and cool.
4. Once set, blend into a gel in Thermomix.

Herb Leaf Tuiles

Approx. 35 Portions

Weight in Grams	Ingredient	Description	Cost Per 100g	Cost Per Recipe
40	Rice Flour	Starch Amylopectin and Amylose	0.31	0.12
10	Potato Starch	Family Elephant 25% Amylose, 75% Amylopectin	0.36	0.04
30	Water	Tap Water	-	-
0.5	Sodium Alginate	Sosa Ingredients	12.93	0.07
2.5	Spirulina	Gamma Linolenic acid Oleic Acid Glycolipids	1.70	0.05
				€0.28

Method:

1. Blend all ingredients into a paste.
2. Spread on silipat and bake at 160C for 10 mins.
3. Reduce heat and bake at 60C for 15mins.
4. Break into small pieces and place on tartar.

Final Costing per Portion

Dish Component	**Price Per Recipe**	**Potions Per Recipe**	**Price Per Portion**
Beetroot Tartar	€1.72	8	€0.22
Glass Potato Crisps	€0.22	15	€0.02
Egg Yolk	€4.52	20	€0.23
Caper Pearls	€1.83	20	€0.09
Horseradish Mustard Seeds	€2.46	25	€0.10
Herb Tuile	€0.28	35	€0.01
Total Cost Per Portion			**€0.67**

The above table is a summary of the cost of individual elements of the dish, provided to create the cost of one individual portion. This cost will allow the researcher to determine whether the dish is cost effective as was outlined as a requirement by the assignment brief.

Figure 4: Final dish photographed Week 4

The above photo is a picture of the final NbN dish. This is the final presentation chosen as the most effective for each sensory element of the dish. Each part of the dish is clearly labelled to allow identification of each individual element.

Conclusion

This year's Note-by-note assignment had the brief of reducing production costs and time, reducing calories but mind the flavor. As displayed in the results section of this report, the creation of the beetroot tartar dish adheres to the requirements of the brief on several different levels. The note-by-note dish is lower in calories, has reduced production costs, uses elements that assist in reducing production time, and the dish still delivers flavor, texture, and visuals that satisfy the consumer.

In terms of reducing the production costs of the note-by-note dish, a few different aspects can be considered. Firstly, the cost of beef currently sits at an incredibly high price. For beef tartar a good cut of beef such as the tenderloin, or fillet. The average cost of beef fillet currently sits at €2.70 per 50g. The Nbn beetroot tartar cost €0.22 per 50g portion, with the entire dish costing around €0.67 per portion. This means that the beef alone for the tartar costs just over 4 times the amount of the entire Nbn beetroot tartar dish costs to make. The significant difference in cost highlights the ability of note-by-note cooking to reduce production costs when creating dishes. Another aspect of reducing production costs that can also be looked at for the dish is the production processes themselves. The recipes for each element of the dish are simple and easy to follow; they are also time efficient and don't require specialist equipment or staff to have special skills. From a labor perspective they cost effective, preparing beef tartar would require butchery skills to prepare the beef correctly, if not it will be tough and unpleasant to eat. Also beef for beef tartar must be consumed within the day it is prepared as the beef oxidizes and is no longer suitable for consumption. This can result in waste; the beetroot tartar once made is not susceptible to a similar fate so would not result in the same level of costly wastage.

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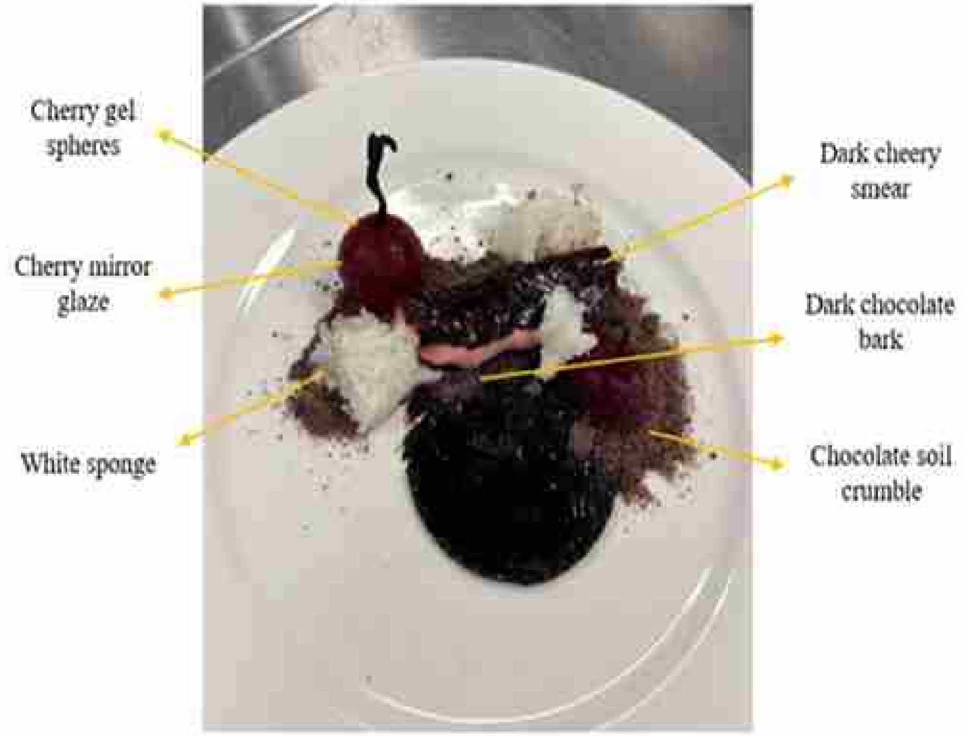
Cherry Noir by Aditi Choudhary


