Effect of Long-Term Administration of Dietary β-Glucan on the Expression of Immune-Related Genes in *Litopenaeus vannamei*

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Abstract

Expression of immune-related genes in muscle was evaluated in a 84-day feeding trial in white shrimp, *Litopenaeus vannamei*, fed diets containing 0, 250, 500, or 1000 mg/kg β-1,3-glucan from *Laminaria digitata*. The transcript abundance of hemocyanin, lipopolysaccharide/b-glucan binding protein (LGBP), penaeidin-3, prophenoloxidase (proPO), serine proteinase, and cytosolic manganese superoxide dismutase (cMnSOD) was quantified by real-time PCR. The dietary inclusion of β-1,3-glucan significantly affected the mRNA expression of all six genes. LGBP, cMnSOD, and hemocyanin were significantly up-regulated by day 14, serine proteinase peaked on day 28, and penaeidin-3 and ProPO peaked on day 56. The dosage of β-1,3-glucan also affected mRNA expression. cMnSOD was significantly higher in shrimp fed the diets containing 250 or 500 mg/kg β-1,3-glucan than in those fed the control. ProPO and penaeidin-3 were significantly increased in shrimp fed the diet containing 500 mg/kg β-1,3-glucan than in those fed the control. LGBP, serine proteinase, and hemocyanin were significantly higher in shrimp fed the 500 or 1000 mg β-1,3-glucan/kg dry diet can help improve the expression of immune-related genes in *L. vannamei*.

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