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Development and analysis of the formulation of an innovative concept for a conventional pastry product

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Abstract: *Innovative pastry products do not necessarily rely on new raw materials. Differentiation may arise from combining known components in an architecture that modifies the sequence of flavour and texture perceptions, provided that technological feasibility and composition are verified. This paper analyses the concept of cinnamon rolls with a salted caramel insert and a cream cheese and chocolate coating. The method comprises transcription of the formulation, reconstruction of the process flow, verification of the accuracy of the nutritional data and analysis of the final mass, supplemented by interpretation of the specialist literature. The recipe comprises four subsystems: yeasted dough, flavoured filling, caramel and a two-layer coating. Under the nominal convention used, the ingredient mass is 1,732 g when the yeast is included, compared with 1,722 g when it is omitted (Table 1). The dough accounts for 36.78%, the caramel for 26.56% and the coating for 30.02% of the materials entering the process flow. The energy contributions total 5,735 kcal; however, the approximate value of 333 kcal/100 g is based on the ingredient mass rather than on the finished-product mass. Mass loss highlights the influence of yield on energy density, with implications for the nutrition declaration. The innovative character lies in the formulation and in the sensory profile. Advantages regarding tenderness, acceptability and stability require further study. Validation criteria are proposed for proofing, insert dosing, water migration and coating uniformity, in combination with optimization of the process parameters.*
Keywords: *innovative product; yeasted dough; concept/ingredients; mass balance.*

• Introduction

Innovation in pastry can arise from the architecture of the product, not only from new raw materials. The analysis addresses cinnamon rolls with a salted caramel insert and a two-layer coating from a technological perspective.

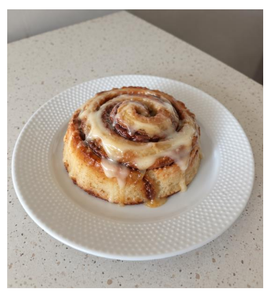


Fig. 1. *Cinnamon roll.*

• Materials and Methods

Study: transcription of the formulation, reconstruction of the process flow, verification of the nutritional data and analysis of the final mass (M0 = Σmi).

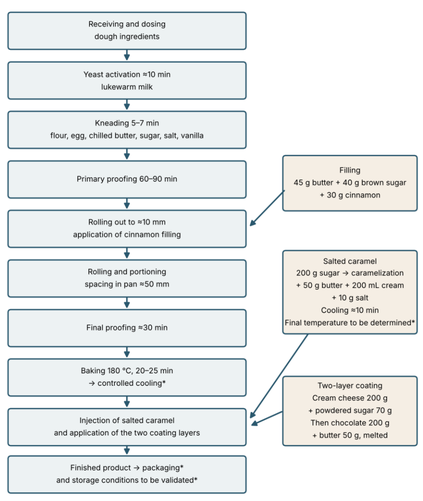


Fig. 2. *Proposed process flow diagram.*

Table 1. *Reference recipe by technological component.*

Component	Ingredients and quantities as given in the source	Nominal total[1] (g)
Dough	Flour 285 g; milk 180 mL; butter 45 g; white sugar 40 g; vanilla extract 20 mL; dry yeast 10 g; salt 7 g; one egg[2]	637
Filling	Butter 45 g; brown sugar 40 g; cinnamon 30 g	115
Salted caramel	White sugar 200 g; liquid cream 200 mL; butter 50 g; salt 10 g	460
Two-layer coating	Plain chocolate 200 g; cream cheese 200 g; powdered sugar 70 g; butter 50 g	520
Total input		**1,732**

where: [1]nominal mass convention: 1 mL = 1 g for milk, vanilla extract and cream; [2]egg: 50 g nominal edible mass.

• Results and Discussion

- Caramel and coating account for 56.58% of the nominal mass, so gravimetric dosing is required.
- Butter, chocolate and sugars provide 67.41% of the 5,735 kcal.

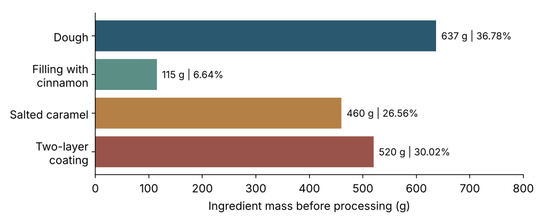


Fig. 3. *Mass distribution among the components (1,732 g).*

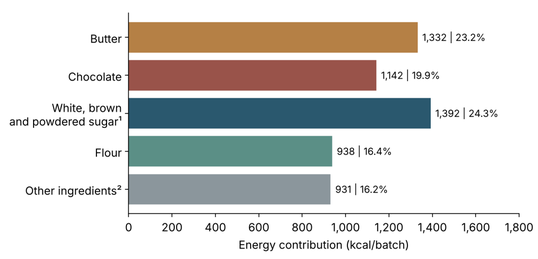


Fig. 4. *Energy contributions of the ingredient groups.*

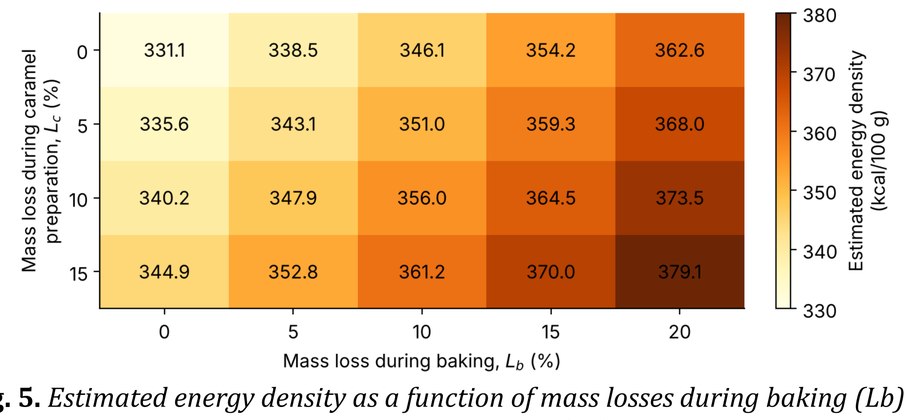


Fig. 5. *Estimated energy density as a function of mass losses during baking (Lb) and caramel preparation (Lc).*

• Conclusions

- The product is a formulation development of a conventional pastry product, based on the contrast between yeasted dough, cinnamon filling, salted caramel and a two-layer coating. Its sensory benefit and superiority over the conventional product remain to be verified.
- Validation requires further optimization, control of proofing and baking, evaluation of water transfer between components and sensory tests. Standardizing ingredients and mass is the condition for moving from a didactic concept to a reproducible product.

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