

#223: Valorisation of mussel *Mytilus galloprovincialis* meat waste to produce bioactive extracts by enzymatic hydrolysis

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Mytilus galloprovincialis is a mussel consumed and appreciated in several countries. However, its commercialization is associated with waste generation since they are submitted to a pre-selection before being delivered for sale. This results to the rejection of broken mussels or mussels with size out of the established criteria in the target market. Mussel meat is rich in proteins and has been described as a source of bioactive peptides with interesting properties for food and cosmetic industries. In this work small sized or broken mussels were submitted to enzymatic hydrolysis with a subtilisin protease, testing different conditions to maximize the production of an extract rich in proteins and bioactive peptides. First, the mussel meat was homogenised in a mincer and then submitted to enzymatic hydrolysis with subtilisin, using different combinations of temperature, enzyme concentration and incubation time.

The different combinations were established using a Box-Behnken experimental design, and their efficacy was achieved by analysing the effect of the three factors on protein release, antioxidant and anti-hypertensive properties. The protein content of each extract was determined by Kjeldahl, the antioxidant activity by oxygen-radical absorbance-capacity (ORAC) assay and anti-hypertensive property by the inhibition method of Angiotensin-I converting enzyme (iACE). The experimental design results were evaluated using Statgraphic centurion software.

The optimal extraction conditions achieved were the incubation of homogenised mussel meat with 1.5% of enzyme at 52°C for 3 hours. A scale up extraction was made using the optimized conditions and the resulting extract showed a protein content of 45%, an antioxidant activity of 426 µmol TE/g of extract and the ability inhibiting ACE with an IC50 of 1 mg of protein / mL. Thus, the use of discarded mussels to produce functional ingredients for food, cosmetic and pharmaceutical industries may contribute to valorise world waste in a circular economy context.

Keywords

Mussel, Antioxidant, Waste valorisation, Anti-hypertensive, Circular economy

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