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Preparation and characterization of fish frame-added snack

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Introduction

Fish frames, which is the residual portion of the fish after filleting headed and gutted fish, are generated in a large quanity (approximately 15-17% based on whole fish) during seafood manufacturing (Wendel et al., 2002). Fish frames also contain large amounts of muscle protein, calcium, and functional lipids (Kim et al., 2000). In the sense, Fish frames can be served as an excellent source of raw material for producing various seafood products, such as surimi and snack. Most fish frame are, however, conventionally used to produce fish meal and fertilizer or are directly discharged into estuaries, resulting in environmental pollution (Ciarlo et al., 1997). New challenges must be attempted to find a way to upgrade the processing of waste to food grade ingredients such as resources of snack and surimi.

The objectives of this study was to prepare fish frame-added snack and also to examine its characterization.

Materials and Methods

Chum salmon and skipjack tuna frames were obtained from a commercial smoked salmon processing plant (Woo Young Fishery, Busan, South Korea) and canned tuna plant (Dong Won Industry Co., Changwon, South Korea), respectively, in April 2004. The fish frames were transferred into ice to the Seafood Byproduct Lab., Gyeongsang National University and kept frozen at -25℃ until used for preparing snack.

The sanitation of fish frame as a snack resource was examined by measuring volatile basic nitrogen (VBN) and heavy metal. The optimal processing condition and characterization of fish frame-added snack were also examined by measuring proximate composition (AOAC. 1995), VBN (method of Conway, 1960), browning (method of Hirano et al., 1987), minerals (Tsutagawa et al., 1994), Water activity, total amino acid, fatty acid and sensory evaluation.

Results

The objectives of this study was to prepare fish frame-added snack and also to examine its characterization. Contents of crude protein and lipid from fish frame were 16.3% and 9.4% for chum salmon, and 18.6% and 8.3% for skipjack tuna, respectively. Volatile basic nitrogen (VBN, 30.6 mg/100 g) and browning index (0.393) of fish frame powder (FFP) from chum salmon were lower than those of FFP from skipjack tuna. Therefore, FFP of chum salmon as a resource for preparing snack was better than that of skipjack tuna. Five types of snack were prepared with 0, 10, 20, 30, 40% (w/w) substitution ratios of FFP from chum salmon. Moisture contents (33.6 to 11.5%) of snacks decreased with substitution ratio of FFP, whereas crude ash (2.9-7.5%), protein (11.4-18.4%) and lipid (13.7-35.1%) increased. Sensory score on texture and taste of snack with 30% FPP were significantly higher ($p< 0.05$) than other snacks, while color and flavour scores of all snacks were not significantly different. The major fatty acids of snacks were 16:0 and 18:0 as saturates, 18:1n-9 as monoenes, and 18:2n-6 and 18:3n-3 as polyenes. Snacks with FFP were detected EPA (0.5-0.8%) and DHA (1.3-1.8%) in total lipid compositions. Total amino acid content (16,080 mg/100 g) of snack with 30% FFP was higher than that (11,180 mg/100 g) of snack without FPP, and the major amino acids were aspartic acid, glutamic acid, glycine, leucine and lysine. The calcium and phosphorus contents of snack with 30% FFP were 1,272 mg/100 g and 854 mg/100 g, respectively, and their ratio was the optimal range (2:1 to 1:2) in body absorption efficiency.

Reference

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