

Optimization of Enzymatic Hydrolysis of Cooked Porcine Blood to Obtain Hydrolysates with Potential Biological Activities

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Abstract : Animal blood is a major by-product of slaughterhouses and still represents a cost and environmental problem in some countries. To be eliminated, blood should be stabilised by cooking and afterwards the slaughterhouses must have to pay for its incineration. In order to reduce the elimination costs and valorise the high protein content the aim of this study was the optimization of hydrolysis conditions, in terms of enzyme ratio and time, in order to obtain hydrolysates with biological activity. Two enzymes were tested in this assay: pepsin and proteases from *Cynara cardunculus* (cardosins). The latter has the advantage to be largely used in the Portuguese Dairy Industry and has a low price. The screening assays were carried out in a range of time between 0 and 10 h and using a ratio of enzyme/reaction volume between 0 and 5%. The assays were performed at the optimal conditions of pH and temperature for each enzyme: 55 °C at pH 5.2 for cardosins and 37 °C at pH 2.0 for pepsin. After reaction, the hydrolysates were evaluated by FPLC (Fast Protein Liquid Chromatography) and tested for their antioxidant activity by ABTS method. FPLC chromatograms showed different profiles when comparing the enzymatic reactions with the control (no enzyme added). The chromatogram exhibited new peaks with lower MW that were not present in control samples, demonstrating the hydrolysis by both enzymes. Regarding to the antioxidant activity, the best results for both enzymes were obtained using a ratio enzyme/reactional volume of 5% during 5 h of hydrolysis. However, the extension of reaction did not affect significantly the antioxidant activity. This has an industrial relevant aspect in what concerns to the process cost. In conclusion, the enzymatic blood hydrolysis can be a better alternative to the current elimination process allowing to the industry the reuse of an ingredient with biological properties and economic value.

Keywords : antioxidant activity, blood, by-products, enzymatic hydrolysis

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