PRODUCTION OF PROTEIN HYDROLYSATE FROM BY-PRODUCTS OF MILKFISH (*Chanos chanos*) PROCESSING

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ACCEPTANCE SHEET

This undergraduate thesis entitled **"PRODUCTION OF PROTEIN HYDROLYSATE FROM BY-PRODUCTS OF MILKFISH (*Chanos chanos*) PROCESSING,"** prepared and submitted by **CYRIL JOY V. BALAIS**, in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCE (ENVIRONMENTAL CHEMISTRY)**, is hereby accepted:

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BIOGRAPHICAL SKETCH

Cyril Joy Villanueva Balais was born on October 20, 1998 in Science City of Muñoz, Nueva Ecija. She was the eldest daughter of Marvin Velasco Balais and Marilyn Villanueva Balais and a sister to Karl Lajos Villanueva Balais.

She studied at Guiding Star Learning Center in the year 2004 for her primary education and begun to showcased her talent in extra-curricular activities and leadership. In 2011, she was admitted at Central Luzon State University - Science High School. In her four-year journey in high school, she had been part and became an officer of different organizations such as SMFILMEKK Class Treasurer, Cultural Group Dance Coordinator, Philatelist Club Secretary, and Senior Class Organization Assistant Secretary.

In 2015, she entered college at Central Luzon State University taking up Bachelor of Science in Environmental Science major in Environmental Chemistry. Upon her onset in college, she was given a scholarship grant from Congressman Joseph Violago and currently from Congresswoman Mikki Violago. Since her first year, she's a consistent Academic Awardee.

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ABSTRACT

BALAIS, CYRIL JOY V., Department of Environmental Science, College of Arts and Sciences, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **February 2020, PRODUCTION OF PROTEIN HYDROLYSATE FROM BY-PRODUCTS OF MILKFISH (*Chanos chanos*) PROCESSING**

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Annually, there are approximately tons of by-products produced resulting from substantial harvesting of marine resources. Different strategies were devised to convert these by-products in a beneficial and nutritive product such as the hydrolysis of fish protein. In this study, production of fish protein hydrolysate (FPH) through acid hydrolysis was carried out using mixed by-products consisting of viscera and bones from the processing of milkfish (*Chanos chanos*). Acid hydrolysis using 4M, 6M and 8M HCl was conducted for 90 minutes under high pressure (15 psi) at 121°C before the samples were oven-dried for 48 h at 80°C. The different functional properties of FPH were investigated. The results showed that treating milkfish bones and viscera with 4M, 6M and 8M HCl can yield 5.141%, 6.083% and 5.510% of FPH, respectively. Although the concentration of acid did not affect the amount of FPH produced, it was found to influence the degree of hydrolysis (DH). The FPH from 8M HCl treatment had the highest DH (43.877%) while the one produced by 4M HCl has the lowest DH (22.048%). All FPHs were not as effective as ascorbic acid as antioxidant, since their EC_{50} values (741.2-1448 mg protein/ml) were several orders of magnitude higher than the value for the positive control (1.939 mg/ml). In general, the FPH samples obtained from 6M and 8M HCl treatments were more soluble across different pH compared to the FPH from 4M HCl. The maximum solubility of the different FPH prepared using 4M, 6M and 8M HCl were at 70.211% ± 10.098, 82.439% ± 4.533% and 94.910 ± 7.191, respectively. The FPH from 8M HCl treatment was found to have the highest emulsifying stability index (43.831min at pH 6) and emulsifying activity index ($53.509 m^2/g$ at pH 8) while the FPH from 6M HCl had the highest foaming capacity (223.333% at pH 8) and foaming stability (208.333% at pH 10). Taken together, the results suggest that even though similar amounts of FPH can be obtained using 4M, 6M and 8M HCl, the FPHs from 6M and 8M HCl treatments have better functional properties.

Keywords: DH; antioxidant; solubility; emulsifying; foaming

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