Extraction of Protein from Discarded Shellfish Waste; Value Added Shrimp By-products for fish Feeds

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Shrimp head and shell waste is a rich protein source having the possibility to use in fish feed formulation. Extraction of these valuable proteins from shrimp waste is restricted due to strong covalent bonds ß (1-4) found in chitin-protein. Present study aimed to extract the proteins in high percentages by breaking the chitino-protein bonds in shrimp shells, combining the activity of proteolytic endoenzymes in crab shell waste and temperature activated autolysis. Two tests were conducted. Test I-pressure cooked ground shrimp waste was mixed with ground crab waste at crab: shrimp ratios of 0:1, 1:1, 1:2, 1:3, 1:4 and, 1:9. Tests II: using the same crab: shrimp ratios in Test I without pressure cooking. All the samples in triplicates were heated with continuous stirring at 55 ^{0}C for 15 minutes. Each hydrolysate was dried at 60 ^{0}C and weighed. Crude protein percentage was determined by Kjeldhal Analysis. Data were analysed by one-way ANOVA using SPSS 17 version. No significant difference in crude protein percentage ($p > 0.05$) between pressure cooked and uncooked samples with the same ingredient ratios. Highest crude protein content was recorded in crab: shrimp 1:2 (69.00 ± 12.66%) in cooked samples and in 1:9 (68.66 ± 9.45%) of uncooked samples. In contrast crab: shrimp ratio of 1:9 of cooked samples had comparatively low protein percentage (55.00 ±7.54%). Lowest crude protein percentage recorded in crab: shrimp 0:1 in both uncooked (41.56 ± 5.56%) and cooked samples (42.00 ± 23.38%) as there is no crab wastes are added. Present study reveals that incorporation of crab shell wastes to uncooked shrimp waste and temperature induced autolysis is an efficient method to extract higher amount of protein from shellfish wastes.

Keywords: Shellfish waste, Enzymatic hydrolysis, Temperature autolysis, Protein extract