

Chalongkwan Pipatcharoenwong 2008: Fish Scale Collagen: Extraction and Partial Characterization. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Wunwiboon Garnjanagoonchorn, Ph.D. 116 pages.

The major composition of red snapper and Nile tilapia scales are protein and ash. In order to obtain high protein fish scale, decalcification process of fish scales was studied. The results showed that ash content of decalcified fish scales were less than 1% dry basis when decalcified by using 1.2 N HCl for 6 hours. In this study, decalcified fish scales were subjected to collagen extraction by 2 consecutive steps which were acid and heat process followed by acid combined with pepsin. Acetic acid was used in this study. The effects of ratio of scales:acid, pepsin concentration, temperature and time of both extraction steps were studied. These factors showed significant effects on molecular weight of peptide subunits and/or protein content of collagen extracted solution. The collagen extracted solution that has the highest protein content and composed of low molecular weight peptide subunits was obtained from acid and heat treatment at 90°C for 9 hours and ratio of scales:acid was 1:5 (w/v) followed by acid combined with pepsin treatment at 37°C for 72 hours using pepsin concentration at 2.5% (dry weight of decalcified fish scales). The collagen extracted solution was transferred into membrane filtration cartridge (MWCO = 3 kDa) and centrifuged at 2,400 x g for 30 mins. The collecting retentate was subjected to membrane filtration 3 times before spray drying to get collagen hydrolysate powder (CHP). CHP from red snapper and Nile tilapia scales composed of peptides with molecular weight lower than 25 kDa. If require type I collagen with  $\beta$ ,  $\alpha_1$  and  $\alpha_2$  subunits, then fish scales should be extracted with acid combined with pepsin at room temperature (28±2°C) for 72 hours where pepsin was added at 2.5% (dry weight of decalcified fish scales). Collagen was salted out from extracted solution by adding NaCl to give a final concentration of 0.9 M. The denaturation temperature of type I collagen from red snapper and Nile tilapia scales was 35.4°C and 37.4°C respectively. Therefore, the conditions of collagen extraction should be monitored in order to obtain collagen with specified characteristic.

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Student's signature

Thesis Advisor's signature