

# Increasing the sustainability of the seafood industry. Food reformulation strategy and technological solutions to elevate the value of waste and by-products

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## Introduction

In 2015, the ONU identified 17 Sustainable Development Goals (SDGs), including 'Zero Hunger' (SDG 2) and 'Life Below Water' (SDG 14). It has been reported that the main source of lost or unused fish is generated at the processing stage [1] where up to 70% of the total fish weight is discarded, including heads (9–12%), viscera (12–18%), skin (1–3%), bones (9–15%) and scales (5%) [2]. Currently, such wastes are mainly used for non-food purposes and to recovery bioactive compounds [1;3]. However the opportunity of valorizing such by-products in human nutrition is of great interest but several challenges still remain.



Figure 1. FAO (2018) The state of world fisheries and aquaculture 2018

## PhD objectives

The PhD project is dedicated to the enhancement of the sustainability of the seafood processing industry by activating the transition from waste and by-products to new ingredients and food products.

**WP1. Analysis of the state-of-art of fish waste and byproducts.** Analysis of fish species of the Mediterranean area, discards and by-products will be studied and analyzed.

**WP2. Quality characterization and valorization of fish byproducts.** Definition of the proximate composition of the fish by-products (T.2.1); Experimental protocols for the extraction/recovery of bioactive compounds from fish by-products (T.2.2).

**WP3. Elevating the values of fish by-products by technological solutions.** Use of food reformulation strategies and innovative technologies for developing food products with improved nutritional values and highly accepted sensory properties.

**WP4. Quality assessment and shelf-life prediction.** Shelf life estimation of the innovative ingredients and food products.

**WP5. D&C.** Publication of original papers in peer-review journals and participation at national and international conferences; Writing and Editing of the PhD thesis.

Activity	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1) <i>Identification of fish discards and byproducts</i>		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WP2) <i>Valorization</i>				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
T.2.1- Proximal and qualitative analyses				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
T.2.2- extraction/obtainment of new stabilised ingredients																									
WP3) <i>Food reformulation strategies</i>																									
WP4) <i>Overall quality assessment</i>																									
WP5) <i>Thesis and Paper Preparation</i>																									

Figure 2. Gantt diagram for the PhD thesis project

## References

[1] Cooney R. et al., (2023). Journal of Cleaner Production, 392: 136283. [2] Boronat Ò. et al., (2023). International Journal of Gastronomy and Food Science, 31: 100657. [3] Coppola D. et al., (2020). Marine Drugs, 18, 4: 214. **Figure 1.** FAO (2018) The state of world fisheries and aquaculture 2018. **Figure 2.** Gantt diagram for the PhD thesis project.