

From Rejects to Riches: Note by Note Cuisine to Tackle Food Waste with the Ugly Apple

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Abstract

This article explores the transformative potential of note by note cuisine in addressing food waste. Symbolised by the Ugly Apple, this culinary creation serves as a representation of discarded produce and incorporates an apple crumble and vanilla ice cream. Leveraging note by note cuisine provides a sustainable solution to food waste by using pure compounds (such as NH pectin, agar agar, and xanthan gum used in this recipe) and circumventing resource-intensive cultivation practices. The Ugly Apple becomes a symbol of innovation and sustainability, offering insights into the intersection of culinary creativity and environmental responsibility.

Keywords

recipe, note by note cuisine, food waste, sustainability

Introduction

The Ugly Apple was created for the 11th International Contest for Synthetic Cooking (“Note by Note”) which addressed the critical challenge

of food waste, focusing on the innovative note by note cooking (International Centre for Molecular and Physical Gastronomy, 2022). This pioneering culinary capability utilises pure compounds to meticulously shape various attributes of a dish, ranging from consistency and flavour to scent and appearance. The transformative potential of note by note cuisine lies in its capacity to innovate food production by employing mass-produced compounds, offering solutions to hunger by providing longer-lasting products and easier transportation, and environmental issues by reducing the energy needs of the traditional food industry (This, 2014). While note by note cooking has found application in restaurants and events, further development is needed for its integration into households, particularly to address waste linked to crops and livestock.

As global food demands escalate, the necessity for sustainable food production intensifies. The strain on the planet's limited resources is underscored by the disconcerting statistic from the Food and Agriculture Organization (FAO), reporting that over a third of the food produced is

lost or wasted (Murad *et al.*, 2017). In response to this urgent issue, the 11th International Contest for Note by Note Cooking prompted participants to explore food waste complexities while exploring the potential of note by note cuisine (International Centre of Molecular and Physical Gastronomy, 2022).

Motivated by the substantial discard of aesthetically non-conforming fruits and vegetables (EUR-Lex, 2013), the inspiration for the recipe described here stems from the observation that items such as purple carrots, deformed lemons, or oversized eggplants, while fully edible and resource-intensive, are needlessly rejected due to their unconventional appearances. Intermarché, a French supermarket chain, recognised this issue and initiated a campaign promoting the consumption of "ugly" produce. By purchasing such produce directly from farmers and offering it at a reduced price, Intermarché demonstrated that, despite unconventional appearances, these items are equally palatable (Intermarché, 2023). This enhanced consumer awareness encourages thoughtful purchasing practices to reduce food waste at the household level and is currently influencing legal norms to ease stringent appearance standards on a larger scale (EUR-Lex, 2021), but this still needs further changes (UNECE, 2007).

Inspired by the success of Intermarché's campaign, one of its iconic items was recreated: the Ugly Apple. Leveraging note by note cuisine, the creation serves as a testament to the unnecessary disposal of such foods. Note by note cuisine, beyond replicating existing foods, ventures into unexplored culinary territories. This inspiration led to the re-imagining of a common dish featuring apples within the Ugly Apple concept: an apple crumble served with vanilla ice cream. The objective is to demonstrate that even the least visually appealing apples can offer exceptional flavour while emphasising the transformative potential of note by note cuisine in tackling the food waste issue.



Figure 1. The apple insert with on the left, the mold just after having been filled, and on the right, the mold once the insert has set.

Materials and Methods

The recipe yields 3 ugly apples.

1. The Apple Insert

Ingredients:

- 1.5 g NH pectin (L'épicerie du Chef)
- 15.5 g unscented coconut oil (MeaVita)
- 200 mL tap water
- 2 g agar agar (Vahiné)
- 30 g sugar (Daddy)
- 25 g "apple essence" made as indicated below

Method:

- The apple essence was extracted from an apple by boiling it in water for 1h, straining the mixture, and then boiling the excess water off.
- All ingredients were combined in a saucepan and brought to a boil with continuous whisking.
- Following complete incorporation, the mixture was maintained at a gentle simmer while continuous whisking persisted for a duration of 2-3 minutes.
- The resultant mixture was then poured into six 2.5 cm diameter half-sphere shaped silicone molds.
- The preparation was allowed to cool to ambient temperature.



Figure 2. The crumble component ready for use.

2. The Crumble

Ingredients:

- 17.5 g unscented coconut oil (MeaVita)
- 15 g gluten (manually extracted from flour)
- 20.5 g Sugarly (Canderel)
- 10 g corn starch (Maizena)
- 5 g wheat starch (manually extracted from flour)

Method:

- Mix all ingredients with a spoon or fork thoroughly until homogeneously combined.

