

Panita Prathomya 2011: Effect of Metalloprotein on Growth, Survival and Non-Specific Immunity of Pacific White Shrimp (*Litopenaeus vannamei*). Master of Science (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 89 pages.

A study of the effects of metalloprotein on growth, survival and immune response in Pacific white shrimp (*Litopenaeus vannamei*) was conducted under laboratory conditions. Laboratory tests were carried out in two treatments (with four replicates/treatment). Each replicate consisted of 50 shrimp (PL 15) in 500 liter fiberglass tanks. Shrimp were fed four times daily for 60 days with pelleted feed containing levels of metalloprotein (0 g and 1 g per kg of feed). After 60 days of dietary administration, shrimp fed with 1 g metalloprotein per kg of feed had an average body weight ( $5.72 \pm 0.98$  g) which was significantly higher ( $P < 0.05$ ) than the control group ( $3.52 \pm 0.56$  g), but survival rate was not significantly different ( $P > 0.05$ ). Total hemocyte count (THC), bactericidal activity, phagocytic activity, phenoloxidase activity superoxide dismutase activity and survival rate of shrimp after experimental infection with *Vibrio harveyi* revealed that shrimp fed with 1 g metalloprotein per kg of feed had significantly higher than control group ( $P < 0.05$ ). A study of the effects of metalloprotein on growth, survival and immune response was conducted under different oxygen level. The experiment was carried out in three treatments (with three replicates per treatment). Each replicate consisted of 30 shrimp ( $7.5 \pm 0.5$  g) and rearing for 55 days. Treatment 1 or control group, shrimp were fed with pelleted feed with normal oxygen conditions. Treatment 2, 1g metalloprotein/kg of the feed was added and rearing in low oxygen conditions. Treatment 3, shrimp were fed with normal feed without metalloprotein also in low oxygen conditions. After 55 days of dietary administration, shrimp fed with normal feed with normal oxygen conditions had an average body weight ( $15.00 \pm 1.36$  g) which was significantly higher ( $P < 0.05$ ) than shrimp fed with 1 g metalloprotein per kg of the feed in low oxygen conditions ( $12.11 \pm 1.13$  g) and the group that fed with normal feed in low oxygen conditions ( $12.00 \pm 2.85$  g) respectively. Survival rate of shrimp was significantly higher in the group that fed with normal feed in normal oxygen conditions ( $84.44 \pm 1.92$  percent) than that shrimp fed with 1g metalloprotein/kg of the feed in low oxygen conditions ( $61.11 \pm 1.92$  percent) and normal feed in low oxygen conditions ( $45.56 \pm 3.85$  percent) ( $P < 0.05$ ) respectively. However, shrimp fed with 1 g metalloprotein per kg of the feed had significantly higher survival rate than the group without metalloprotein ( $P < 0.05$ ). The immune characteristics revealed that THC, phagocytic activity, phenoloxidase activity and superoxide dismutase activity of shrimp from control group and shrimp fed 1 g metalloprotein per kg of the feed in low oxygen conditions were not significantly different ( $P > 0.05$ ) but higher than the group without metalloprotein ( $P < 0.05$ ). The present study indicate that oral administration of metalloprotein could increase immune response and survival rate of *L. vannamei* in low oxygen conditions.

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Student's signature

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Thesis Advisor's signature