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The effects of different levels of lycopene pigment on biochemical, immunological and enzymatic hemolymph parameters of the oriental river prawn, *Macrobrachium nipponense* (de Haan, 1849)

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Abstract

Lycopene pigment is one of the most important carotenoids in terms of antioxidant functions and desirable effect on immune-related processes due to the longest hydrocarbon chain among carotenoids with eleven double bonds. Therefore, the present study was aimed to evaluate the effects of lycopene pigment on biochemical, immunity and enzymatic hemolymph parameters of the oriental river prawn. In this research, two hundred and twenty-five prawns with mean weight of 1.40±0.07 gram were fed by five dietary treatments and three replications including different levels of lycopene zero (control), 50, 100, 150 and 200 milligrams lycopene per kilogram diet for fifty-six days. At the end of the culture period, after collecting the hemolymph of the studied prawns, biochemical, immunity and hemolymph enzymes parameters of the samples were evaluated by experimental kits, ELISA reader instrument and optical microscope. The results of the study showed that the biochemical, immunity and enzymatic parameters of prawn hemolymph were affected by different levels of lycopene pigment. With increasing dietary lycopene levels, the biochemical indices of albumin and total protein of prawn hemolymph increased significantly while cortisol levels decreased. Immunity parameters such as total hemocyte count, granular cells, semi-granular cells and hyaline cells, also increased significantly with increasing dietary lycopene. Hemolymph enzymes such as lysozyme and phenol oxidase were higher in treatments containing lycopene pigment than control treatment, while alanine aminotransferase, aspartate aminotransferase and lactate dehydrogenase were significantly reduced and alkaline phosphatase were not affected by different levels of lycopene pigment. Finally, the findings of this study showed that increasing dietary lycopene levels improved the biochemical, immunity and enzymatic hemolymph parameters of the oriental river prawn and adding 200 milligrams per kilogram of this pigment to the diet was suggested to improve the parameters that mentioned of this prawn.

Key words: Carotenoids, Hemolymph, Immunity, Lycopene, Oriental river prawn

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