

INNOVATIVE PROCESSING AND PRESERVATION TECHNIQUES FOR UNDERUTILIZED AQUATIC SPECIES: A SUSTAINABLE APPROACH TO MARINE BIODIVERSITY CONSERVATION

Alessandra Aiello¹, Rosaria Arena¹, Eleonora Curcuraci¹, Laura La Barbera², Concetta Maria Messina^{1,2}, Andrea Santulli¹

¹Laboratory of Marine Biochemistry and Ecotoxicology, Department of Earth and Marine Sciences, DiSTeM, University of Palermo, Via Barlotta 4, 91100 Trapani, Italy

²Institute of Marine Biology, Consorzio Universitario della Provincia di Trapani, Via Barlotta 4, 91100 Trapani, Italy

INTRODUCTION & AIM

Fish are a key component of the Mediterranean dietary model due to their high nutritional value. However, increasing seafood demand and sustainability challenges require diversification of production strategies (Teixeira & Silva, 2024).

This study focuses on the valorization of underutilized species (*Spicara smaris*) and seasonal species (*Coryphaena hippurus*) through innovative low-sodium salting and cold smoking techniques enriched with natural antioxidants. (Messina *et al.*, 2021)

The aim was to evaluate, through a multidisciplinary approach, the technological feasibility and quality of processed products while promoting biodiversity conservation and circular economy principles.

METHOD



Reduced sodium brining
Optimized brining process with reduced NaCl concentration to lower sodium content while maintaining product stability and safety

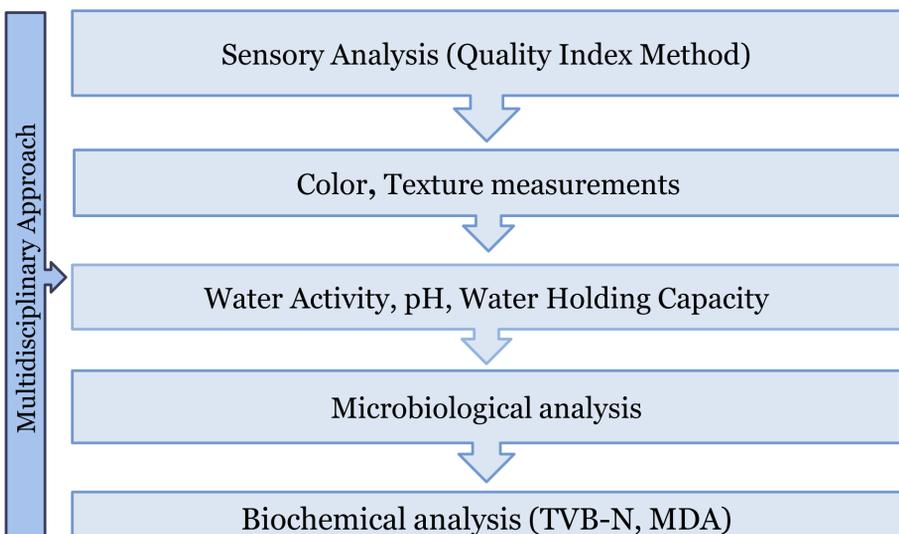


Controlled smoking
Standardized smoking conditions applied to ensure flavor development, microbial control, and product consistency



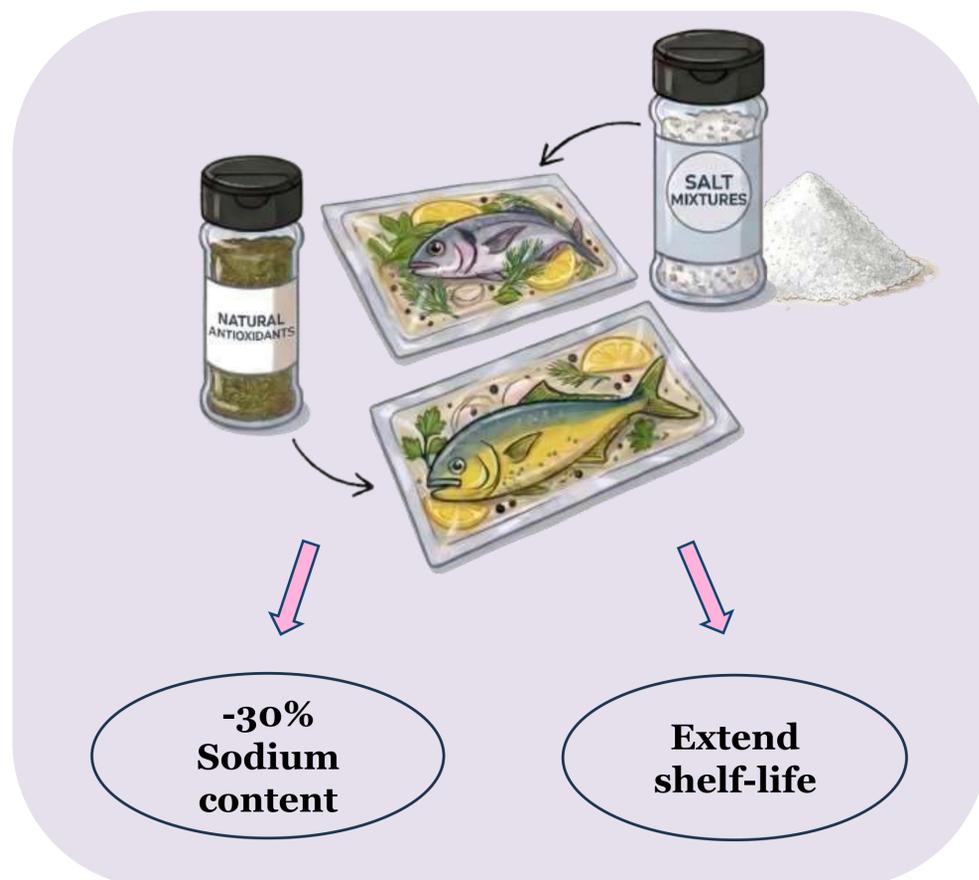
Antioxidant enrichment
Incorporation of natural antioxidant compounds to improve oxidative stability and extend shelf-life

SAMPLINGS



RESULTS & DISCUSSION

The results demonstrated the feasibility of producing high-quality seafood with a **sodium reduction of over 30%**. The innovative treatments successfully preserved the core sensory attributes, high protein content, and essential omega-3 fatty acid levels characteristic of traditional products.



- **Healthy products**
- **Positive consumer perception**

CONCLUSION



Innovative processing strategies significantly contribute to the sustainable use of aquatic resources. By converting underutilized species into high-value products, the industry can reduce dependence on overexploited stocks and foster new economic opportunities. This model successfully bridges the gap between marine conservation and public health objectives.

FUTURE WORK / REFERENCES

- Messina, C.M. et al. (2021). Combination of Freezing, Low Sodium Brine, and Cold Smoking on the Quality and Shelf-Life of Sea Bass (*Dicentrarchus labrax L.*) Fillets as a Strategy to Innovate the Market of Aquaculture Products. *Animals*, 11(1), 185.
- Teixeira, C.M. & Silva, P.M. (2024). The huge dilemma: how to increase seafood consumption for health benefits without impacting fisheries' sustainability? *International Journal of Food Science and Technology*, 59, 661-672.