

**BIOACTIVITIES OF PROTEIN HYDROLYSATES FROM
*Chlorella sorokiniana***

LHUMEN A. TEJANO

**A Master's Thesis Presented
to the Graduate Faculty of the
Institute of Fish Processing Technology
College of Fisheries and Ocean Sciences
University of the Philippines Visayas**

**In Partial Fulfillment of the Requirements
for the Degree of
Master of Science in Fisheries (Fish Processing Technology)**

June 2018

ABSTRACT

Microalgal proteins can be a good source of nutrients and compounds with bioactivities. In this study, proteins from *Chlorella sorokiniana* were isolated by pH shift technology and enzymatically hydrolyzed using pepsin, bromelain, and thermolysin to produce hydrolysates. Molecular characteristics of the hydrolysates were determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) and amino acid analysis. After membrane ultrafiltration, bioactivities of the hydrolysates and peptide fractions were determined. Results revealed that thermolysin exhibited the highest degree of hydrolysis with 18.08 + 1.13%, followed by bromelain, and lastly by pepsin, after 4 h of hydrolysis. SDS-PAGE results showed that the hydrolysis generated peptides exhibited molecular weights of mostly <10 kDa of the hydrolysates, much less than those of the large and diverse proteins of the protein isolate. The essential amino acid indices (EAAs) suggest that the hydrolysates could be considered as good quality protein sources. In vitro bioactivity assays, on the other hand, revealed that the pepsin peptide fraction of <5 kDa showed the highest DPPH radical scavenging activity (48.86 + 1.95%). Only pepsin hydrolysates and pepsin peptide fractions displayed inhibition to *Staphylococcus aureus* and *Escherichia coli*. However, there are no significant differences among the Angiotensin I Converting Enzyme (ACE) inhibitory and reducing power activities of the hydrolysates and peptide fractions. Both the protein hydrolysates and peptide fractions were observed to have satisfactory pH and heat stabilities. Overall, the results suggest that *C. sorokiniana* proteins can be a good alternative source of valuable compounds with pharmaceutical and nutraceutical application potentials.

Keywords: *Chlorella sorokiniana*, protein hydrolysate, fractionation, bioactivity, stability