



REINVENTING "BACALHAU COM TODOS" IN A PLANT-BASED VERSION THROUGH THE APPLICATION OF HYDROCOLLOIDS AND MOLECULAR COOKING TECHNIQUES

Paula Cristina Santos, Alexandre Correia, Shengji Wang, Paulina Mata, Bruno Moreira-Leite
School of Science and Technology, NOVA University of Lisbon (NOVA FCT)

1. CONTEXT OF THE STUDY

"Bacalhau com Todos" (salted cod with vegetables) is one of the most emblematic dishes of Portuguese gastronomy, traditionally associated with Christmas Eve, family gathering and collective memory.

This work proposes a plant-based reinterpretation of the dish, not as a simple replacement of animal ingredients, but as a sensory and symbolic reconstruction of a deeply rooted culinary tradition.

By combining plant-based ingredients with hydrocolloids and molecular gastronomy techniques, the project aimed to preserve the visual, textural and emotional references of the original preparation while responding to contemporary challenges related to sustainability, food ethics and dietary inclusion.



2. R&D METHODOLOGY

The development followed an iterative experimental process in which each traditional component was redesigned according to its sensory function. The "cod" was recreated using thin layers of celeriac, blanched in a 30 g/L saline solution, cooled in an ice bath and infused with aromatic olive oil, garlic, onion, bay leaf and nori seaweed to evoke the marine and salted profile of cod. The chickpea component was transformed into a warm, aerated mousse, stabilized with 3% methylcellulose, taking advantage of its thermal gelation properties. The cabbage was reformulated as a crispy film made from cabbage juice, agar, xanthan and maltodextrin, then dehydrated at low temperature. The olive element was presented as a glossy green olive gel, structured with xanthan gum and Ultratex 3. Finally, the egg yolk was reimaged through direct spherification of roasted pumpkin purée with sodium alginate and calcium chloride, with *kala namak* (Himalayan black salt) added to evoke the sulfurous aroma of cooked egg.

3. ENSURE THE QUALITY

The final preparation was evaluated by a focus group of five tasters, aged between 25 and 45 years, using a structured hedonic scale from 1 to 9.

The dish obtained average scores of 7.5 for appearance and aroma, and 8.5 for flavour, texture and overall appreciation.

Qualitative feedback highlighted the excellent flavour, texture and presentation of the dish, while the main improvement identified concerned the crispness and salt balance of the cabbage element.

These results indicate a strong overall acceptance and confirm the effectiveness of the technical approach in creating a coherent and appealing plant-based reinterpretation.

4. CONVIVIAL MEAL

Beyond technical reconstruction, the dish was designed as a convivial, inclusive and emotionally recognizable gastronomic experience.

Adapting traditional dishes to people with dietary restrictions is essential to ensure that cultural food heritage remains accessible to everyone, including vegan and vegetarian consumers, as well as individuals with specific food intolerances or ethical dietary choices.

Each element was developed to perform a dual role: a functional role, related to texture, structure and stability, and a symbolic role, connected to memory, tradition and cultural identity.

The final composition preserves the recognizable codes of "Bacalhau com Todos" while presenting them through a contemporary culinary language.

In this sense, the dish is not merely a vegan alternative, but an example of inclusive gastronomy, where science and creativity allow more people to participate in shared culinary rituals without losing the emotional and cultural meaning of the original dish.



5. CONCLUSIONS & PERSPECTIVES

This work demonstrates that hydrocolloids can be powerful tools for the plant-based reinterpretation of traditional dishes, enabling the reconstruction of texture, stability, appearance and sensory meaning without relying on animal-derived ingredients.

The final result shows that innovation in gastronomy does not require the abandonment of tradition; rather, it can expand its relevance by making it more inclusive, sustainable and technically refined.

Future developments may explore nutritional profiling, environmental impact assessment, larger sensory panels and the adaptation of this approach to other traditional Portuguese dishes. Ultimately, this project positions gastronomy as a bridge between heritage and innovation, memory and technology, pleasure and responsibility.