



Effect of different chronic salinity regimes on survival and hematologic indices of three different common carp population

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Abstract

This study aimed to investigate the effect of different chronic salinity regimes (1, 3, 6, 9, and 12 ppt) on survival and hematologic indices of three different common carp population (TATA, Chinese, and North Iran- carp). The study was run in triplicate. 90 fish of each population (average body weight= 250±10 g) were stocked six individuals per tanks, acclimatized with the intended salinity, and fed with a commercial fish diet for one week before starting the experiment for another 10 weeks. The hematological indices including RBCs, WBCs, HCT, Hb concentration, MCV, MCH, and MCHC were calculated. The salinity has not influenced the survival in all regimes, while the growth rate declined after inducing 9 ppt in all the above-mentioned population. The RBCs, HCT, and Hb concentration elevated significantly followed by an increase in salinity up to 6 ppt in TATA and the Chinese population, and then after decreased with 12 ppt ($p<0.05$). While the same pattern occurred in North Iran- carp up to 9 ppt, and declined in 12 ppt ($p<0.05$). The gradual increase in RBCs and Hb up to 6 (in TATA and Chinese) and 9 ppt (in North Iran- carp) is a physiological response for osmoregulatory demand for the acclimation process. The meaningful effect of salinity on reduced RBCs, HCT, and Hb after 9 and 12 ppt may be associated with osmoregulatory dysfunction induced by high salinity levels. A decrease in HTC could be explained by the reduced volume of RBCs due to osmotic changes caused by ion leakage from the plasma. The low amount of MCV in 6 and 9 ppt treatment is reversely correlated with the number of RBCs. Moreover, the MCH was significantly low in treatment 6 and 9 ppt in two other population and North Iran



($p < 0.05$), respectively, showing that the RBSs production did not match by hemoglobin synthesis and the cell has not enough time to produce the proper amount of hemoglobin. The lowest amount of MCHC was found in 1 ppt in all population, having a significant difference with other treatments ($p < 0.05$). The current study results showed a significant increase in the leucocytes count in the 6 and 9 ppt salinity treatment, in TATA- Chinese and North Iran population ($p < 0.05$), respectively, being a good indicator of physiological stress. This study has demonstrated that hematological variances can occur between different populations of a species, and based on hematological indices the maximum salinity regime that carp tolerate is 6 to 9 ppt.

Keywords: Common carp, hematological indices, salinity, tolerance