

VALORIZATION OF BLU CRAB (*CALLINECTES SAPIDUS*): OPTIMIZATION OF ENZYMATIC PROTEOLYSIS AND CHARACTERIZATION OF THE PROTEIN HYDROLYSATE

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The blue crab (*Callinectes sapidus*) is an invasive alien species that is causing significant ecological and economic damage in Italian marine ecosystems. However, its protein-rich biomass offers an opportunity for enzymatic hydrolysis, allowing the production of protein hydrolysates with valuable functional properties. This study aimed to optimize the enzymatic hydrolysis conditions to obtain protein hydrolysates from blue crab biomass, promoting a sustainable valorization strategy.

The optimal enzymatic hydrolysis conditions were determined using Neutrase, identifying pH 9, solid/liquid ratio of 1:4, temperature of 50°C, enzyme/substrate concentration of 2500 U/g and hydrolysis time of 8 hours as the best parameters. Under these conditions, the hydrolysate showed a hydrolysis yield of 52,82%, a protein recovery of 65%, and a degree of hydrolysis (DH) of 42,05%.

The protein hydrolysate was characterized by its technological and functional properties. The results highlighted a high-water solubility index (WSI = 98,18 ±0,76%), an oil-holding capacity (OHC) of 1,8 ±0,1 g/g, and good emulsifying properties, with an emulsifying activity index (EAI) of 13,12 m²/g and an emulsion stability index (ESI) of 96,48%. Regarding foaming properties, the hydrolysate exhibited a foaming capacity (FC) of 20%, while the foam stability (FS) remained at 90% after 4 minutes. Furthermore, the hydrolysate demonstrated strong antioxidant activity (DPPH = 77,08%), suggesting potential applications in food and nutraceutical formulations. These findings indicate that blue crab protein hydrolysates have promising applications in the food, nutraceutical, and pharmaceutical industries, thanks to their functional properties and bioactive potential. The use of spray-drying allowed the production of a stable and easy-to-handle protein powder, enhancing its industrial applicability. This study aligns with the circular economy model, offering an innovative and eco-friendly strategy to mitigate the impact of the blue crab invasion while promoting the sustainable exploitation of marine resources.