The Effects of Vitamin C and Vitamin E in Shrimp Feed on Blood Component, Immune Responses and Disease Resistance of Black Tiger Shrimp

*(Penaeus monodon* Fabricius, 1798)*

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**Abstract**

The effects of vitamin C and vitamin E supplementation in pellet feed on blood components, immune responses and disease resistance of black tiger shrimp (*Penaeus monodon*) were examined. Shrimp of 10.0 g initial weight were cultured in twelve 50x178x69 centimeters concrete ponds of 50 shrimp each and divided into 4 treatments in triplicate. Each treatment was randomize fed one of 4 different pellet diets for 30 days; diet 1 without vitamins supplementation (Control), diet 2 with 400 mg vitamin C (L-ascorbyl-2-monophosphate-Mg)/kg diet (VC), diet 3 with 400 mg vitamin E (DL-α-tocopheryl acetate)/kg diet (VE), and diet 4 with 400 mg of vitamin C and 400 mg of vitamin E/kg diet (VCVE). All diets were coated with 25 g fish oil/kg diet to reduce the leaching of vitamins during feeding. Total hemocyte count (THC), number of granulocyte and hyaline cells of shrimp fed vitamin E supplemented diets (VE and VCVE) were significantly higher than control group (p<0.05). The phenoloxidase activity of shrimp fed vitamin E (VE) was also significantly higher than control (p<0.05) while there were no differences of superoxide anion production among group. In additional the ability of shrimp to eliminate bacteria *Vibrio harveyi* from body was highest in shrimp fed vitamin C supplementation (VC) following by shrimp fed vitamin C and E (VCVE) and shrimp fed vitamin E (VE) respectively, the ability of these 3 groups were significantly greater than control (p<0.05). The survival of shrimp fed vitamin C supplemented diet (VC) was highest after *Vibrio harveyi* and white spot syndrome virus (WSSV) challenged. Therefore supplementation of vitamin C and vitamin E in shrimp feed could increase disease resistance and the immune responses of black tiger shrimp.

**Key words:** black tiger shrimp (*Penaeus monodon*), immune system, vitamin C, vitamin E, disease resistance

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