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Abstract

Comparative Studies concerning Bioactive Peptides Obtained from Fish By-Products †

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Fish byproducts (bone, scale, or skin) contain a wide range of nutritional components, especially proteins and lipids, the most important of all being collagen. The hydrolysate of collagen from this source, obtained by the enzymatic method with papain, is rich in bioactive peptides.The aim of this work was to obtain and characterize peptides obtained by enzymatic hydrolysis from fish byproducts. Collagen was obtained by enzymatic methods with pepsin. Peptides were obtained from extracted collagen by enzymatic hyrolysis with papain and were separated by tangential ultrafiltration (using ÄKTA flux cross flow filtration system). This method allowed the separation of low molecular weight peptides (1–30 kDa) from those with high molecular weight (>50 kDa). Bovine collagen hydrolyzate was used as a control. For the peptide samples, we determined: protein content (by Biuret method), antioxidant capacity (by DPPH and ABTS methods), protein hydrolysis degree (using 2,4,6-trinitrobenzenesulfonic acid-TNBS reagent [1]), the inhibitory potential of angiotensin converting enzyme (ACE) [2] and the cytotoxicity in NCTC fibroblast cell line (clone L929) according to the international standard SR EN ISO 10993-5, by MTT assay. SDS-Page electrophoresis was used to assess the presence of peptides in the mass range of 1–100 kDa [3]. The results obtained for the hydrolysis degree as well as for the ultrafiltrated peptides were confirmed by the electrophoresis profile. Biochemical determinations (the antioxidant capacity, the ACE inhibition potential) and the cytotoxicity of tested peptides, with MW lower than 50 kDa, demonstrated their bioactivity. The results of the MTT assay demonstrated that obtained peptides did not affect the cell viability in the range of concentration 50–1000 µg/mL, except bovin collagen sample which is slightly cytotoxic at 1000 µg/mL concentration. Our results showed that the collagen peptides obtained after fish collagen hydrolysis with papain had antioxidant and antihypertensive activity, and the treatment of NCTC fibroblast cells with these peptides did not affect the cell viability. These results suggest that peptides obtained by enzymatic hydrolysis from freshwater fishes by-products collagen can be used in food supplements or cosmetic products.

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