

Thasanee Nonwachai 2010: Growth, Survival and Non-Specific Immune Characteristics of Pacific White Shrimp (*Litopenaeus vannamei*) Fed with Supplement *Schizochytrium* sp. and ARA Containing Diets, and Challenged with *Vibrio harveyi*. Master of Science (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 113 pages.

A 70-day growth trial was conducted with postlarvae 12 Pacific white shrimp (*Litopenaeus vannamei*) to study the use of soybean meal, and oil from *Schizochytrium* sp. and arachidonic acid (ARA) as fish meal and fish oil substitutes in practical diets for *L. vannamei*. The growth, survival and immune characteristics of shrimp were evaluated. Seven experimental diets (treatments) were designed with soybean meal used as the primary protein source, and each formulation contained 33% crude protein and 8% lipid. Fish oil was completely substituted with 3% soybean oil and *Schizochytrium* sp. and ARA rich in docosahexaenoic acid (DHA) and ARA were added at different concentrations. Seven treatments consisted of DHA:ARA ratio 0:0 (A), 0.5:0 (B), 0.25:0 (C), 0:0.25 (D), 0:0.12 (E), 0.5:0.12 (F) and 0.25:0.06 (G) percent respectively. Commercial shrimp feed was used as a reference. The final weight and survival rate of shrimp were not significantly different ($p>0.05$) among all treatments. However, shrimp fed on diets supplemented with DHA and ARA showed significant improvements in immune parameters, such as total hemocyte count (THC), phenoloxidase activity, superoxide dismutase activity, and bactericidal activity. Shrimp fed with feed formular F had highest THC but not significantly different ($p>0.05$) from shrimp fed with feed formular G, however significantly higher than those of treatments A, B, C, D, E and control group ($p<0.05$). Shrimp fed with feed formular G had highest percentage phagocytosis, phenoloxidase activity and superoxide dismutase activity. However, there was no significant difference ($p>0.05$) from treatment F but significantly higher ($p<0.05$) than treatments A, B, C, D, E and control group. Shrimp fed with feed formular B, C, D, E, F and G had bactericidal activity at the serum dilution of 1:8 while shrimp in the control group and treatment A had bactericidal activity at the serum dilution of 1 : 4. After shrimp were challenged with *Vibrio harveyi*, treatments F and G had highest survival rate (76.67 ± 0.58 %) significantly higher ($p<0.05$) than treatments A, B, C, D, E and control group. These findings demonstrate both a positive effect of soybean meal and oil from *Schizochytrium* sp. and ARA are alternative to fish-based ingredients in shrimp diets.

Student's signature

Thesis Advisor's signature