

Efficiency of Grape (*Vitis vinifera*) Seed Oil on Nonspecific Immune Response and Histopathological Effects in Common Carp *Cyprinus carpio* Challenged with *Pseudomonas aeruginosa*

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Abstract: The present study was carried out to assess the effect of grape seed oil supplemented diet on non-specific immunity of *Cyprinus carpio* against the pathogenic bacteria *Pseudomonas aeruginosa*. Fish weights 41.69 ± 2.25 g and total length 13.65 ± 1.24 cm were randomly distributed into four treatments (two replications for each treatment). Fish groups were fed four dissimilar diets up to 40 days. The first group (T1) was fed with 0.2% grape seed oil, the second group (T2) was fed supplemented with 0.5% grape seed oil, the third group (T3) was supplemented with 1% grape seed oil and the fourth group (T4) was served as the control group which fed basal diet without supplementing with grape seed oil. Forty-six fishes in all treatment groups were challenged intramuscularly with *P. aeruginosa* on day 41. The fishes in experimental groups were challenged intramuscularly with 0.2 ml *P. aeruginosa* at a concentration of 10^8 CFU/ml and after challenge (14 days), the different parameters were determined including nitroblue tetrazolium % (NBT), myeloperoxidases % (MPO), phagocytic activity (%) and serum lysozyme activity (U/min). The results indicated that T2 group had significant increased ($p < 0.05$) in NBT activity, MPO activity, phagocytic activity and lysozyme activity compared with control group and to other treatment groups, followed by T1 and T3, respectively. In addition, T2 showed highest resistance to challenge *P. aeruginosa* compared with other groups. T3 and T4 groups showed a decreased performance in all non-specific immune parameters. There were histopathological effects in liver, showing a focal region of lymphocyte aggregation (T3), and hemorrhage into the hepatic vein with infiltration of inflammatory cells (T4). Therefore, these results indicated that 0.5% grape seed oil (T2) as additive fed could be used as prophylactic in common carp culture to enhance the protection against any possible infection by *P. aeruginosa*.

Keywords: *Cyprinus carpio*, *Pseudomonas aeruginosa*, Grape seed oil, Nonspecific immune, Histopathological effects

Introduction

The unmanaged fish culture practices and inverse environmental conditions which influence fish health leading to the economic losses in production of fishes. Fish diseases are causing intensive loss to the fish farmers throughout the world (Amrevuawho et al., 2014; Al-Faragi & Hassan, 2017).

Bacterial pathogens are the utmost important and in charge of severe mortalities in a broad range of fishes at various stages of growth (Swain et al., 2007; Al-Faragi,