Cherry gel spheres
Cherry mirror glaze
White sponge
Dark cheery smear
Dark chocolate bark
Chocolate soil crumble

Ingredients Used

Ingredient	Brand / Supplier	Quantity Used	Function in Recipe
MSK Eggless Powder (Alpha-cyclodextrin based)	MSK Ingredients	As required	Egg replacement, structure and aeration
Cornflour	Generic / Catering brand	20 g	Structure and thickening
Maltodextrin	Texturas / Sosa	20 g	Bulk agent, mouthfeel
Sucralose	Sosa	0.3 g	High-intensity sweetener
Glucose Syrup	Queen / Catering brand	25 g	Sweetness and texture
Cocoa Butter	Callebaut / Generic	6 g	Fat source and mouthfeel
Xanthan Gum	Sosa	0.3 g	Stabiliser
Soy Lecithin	Sosa	2.5 g	Emulsifier
Citric Acid Powder	Sosa	0.7 g	Acidity control
Malic Acid	Douglas	0.3 g	Fruit acidity

Agar Agar (Seaweed based)	Sosa	1.7 g	Gelling agent
Vodka	Grey Goose / equivalent	0.8 g	Aroma carrier
Water (Filtered)	—	275 g	Base liquid
Food Colour (if used)	Sosa	As required	Visual effect
Flavouring (Cherry)	Sosa / MSK	As required	Flavour profile

Equipment List

Equipment	Purpose
Digital weighing scale	Accurate measurement of ingredients
Hand blender	Mixing and emulsification
Fine sieve	Removing lumps and air bubbles
Mixing bowls (stainless steel)	Ingredient preparation
Whisk	Dry ingredient mixing
iSi Cream Whipper (½ L)	Aeration and sponge formation
N_2O Chargers	Foam creation
Microwave	Cooking sponge
Paper cups	Sponge mould
Spatula	Mixing and scraping
Measuring spoons	Small quantity measurement
Piping bottle	Controlled dispensing
Thermometer	Temperature control
Sieve / Strainer	Smoothing mixtures

Picture Reference of the Final Dish

Recipes and methods

Cherry Gel Sphere (Molecular Gastronomy, 2013)

Ingredients

Ingredients	**Quantity**	**Brand**	**Composition**
Water	50 g	Tap water	H_2O
Sucralose	0.2g	Bulk sports supplements	Sucralose(E955)
Citric acid	0.4 g	MSK Ingredients	Citric acid
Malic acid	0.2 g	MSK Ingredients	Malic acid
Cherry flavour	0.5 g	Culinaide	Water, flavour compounds
Vodka	0.5 g	Grey Goose	Ethanol, water
Food colour (Red)	2–3 drops	Mallard Ferrière	E129
Agar-agar	0.6 g	Sosa	Agar (E406)

Method

- In a saucepan, add water and sucrose and heat until dissolved.
- Add citric acid, malic acid, cherry flavour, and colour.
- Sprinkle agar-agar while whisking to avoid lumps.
- Bring to a boil and cook for 10 seconds.
- Remove from heat and add vodka.
- Pour into silicone half-sphere moulds.
- Allow to cool and set in the refrigerator.
- Join two halves together to form full spheres.

Cherry Mirror Glaze (Molecular Gastronomy, 2013)

Ingredients

Ingredients	**Quantity**	**Brand**	**Composition**
Water	40 g	Tap water	H_2O
Sucralose	0.2g	Bulk sports supplements	Sucralose(E955)
Glucose syrup	25 g	DGF	Glucose
Agar-agar	0.4 g	Sosa	Agar (E406)
Cherry flavour	0.15 g	Culinaide	Flavour compounds
Food colour (Red)	As required	Mallard Ferrière	E129

Method

- Heat water and sucrose until dissolved.
- Add glucose syrup and mix well.

- Sprinkle agar-agar and bring to a gentle boil.
- Add food colouring and mix evenly.
- Allow glaze to cool slightly to around 35–40°C.
- Add cherry flavour and mix gently.
- Pour glaze over chilled cherry spheres and allow to set.