3. The Ice Cream

Ingredients:

- 12 g vanilla extract (Sainte Lucie)
- 50 g Sugarly (Canderel)
- 500 mL tap water
- 5 g xanthan gum (Now Real Food)
- 30 g unscented coconut oil (MeaVita)
- 30 g corn starch (Maizena)

Method:

- In a saucepan, combine all ingredients except for approximately 50mL of water and the corn starch.
- Apply heat on a low setting while whisking until everything is incorporated.
- In a small container, blend the reserved water and corn starch until fully combined; then while still heating introduce this mixture into the saucepan, whisking to ensure thorough integration.
- Transfer the resulting mixture to a tall container and blend with an immersion blender.
- Subsequently, transfer the prepared mixture to an ice cream churn for further processing (optional step – if the churn is not used the ice cream will have a more icy texture than the creamier alternative).

4. The Glaze

Ingredients:

- 142 g Greek yoghurt (Nestlé)
- 30 g glucose (Caullet)
- 150 g white chocolate (Nestlé Dessert)
- 1-2 teaspoons of green food colouring (powder, La Pateliere)

Method:

- Blend yoghurt and glucose, then microwave the mixture for 1 minute at 750 W.
- Mix the microwaved mixture.
- Pour the heated mixture over white chocolate and stir until fully combined.
- If solid white chocolate pieces persist, subject the mixture to 15-second intervals in the microwave oven until melted.
- Add green food colouring incrementally until achieving the desired colouration.
- Use the glaze at room temperature (store in the refrigerator if not using immediately and remelt in the microwave oven for a few seconds before use).

5. Assembly of the Ugly Apple

- Place the crumble at the base of the spherical

silicon mold (62 cm in diameter, height 52 mm), repeating the process for the desired number of Ugly Apples (the recipe should yield 6 spheres and therefore 3 ugly apples).

- Cover the crumble with a spoonful of ice cream.
- Position two semi-spheres of the apple insert to form a sphere at the centre of the ice cream.
- Fill the remaining space in the mold with ice cream.
- Freeze the assembled dessert overnight or until thoroughly frozen.
- Once frozen, unmould two spheres.
- Create a flat base for the sphere to stand on by placing a knife under hot water and carving the sphere.
- Use a thin cheese grater or zester to shave the second sphere to a smaller size.
- Slightly melt the ice cream with a hot knife and stick both spheres together.
- Return the dessert to the freezer.
- Once the new shape is frozen, place it on an inverted cup over a large plate.
- Pour the room temperature glaze over the spheres, ensuring full coverage. The cold temperature should facilitate rapid glaze setting.
- Position an apple stem at the cross-section of both spheres.
- Return to the freezer to ensure the glaze sets.
- Once the glaze is set, transfer the dessert to a presentation plate.
- For optimal enjoyment, it is recommended to let the dessert thaw for 5-10 minutes, depending on room temperature, to avoid the centre from still being frozen.

Results

Figures 1 to 4 show the preparation of the different components of the dessert. In figure 1, the apple insert can be seen. Figure 2 showcases the crumble component after thorough mixing with a spoon. The ice-cream mixture, both before and after freezing, is documented in figure 3. Figure 4 presents an image of the glaze in its pre-application state. The final product, the Ugly



Figure 4. The filled spherical mold before freezing (left) and after freezing (right).



Figure 3. The glaze ready for use.



Figure 5. The final ugly apple (left) and one of the spheres cut in half (right).

Apple, along with an internal view revealing the creation cut in half, is depicted in figure 5.

Discussion

Note: The sensory comments in this discussion reflect the author point of view, unless stated otherwise.

The apple insert effectively conveyed notes of apple. Notably, a subtle caramel-like flavour emerged from the preparation of the apple essence, complementing the overall profile and aligning well with the concept of an apple crumble. For a more faithful recreation of traditional flavours, the incorporation of a commercial apple essence, caramel, and possibly cinnamon essences could be considered. This could easily be done by

purchasing the essences individually and by adding the desired amount. This aspect of note by note cuisine shows a true difference to traditional culinary methods where one usually cannot control the scent as precisely.

The texture of the apple insert resembled that of a jelly, reminiscent of apples slightly caramelized in a sauce, mirroring the characteristic texture of the apple in a traditional apple crumble.

Upon cooling in the mould, numerous air bubbles were observed on the surface of the insert (Figure 1). To mitigate this aesthetic concern, it is suggested to either whisk the mixture less vigorously during the insert preparation or utilize a wooden spoon to prevent the incorporation of air bubbles. However, it is noteworthy that this issue is primarily cosmetic, as the semi-spheres are joined together to form a complete sphere concealed in the centre of the apple.

