Effects of different concentrations of bacteria *Lactobacillus casei* on some innate response and hematological indices of rainbow trout (*Oncorhynchus mykiss*) in the challenge of lead toxicity in the diet

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Abstract

The present study was conducted to evaluate the effects of probiotic *Lactobacillus casei* on hematological and immunological parameters of rainbow trout after lead poisoning. In order to achieve this, 375 fish about 15±4.6 g of weight were selected and after being physically examined were divided randomly in to 5 groups including 3 groups which were fed by healthy food containing 5×10^6, 5×10^7 and 5×10^8 CFU/g *Lactobacillus casei* for 45 days and also 2 positive and negative control group of lead which were fed by healthy food without probiotics. Then 3 probiotics and positive control groups were fed by poisoned food (500 µg/Kg lead nitrate) for 21 days. Blood samples after anesthesia were collected from dorsal vein at days 45, 52, 59 and 66. Then, Hematological (hemoglobin, PCV, red blood cells and white blood cells) and some immunological parameters such as serum lysozyme and bactericidal activity, complement, respiratory burst activity, total protein and albumin were compared and were assessed between groups. Results showed that hemoglobin, red blood cells and white blood cells in 3 probiotics groups were increased significantly compared with control group ($P<0.05$). Serum lysozyme and bactericidal activity and also complement, were enhanced significantly with respect to control group ($P<0.05$). Respiratory burst activity at days 52 in group 2 had significant increase compared with control group ($P<0.05$). Total protein and globulin decreased compared with control group ($P>0.05$). According to obtained results, it might be concluded that the feeding of this species by *Lactobacillus casei* could reduce damages caused by lead poisoning and enhance hematological and immunological parameters. Also, concentration 5×10^7 CFU/g has had better effect on immune system of rainbow trout.

Keywords: probiotic, *Lactobacillus casei*, *Oncorhynchus mykiss*, lead.