HAU ENG HUAN

MASTER OF SCIENCE

2017

DECIPHERING THE ROLES OF PROTEIN HYDROLYSATE FROM YELLOWSTRIPE SCAD (*Selaroides leptolepis*) IN REDUCING OIL UPTAKE IN FRIED BATTERED SQUID

HAU ENG HUAN

MASTER OF SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2017

DECIPHERING THE ROLES OF PROTEIN HYDROLYSATE FROM YELLOWSTRIPE SCAD (*Selaroides leptolepis*) IN REDUCING OIL UPTAKE IN FRIED BATTERED SQUID

HAU ENG HUAN

Thesis Submitted in Fulfillment of the Requirement for the Degree of Master of Science in the School of Food Science and Technology Universiti Malaysia Terengganu

JUNE 2017

DEDICATION

I humbly dedicate this thesis to my lovely parents and brother whose encouragement, love, guidance and prayers accompanied me along this windy and bumpy road of success.

~Hau Eng Huan~

ABSTRACT

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science

THE ROLES OF PROTEIN HYDROLYSATE FROM YELLOWSTRIPE SCAD (*Selaroides leptolepis*) IN REDUCING OIL UPTAKE IN FRIED BATTERED SQUID

HAU ENG HUAN

JUNE 2017

Main supervisor : Mohamad Khairi bin Mohd Zainol, Ph.D.

Co-supervisor : Associate Professor Amiza Mat Amin, Ph.D.

School : Food Science and Technology

Yellowstripe scad (*Selaroides leptolepis*) belongs to the small pelagic group that abundantly found in South China Sea and is categorized as low value fishes. Enzymatic hydrolysis produced more marketable fish protein hydrolysate, at which protein has been focused on oil-uptake reduction due to their film forming ability and thermal gelation properties. The main objective of this study was to determine the effect of crude protein hydrolysate (CPH) and purified protein hydrolysate (PPH) from yellowstripe scad in reducing oil uptake in fried battered squid. The optimum conditions to produce protein hydrolysate (drying method, hydrolysis time and enzyme concentration) were evaluated based on several physical analysis such as yield, protein content, water holding capacity (WHC) and degree of hydrolysis (DH). Significant ($p<0.05$) effects of drying methods,

hydrolysis time and enzyme concentration on yield, protein content and WHC of CPH were observed, whereas only enzyme concentrations significantly ($p<0.05$) affected DH, with the highest DH at 47%, containing the highest protein content (60%). Therefore, the most optimum conditions to produce freeze dried CPH was found to be 2 h of hydrolysis and 2.0% of enzyme concentration. This CPH was incorporated into batter formulation for oil uptake analysis. Significant effect ($p<0.05$) on battered WHC can only be observed at 20% incorporation of CPH. The viscosity of batter showed thinning behavior as incorporation of CPH increased while batter pick up (BPU) showed reducing trend. Incorporating 10% of CPH significantly reduced oil uptake by 17.35% with positive water retention (38.46%). Sensory acceptance portrayed no significant difference ($p>0.05$) among the three samples of fried battered squid (0%, 5% and 10% of incorporation of CPH), signifying panelists were able to accept sample incorporated with CPH. Physical analysis showed 10% of incorporation is the best percentage in batter incorporation. Protein purification showed that there were two different peaks (PPH A and PPH B) with different retention time collected, with only 10% of CPH and PPH were incorporated into batter. WHC, viscosity and BPU showed no significant differences between CPH and PPH. Oil uptake showed significant difference ($p<0.05$) between PPH (PPH A and PPH B) and CPH, with the highest reduction in oil uptake using PPH A (38%). PPH A also showed the highest water retention among all the fish protein hydrolysate. Microstructure observation also showed that PPH altered pores structure of fried crust to a few shallower pores. PPH reduced higher amount of oil absorption than CPH. These proved that fish protein hydrolysate has great potential in reducing oil uptake in fried battered squid.