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The outcome of the crumble was very satisfactory. The overall texture and mouthfeel closely resembled that of a traditional crumble. This can be primarily attributed to the cohesive effect of the coconut oil used to bind the other ingredients used, with these contributing to the grainy appearance. A subtle crunch was derived from the presence of gluten and the sugar like texture of Sugarly. However, the crumble texture might have been influenced by the particle size of the gluten, as the blender struggled to fully break down the dehydrated gluten. This resulted in an additional desirable crunch, a characteristic that may be absent when using a finer gluten powder.

The ice cream aligned with expectations, featuring a creamy texture attributed to the presence of xanthan gum and corn starch, both serving as thickeners. It is worth considering an increase in the fat content to further increase the creaminess after freezing, as the observed texture suggests an excess of water in the mixture. This contributes to the presence of ice crystals which slightly reduce the desired creaminess associated with traditional ice cream.

Initially, an alternative glaze recipe incorporating agar agar was tested with the intention of ensuring that the glaze would set onto the frozen apple upon contact. However, this glaze proved excessively transparent, leading to inadequate coverage and an insufficient green hue on the apple. Furthermore, the use of spinach extract as the green food colouring introduced an unexpected and pronounced spinach flavour, conflicting with the desired apple crumble taste.

In response to these challenges, an alternate glaze recipe was employed. Due to time constraints, the recipe adopted a more traditional approach, incorporating ingredients such as white chocolate and Greek yogurt. Despite this departure from the initial preference for note-by-note cuisine, the glaze, once applied to the fully frozen apple, exhibited ease of pouring and promptly adhered to the surface. The resulting apple attained a satisfactory green colouration, aligning with the intended aesthetic.

The assembly process proved to be straightforward. However, caution is advised when handling the frozen apple at room temperature to prevent rapid melting. Once the glaze is applied, it is crucial to avoid touching the surface to prevent leaving fingerprints on the apple. While time constraints limited the exploration of note-by-note cuisine for creating an apple stem, a conventional apple stem was added. Consideration was given to the possibility of crafting an edible biscuit-like stem, aligning with the concept that all elements displayed on the plate should be edible - an idea that remains open for future exploration.

The final product, named "The Ugly Apple," bears a striking resemblance to Intermarché's "pomme moche" or "grotesque apple" (Intermarché, 2023). The nomenclature chosen aims to symbolize all imperfect fruits and vegetables that often go to waste. While the glaze texture mirrors that of a Granny Smith apple, an enhancement could involve increasing the shininess, potentially achieved by incorporating a slightly higher amount of glucose.

The nutritional value of the ugly apple was not calculated; however, such an analysis would have been useful, especially when comparing it to the more familiar classical dessert of apple crumble and ice cream. Ideally, using note by note cuisine, a dish's nutritional composition can be enhanced. Deconstructing and reconstructing dishes at the molecular level allows for precise control over each component. Although, achieving this balance between nutritional value, texture, taste, and aesthetic appeal remains a challenge. Overall, the components harmonize effectively, with vanilla ice cream serving as a delightful addition to the apple crumble concept. It is recommended to enjoy the apple thawed for 5-10 minutes at room temperature to ensure a pleasing texture, avoiding excessive freezing of the interior. The reception from family members attests to the palatability of the creation, reinforcing its potential appeal to a wider audience.

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Conclusion

The 11th edition of the International Contest for Note by Note Cooking highlights the unsustainable practices in nourishing our planet, offering a potential remedy through the evolution of note by note cuisine. The symbolic note by note Ugly Apple has been meticulously crafted to embody the vast array of discarded produce, unjustly dismissed solely based on appearance. Concealed within this representation of an "ugly" apple lies a delectable apple crumble paired with vanilla ice cream, a combination capable of invoking nostalgic childhood memories for some. Beyond its culinary appeal, the Ugly Apple serves as a poignant call to address the escalating challenges of food waste, both at an individual and industrial scale. This call resonates on environmental and societal fronts, compelling us to reevaluate our food choices. Embracing note by note cuisine as much as possible within a home kitchen (extracting gluten from flour, buying components from a local supermarket...), this creation offers a tangible solution to the pervasive problem of food waste. In essence, note by note cuisine emerges as a hopeful possibility, presenting a transformative solution to the complex and pressing issue of food waste, symbolized by the Ugly Apple. This culinary endeavour stands as a testament to the potential of redefining our relationship with food and promoting a sustainable future.

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