

SOME PHYSIOLOGICAL CHANGES (ALP, AST AND ALT) OF COMMON CARP (*CYPRINUS CARPIO*) CAUSED BY HIGH SALINITY

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ABSTRACT : The present study was conducted to investigate the effect of high salinity on the some physiological parameters of common carp (*Cyprinus carpio*) which gradually exposed to salt concentrations of 5, 10 and 15 g/liter, as well as tap water (control 0.1g/liter) for 90 days. 80 fish were randomly distributed on eight glass tanks with 2 replicates as 10 fish / replicate at average weight of 15 ± 3 g to study the effect of salinity on the Alkaline phosphatase enzyme (ALP), ALT and AST enzymes. Fish were fed during the trial on commercial diet with 31.9% protein content. Results showed an increase in the alkaline phosphatase to 43.12, 57.69 and 82.35 IU/L when the salinity increased to 5, 10 and 15 g/l respectively, compared with the control treatment (34.17 IU/L). Aspartate Aminotransferase (AST) also increased to 84.18, 103.21 and 125.47 IU/L, when the salinity increased to 5, 10 and 15 g/l respectively, in comparison with control treatment (66.06 IU/L), while Alanine Aminotransferase (ALT) increased to 53.25, 69.59 and 81.02 IU/L, when the salinity increased to 5, 10 and 15 g/l respectively, in comparison with control treatment (36.71 IU/L).

Key words : *Cyprinus carpio*, Alkaline phosphatase, AST enzyme, ALT enzyme.

INTRODUCTION

Salinity is considered an important factor in the environmental status of fish through its direct or indirect impact on the osmosis pressure and metabolism. It also causes a set of changes to the activity, physiological function and the hormone, enzymes composition, as well as affecting its survival and habits (Wang and Zhu, 2002). Fish cultured in farm systems are exposed to tiring and unstable conditions in a cumulative manner. These conditions include factors like temperature, congestion, pesticides and salinity (Collingsworth *et al*, 2017). These factors may have huge negative effects which include reduced growth, immune and various physiological disturbances, and may cause the loss of the fish in the end, where any negative environmental status the fish may be subjected to will lead to a kind of challenge to their abilities in maintaining the balance (Akhtar, *et al*, 2010). Salinity occupies the first place in this list of factors as it has a great influence on most aquatic organisms starting with the egg phase to adulthood stage, early embryonic development and larval growth; as all these phases on the level of salinity (Boeuf and Payan, 2001). All the previous studies refer to the fact that changes in the level of salinity may affect the immune responses and blood

characteristics of fish (Ostrowski *et al*, 2011). Common carp are generally considered as fresh water fish, and they are hyper osmotic, which means that the ions inside their blood are more than those outside their bodies, so they need a higher energy in order to keep the body liquids at levels that are higher than their outer surroundings to fit in the different levels of salinity (Marti'nez-Alvarez *et al*, 2002). Alkaline Phosphatase enzyme (ALP) takes a part in the process of active transport in the cell membrane, it is found on the simple epithelial cells and vertical cells in certain parts of the fish body in general (Bucher and Hofer, 1993). This enzyme has a role in the metabolism of carbohydrates, growth, cells differentiation, protein synthesis and the manufacturing and releasing of certain types of enzymes (Savova and Kirev, 1992; Pizauro *et al*, 1993). Moreover, there is an increasing interest in the ALP Enzyme because of its role in the processes of cells regeneration and wound healing, as an increase in this enzyme has been noticed when fish are subjected to stress or injury, yet, these studies have not been authenticated (Rai and Mittal, 1983). The effectiveness of ALP increases with the high concentrations of monovalent ions like Na⁺, K⁺ and the divalent ions especially Mg⁺⁺ (Utida *et al*, 1968). ALT or