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The potential of *Eucheuma serra* lectin as immunomodulator in Vannamei shrimp by using the total hemocyte count (THC)

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The declining of shrimp production from 209.648 tonnes in 2008 to 170.969 tonnes in 2009 in Indonesia was caused by several pathogens such as virus, bacteria and parasite infecting the shrimp. *Eucheuma serra* has several minerals, proteins and glucose or glycoprotein, where 80% of its protein consists of lectin. Lectin from *E. serra* (ESA) can recognize and bind with the sugar portion of other molecules from foreign particles with broad specificity and also functionate as immunomodulator activity that can stimulates the hemocyte production and activation. This research aims to identify the effect of lectin from *E. serra* to enhance the non-specific immune of the shrimp by using THC and to identify the optimal dosage. The research method used was complete randomized design with 5 treatments (2 ppm, 4 ppm, 6 ppm, 8 ppm, and 10 ppm) and one control with 4 repetitions. The lectin administered with the injection in fourth segment and the depriving of hemocyte in day 0 was applied in order to identify the amount of hemocyte which can be produced after acclimation, whereas the depriving in day 6 was estimated, that the direct injection in bloodstream of shrimp can enhance hemocyte production and activation more effectively. The result showed that the highest hemocyte productivity was occurred in p4 treatment with 8 ppm of injected lectin dosage, accounting for 18.45 million cells/ml in average. Subsequently, p1 (2 ppm) and p4 (12 ppm) had a nearly similar amount of hemocyte, constituting to 14.82 million cells/ml and 15.03 cells/ml in average. In conclusion, the high immune response showed in 8 ppm of treatment with the rise of hemocyte approximately in an average of about 18.45 million cells/ml. It means that lectin from *E. serra* positively can be used as immunomodulator in vannamei shrimp.

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Influence of probiotic *Lactobacillus acidophilus* on immune response, hematological parameters and resistance of striped catfish (*Pangasianodon hypophthalmus* sauvage, 1878) juveniles against *Aeromonas hydrophila* CT19

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The effects of dietary supplementation with *Lactobacillus acidophilus* on hematology parameters, immune response and protection against *Aeromonas hydrophila* CT19 were evaluated in striped catfish (*Pangasianodon hypophthalmus*, Sauvage, 1878) juveniles. The diet that was not supplemented with LAB served as the control. Four diets containing various levels of *Lactobacillus acidophilus* (10^3 , 10^5 , 10^7 and 10^9 CFU/g) were prepared and fed twice daily at 2.5% of fish body weight to triplicate groups of striped catfish juveniles (initial weight of 21.69 ± 0.18 g) for 12 weeks. Fish were challenged with *A. hydrophila* CT19 after the 12-week feeding trial and mortalities were recorded for 3 weeks. The results of challenge test indicated that the survival improved with increased *Lactobacillus acidophilus* up to 10^5 CFU/g, beyond which survival did not change significantly. A better concentration of hematological parameters and total immunoglobulin (Ig) content was reported when the striped catfish fed with *Lactobacillus acidophilus* supplemented diets. After 3-week post challenged, the hematological parameters, total Ig content and survival were significantly highest in fish fed with LAB supplemented diets at 10^5 CFU/g and above, while it was not observed in the case of lysozyme activity. Based on the results of this study it is concluded that supplementation with *L. acidophilus* at least 10^5 CFU/g has positive influenced on hematology parameters, immune response and resistance against *A. hydrophila* CT19 in striped catfish juveniles.