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Production of Fish Hydrolyzates by Single and Multiple Protease Treatments under Medium High Pressure of 300 MPa

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Abstract : It has been reported that some enzymes such as trypsin and Alcalase 2.4L are tolerant to a medium high pressure of 300 MPa and preparation of protein hydrolyzates under 300 MPa was advantageous with regard to hydrolysis rate and thus production yield compared with the counterpart under ambient pressure.1,2) In this study, nine fish comprising halibut, soft shell clam and carp were hydrolyzed using Flavourzyme 500MG only, and the combination of Flavourzyme 500 mg, Alcalase 2.4 L, Marugoto E, and Protamex under 300 MPa. Then, the effects of single and multiple protease treatments were determined with respect to contents of soluble solid (SS) and soluble nitrogen, sensory attributes, electrophoretic profiles, and HPLC peak patterns of the fish hydrolyzates (FHs) from various species. The contents of SS of the FHs were quite species-specific and the hydrolyzates of halibut showed the highest SS contents. At this point, multiple protease treatment increased SS content conspicuously in all fish tested. The contents of total soluble nitrogen and TCA-soluble nitrogen were well correlated with those of SS irrespective of fish species and methods of enzyme treatment. Also, it was noticed that multiple protease treatment improved sensory attributes of the FHs considerably. Electropherograms of the FHs showed fast migrating peptide bands that had the molecular masses mostly lower than 1 kDa and this was confirmed by peptide patterns from HPLC analysis for some FHs that had good sensory quality.

Keywords : production, fish hydrolyzates, protease treatments, high pressure
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