Dark Cherry Smear (Molecular Gastronomy, 2013)

Ingredients

Ingredients	**Quantity**	**Brand**	**Composition**
Water	25 g	Tap water	H_2O
Sucralose	0.2 g	Bulk sports supplements	Sucralose(E955)
Citric acid	0.1 g	MSK Ingredients	Citric acid
Cherry flavour	0.1 g	Culinaide	Flavour compounds
Food colour (Red)	1–2 drops	Mallard Ferrière	E129
Food colour (Black)	Trace	Mallard Ferrière	E151
Agar-agar	0.4 g	Sosa	Agar (E406)

Method

- Combine water, sucrose, cherry flavour, and colour in a saucepan.
- Add agar-agar and whisk well.
- Bring to a boil and cook for 10 seconds.
- Pour into a shallow tray and allow to set.
- Before plating, lightly blend or smear to obtain a smooth texture.

Chocolate Bark (Note-by-Note Method)

Ingredients

Ingredients	Quantity	Brand	Composition
Water	60 g	Tap water	H_2O
Sucralose	0.2g	Bulk sports supplements	Sucralose(E955)
Cocoa butter	6 g	Callebaut	Cocoa fat
Cocoa aroma	0.5–1 g	Sosa	Flavour compounds
Agar-agar	0.7 g	Sosa	Agar (E406)
Lecithin	0.5 g	Texturas	Soy lecithin (E322)
Food colour (Brown)	2–3 drops	Mallard Ferrière	E150
Food colour (Black)	1 drop	Mallard Ferrière	E151

Cherry Mousse (Siphon Method)

Ingredients

Ingredients	Quantity	Brand	Composition
Water	100 g	Tap water	H_2O
Sucralose	0.2g	Bulk sports supplements	Sucralose (E955)
Cherry flavour	1 g	Culinaide	Flavour compounds
Citric acid	0.2 g	MSK Ingredients	Citric acid
Malic acid	0.1 g	MSK Ingredients	Malic acid
Vodka	0.3 g	Grey Goose	Ethanol, water
Lecithin	2 g	Texturas	Soy lecithin (E322)
Xanthan gum	0.3 g	Texturas	Xanthan (E415)
Food colour (Red)	2 drops	Mallard Ferrière	E129

Method

- All ingredients were blended together using a hand blender until smooth.
- The mixture was passed through a fine sieve to remove air bubbles.
- The liquid was poured into a siphon and charged with one N_2O cartridge.
- The siphon was shaken well and chilled before use.

- The mousse was dispensed directly into the chocolate bark during plating.

Chocolate Soil (Note-by-Note Method)

Ingredients

Ingredients	Quantity	Brand	Composition
Isomalt	20 g	Sosa	Isomalt
Maltodextrin	10 g	Texturas	Maltodextrin
Cocoa aroma	Few drops	Sosa	Flavour compounds
Food colour (Brown)	1–2 drops	Mallard Ferrière	E150

Method

- Isomalt was heated until fully melted.
- Maltodextrin and cocoa aroma were added and mixed quickly.
- The mixture was stirred until a dry, crumbly texture formed.
- The soil was spread on a tray and left to cool before use.

Micro Sponge (Siphon Method)

Recipe Table

Ingredient	Quantity	Brand	Composition
MSK Eggless	30 g	MSK	Alpha-cyclodextrin – used as an egg replacer to provide structure, aeration, and stability in sponge-based preparations
Cornstarch	10 g	Corn Flour (Generic)	Thickening agent
Sucralose	1 g	NCCDB	Sweetener
Salt	0.5 g	Table Salt	Flavour enhancer
Water	120 ml	Tap	Liquid phase
Cocoa butter	20 ml	Generic	Fat component
Vanilla essence	2–3 drops	Generic	Flavour
N_2O charger	1	iSi	Aeration

Method

- Combine MSK Eggless, cornstarch, sucralose, salt, and alpha-cyclodextrin in a bowl.
- Add water, oil, and vanilla essence to the dry ingredients.
- Blend using a hand blender for 20–30 seconds until fully smooth.
- Strain the mixture through a fine sieve to remove any lumps.
- Pour the mixture into a ½ L siphon.
- Charge with one N_2O cartridge and shake well for 25–30 seconds.
- Dispense the mixture into a paper cup, filling only one-third full.
- Microwave for 35–55 seconds until fully risen and set.
- Turn the cup upside down and allow to cool for one minute.
- Remove the sponge from the cup and use as required.

Assembly of the Dish

- A small amount of cherry smear was placed on the plate and spread using a spoon.
- Chocolate soil was sprinkled beside the smear.
- Chocolate bark cylinders were placed on top of the soil.
- Cherry mousse was piped into the centre of the bark.
- Glazed cherry spheres were arranged beside the bark.
- The dish was finished with sponge pieces.

Figure 1: Final plated Cherry Noir dessert (Week 4)

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