

# AQUATIC BIOMASS VALORIZATION

## Have you ever heard about BLUE ECONOMY?

The blue economy is a sustainable economic model that proposes new solutions for ocean-related activities and in which aquatic spaces are considered engines of innovation and growth. The concept is based on the imitation of nature, following the principle of the circular economy, to convert waste back into efficient materials.



**FISH WASTE OR ALGAE CAN ALSO HAVE A VALUE:** every year, 6-8 million tons of fish waste are produced globally. Do you know that fish waste can be a raw material to produce new biomaterials?

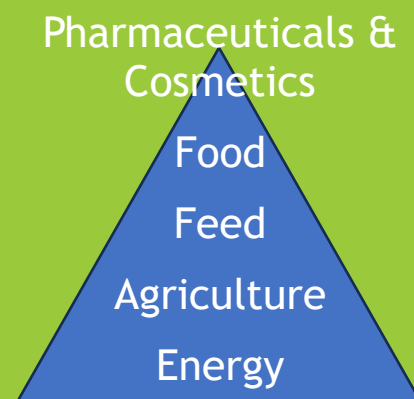


## CLOSING THE CIRCLE: THE CIRCULAR ECONOMY

The valorization of waste or residues from the processing of aquatic biomass can reduce waste disposal costs and generate added value with the recovery of several valuable molecules such as oils, proteins, pigments, bioactive peptides, amino acids, collagen, chitin, and gelatin. They can have applications in several industrial sectors!



**THE BLUE BIOREFINERY FOR THE ENVIRONMENT and ECONOMY**



## SOME EXAMPLES



Calcium carbonate, a biomaterial useful in the building industry or for water treatment, chitin for cosmetic or health products, and proteins for animal feed or use as fertilizer can be recovered from shell waste.

<https://site.unibo.it/caseawa/en>



Green algae waste extracts incorporated into a chitosan-based edible coating and applied to red tomatoes, can minimize post-harvest losses and extend shelf life, improving product quality.



Fish gelatine and chitosan have excellent characteristics for the production of films to be used in food packaging as an alternative to plastics.



Fish scales have a structure similar to that of human tissues: they are rich in collagen, peptides, gelatin, chitin, and hydroxyapatite, and therefore can be used in the food, cosmetic, medical, bone or cartilage repair industries, and for wastewater treatment.

**MICOPERI BLUE GROWTH**



**Recover  
Ingredients**



The increasing global demand for seafood and the need to supply the required quantities are creating sustainability issues, as well as an increasing attention towards plant and marine proteins for aquafeed or food production.

There are large quantities of aquatic biomass that are being lost through bycatch/discards, waste from aquaculture, or as food waste.

The circular economy aims to reduce by-product underutilisation, increase the rate of reuse, and reduce pressure on natural resources and systems. These by-products can be effluents from process water (i.e., sludge, aquaculture wastewater, and cooking effluents) or the biological by-products resulting from the processing (e.g., crustacean, bivalve shells, offal, fish heads).

These can all be valorised for the generation of feeds, value-added products, or other food, leading to a higher production efficiency, mitigation of its environmental impact, and reduction of the demand for natural resources.

Although several products of interest can be obtained, the use of seafood by-products continues to be a challenge due to food safety, their interactions with other ingredients used in the final food product, and public perception and consumer acceptance. Examples of higher-value alternatives for by-product use include the production of hydrolysates for human consumption, aquafeeds, the production of fertilisers and biostimulants, the extraction of omega-3 fatty acids for food supplements, collagen for food, cosmetic, pharmaceutical, tissue engineering, and biomedical industries, and chitin or chitosan from shells for chemical applications. Other opportunities are the extraction of oils and the production of biofuels, like biogas or biodiesel.