

# Marine-Derived Biopolymer Coatings and Films for Sustainable Seafood Preservation

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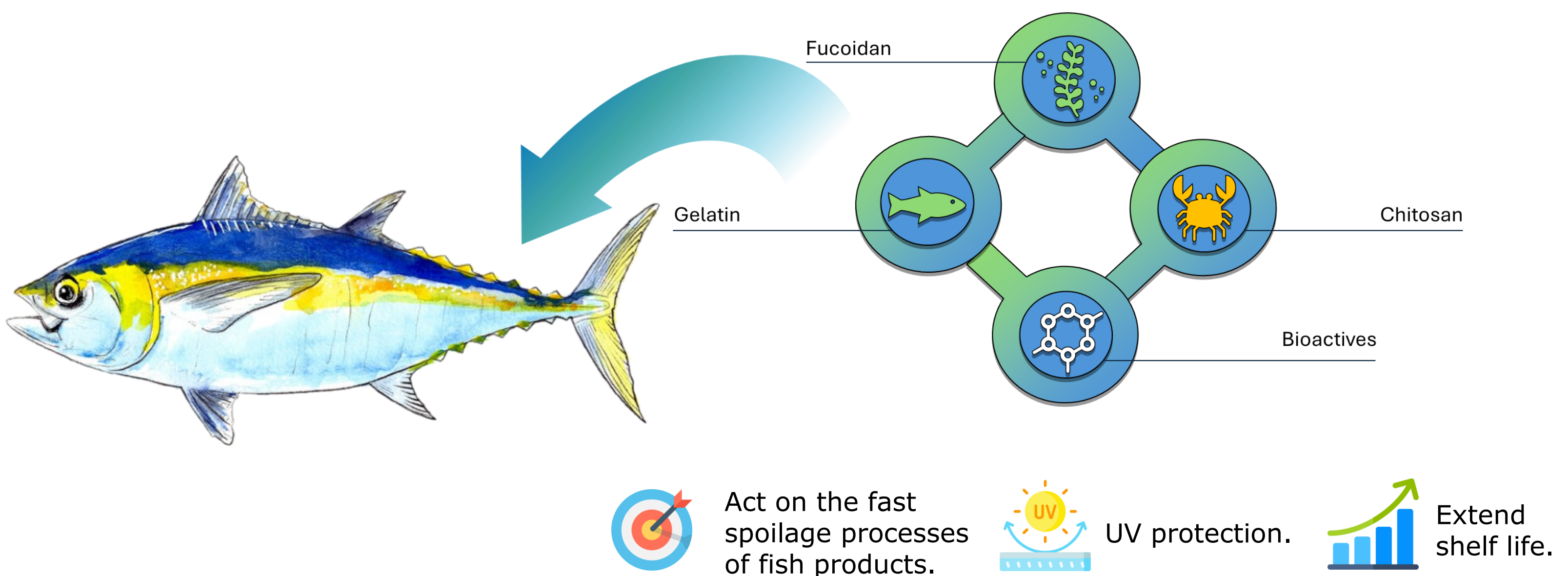
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## The motivation

Over the past 60 years, global seafood production and consumption have increased significantly. To effectively manage the spoilage process and meet the demand for high-quality and minimally processed seafood, innovative packaging solutions are needed. This has driven the search for novel bio-based and biodegradable packaging materials, able to compete with traditional packaging systems in terms of overall performance and cost-effectiveness.

## Project Aim

Producing new packaging materials that can be used for seafood, providing UV protection, antimicrobial properties, and extending the shelf-life of the products. This will be achieved combining polymers derived from seafood and algae industry by-products with natural bioactives.



## Research Plan

Development and characterization of films and coatings using blends of gelatin, chitosan, and fucoidan. Grafting with natural antioxidant and UV-shielding molecules, and assessment of their effectiveness through spectrophotometric and radical scavenging tests. Finally, evaluation of the performance of the films and coatings on model foods by analyzing microbial spoilage indicators and antioxidant effects.

### Microbiological evaluation

Analyses will focus on spoilage bacteria like *Pseudomonas spp.* and *Shewanella putrefaciens*. Both qualitative tests (inhibition halo) and quantitative tests (microbial counts) will be conducted.

### Technological evaluation

Analyses will include large deformation analysis, dynamic mechanical analysis (DMA), thermal properties via differential scanning calorimetry (DSC), and swelling behavior.

### UV-shielding evaluation

Efficacy of natural bioactives will be assessed by spectrophotometric analysis and in terms of radical scavenging ability, using the DPPH test.

### Selected References

(1) FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO; (2) Kontominas, M. G., Badeka, A. V., Kosma, I. S., & Nathanailides, C. I. (2021). Recent developments in seafood packaging technologies. *Foods*, 10(5), 940.