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# Modeling sensory acceptance prediction based on texture attributes and physicochemical properties in the case study of dairy sweet gel (flan) and plant-based milk substitutes

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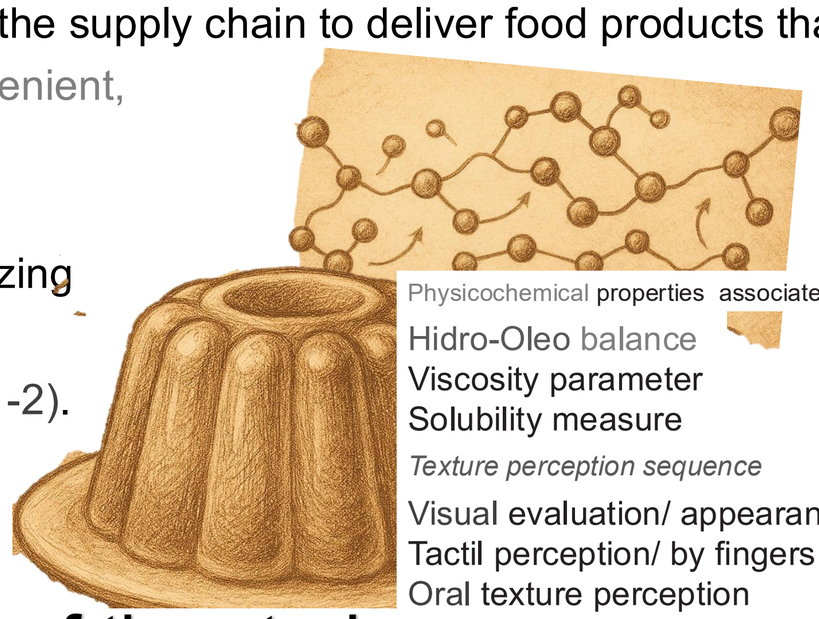
## INTRODUCTION

Industry 4.0 and Emerging Food Technology Trends, are reshaping the supply chain to deliver food products that are more convenient, nutritious, and affordable while emphasizing their safety and benefits (1-2).



Physicochemical properties associated
Hidro-Oleo balance
Viscosity parameter
Solubility measure

*Texture perception sequence*

Visual evaluation/ appearance
Tactil perception/ by fingers
Oral texture perception

## The aim of the study

Was formulate and optimize a gel-based tartlet by replacing egg protein with plant-based ingredients. Additionally, a mathematical model is proposed that correlates consumer acceptance data with measurable texture profiles and physicochemical properties.

## MATERIALS & METHODS

The study establishes sensory acceptance as the target function for optimization, created from statistical design (DOE), A Box–Behnken design was used to optimize formulation.

To replicate the egg-tartlet's gel texture 9 sources was used as mixtures:

Using experimental data on mixtures and responses in terms of viscosity, density, color delta, pH; as well as texture profile in terms of hardness.

Once the data has been obtained, optimization is applied to find the firmest and most appealing texture.

The sensory evaluation was carried out in three stages:

1. Discriminative test (identify egg-formula gel)
2. Hedonic test (acceptance and descriptive test)
3. Discriminative intensity test (correlation of texture perception)

Each panel member signed an informed consent form authorised by the institution's ethics committee.

## RESULTS & DISCUSSION

The **optimal formula** was a mixture of coconut cream (40%), almond-amaranth protein (25%), and corn starch (35%) on a wet basis.

The resulting **texture was measured at 0.18 N ± 0.01** and the viscosity was measured at 35.7 cP ± 12, and the **texture profile analysis included hardness, elasticity, chewiness, and masticability**.

The consumer preference data was used to study the control tartlet made with eggs and two plant-based versions.

