NGUYEN VAN TRI. 2009. Recovery of fish oils and proteins from salmon processing co-products and their potential applications. Msci. THESIS, Department of Medicinal Biotechnology, FLINDERS UNIVERSITY, SOUTH AUSTRALIA. 81 pp.

ABSTRACT

Salmon co-products, which constitute an important part in the fish filleting industry, are produced in large quantities in Australia. These co-products are a good source of fish lipid and protein. However, they are currently only used for low value production of fishmeal or ensilation or frequently discarded. The aim of this project is to investigate the use of acid-assisted processing to recover both lipids and proteins from salmon processing co-products and their potential applications.

The fermentation industry is continuously looking for new economic nitrogen sources, containing a complex peptides, amino acids, vitamins, and nucleotides, which are free from the risk of contagious animal diseases and genetically modified plants. This work describes the optimization of pH conditions for the high recovery of both lipids and soluble proteins and the supplementation of fish protein supernatant and fish protein hydrolysates in growth media as the complex nitrogen sources.

Salmon lipid recovery was approximately 12% (w/wet weight of material) with a high polyunsaturated fatty acid composition. The highest production of protein hydrolysates at 8.24% was obtained using pH1, but interestingly, its soluble protein content was lowest.

Fish protein hydrolysates produced from three different pH conditions were tested as replacement nitrogen sources in MRS medium for the growth of *L. rhamnosus* in shake flasks. Hydrolysates produced in using pH3 condition showed the best result for the growth of *L. rhamnosus*. The different growth performances in the three hydrolysates indicate that a processing parameter, in this case pH, is not only important for solubilisation yield, but also for the ability of the resulting hydrolysate to promote microbial growth.

The growth of bacteria was compared between media containing fish protein supernatant and fish protein hydrolysate products. The results confirmed that both *L. rhamnosus* and *L. plantarum* could grow equally well in media containing fish protein supernatant and fish protein hydrolysate.

In a 2L-bioreactor scale, fish hydrolysis supernatant was also shown to work well as a complex nitrogen source replacement in MRS medium. These results suggest that fresh fish protein supernatant have a high potential for the application in industrial fermentation with good performance.

In conclusion, salmon co-products can be utilized as a good source for recovery of both lipids and proteins by acid-assisted processing. Fish protein supernatant and fish protein hydrolysate are good growth media of lactic acid bacteria as the complex nitrogen sources.