A semi-trained panel of 35 people who had received texture identification training evaluated **texture, taste, and acceptability**

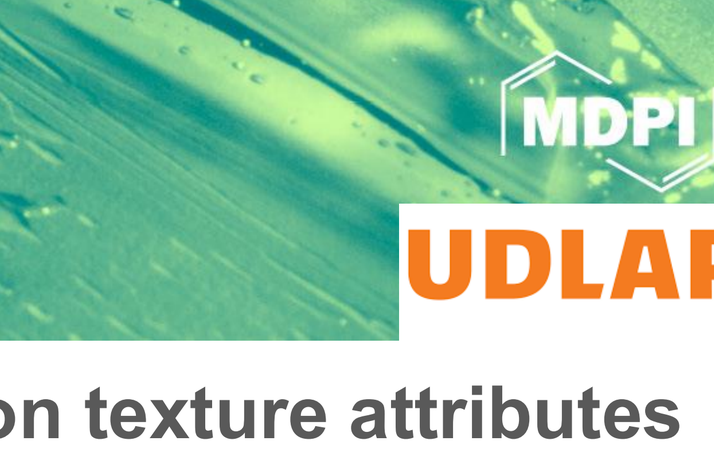



**Figure 1. Model for preference prediction from sensory attributes and physicochemical properties in samples**

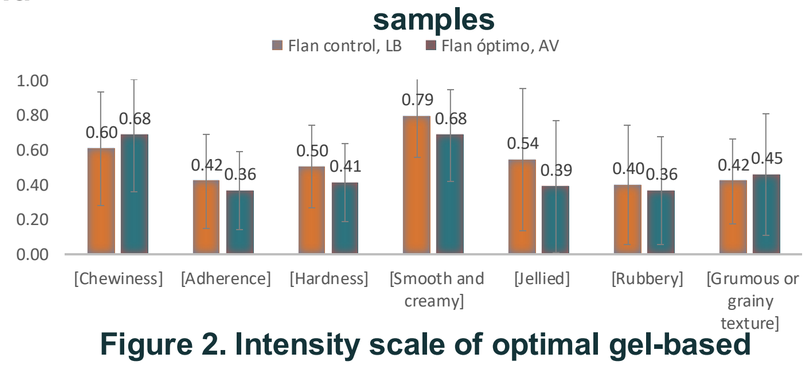



**Figure 2. Intensity scale of optimal gel-based dessert**

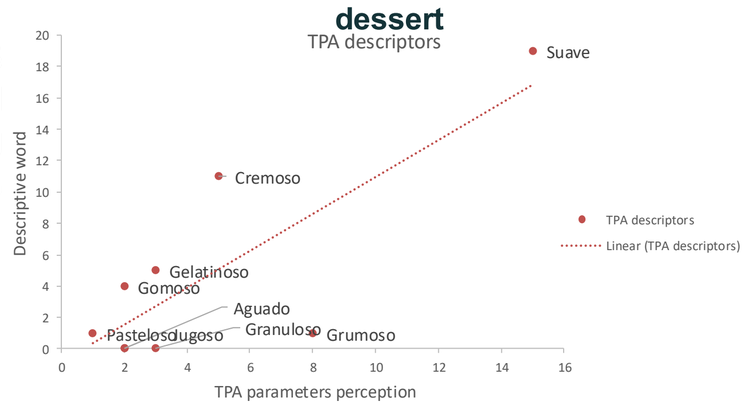
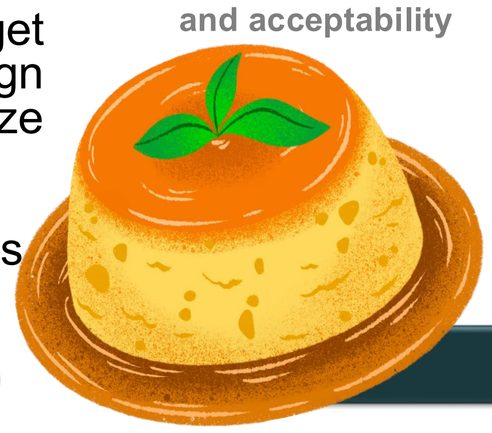



**Figure 3. Correlation between TPA parameters and attributes descriptors**



## CONCLUSION

The dressing formulation was described in terms of texture and viscosity density, solubility and particle size and flavor descriptors, as well as optimal formula was a mixture of coconut cream (40%), almond-amaranth protein (25%), and corn starch (35%) on a wet basis.

The results obtained open up new possibilities for the formulation of vegetable options with a higher nutritional value and better consumer acceptance

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