Blood profile and resistance of rainbow trout against Yersinia ruckeri following the diet supplemented with Mentha piperita

This study was aimed to assess the potential effects of ethanolic *Mentha piperita* (MP) extract on the hemato – immunological and biochemical parameters, skin antibacterial activity and survival rate against *Yersinia ruckeri* infection in rainbow trout *Oncorhynchus mykiss*. Fish (32.2 ± 2.2 g) were divided into 4 groups before being fed diets supplemented with 0, 1, 2 and 3% of MP plant extract for 8 weeks., The RBC counts and haemoglobin concentrations showed a significant increase in 2 and 3% MP extracts enriched diet feeding group compared to the control and 1% MP extract enriched diet treated group.

Fig. 1. Mentha piperita.

At the same time, the haematocrit levels were significantly increased on fish fed diets enriched with 2 and 3% of MP extract and 3% group shown the highest Ht. Additionally, there were significant increases of WBC levels of fish fed with 3% MP extract when compared to the control and 1% MP extract groups. Thus, neutrophil percentage were also higher in fish feeding with 3% MP extract compared to the control and 1% MP extract groups. The results of the total protein showed that 3% MP extract group had a significant difference compared to the control and 1% groups. The albumin value was significantly enhanced in fish fed 2% and 3% MP extract when compared to the control and 1% groups. The lysozyme activity were significantly increased in all the groups of fish fed MP extract enriched diets, respect to the values found in control group, being the highest observed increments in those fish fed 2 and 3% enriched diets of MP extract. The serum total Ig values of 2 and 3% MP extract groups were significantly higher than the control and 1% groups and 3% group showed the highest serum total Ig value. The respiratory burst activity was significantly enhanced in all the groups of fish fed MP extract enriched diets when compared to the control group and the

highest respiratory burst activity was found in 3% group. The serum total peroxidase content after 8 weeks showed that 2 and 3% MP extract groups had a significant difference compared to the control and 1% groups. Feeding on MP extract -supplemented diets caused a significant increase in antibacterial activity compared to the control group. The growth of all the bacteria species tested (*S. iniae, Y. ruckeri, A. hydrophila and L. garviea*) was significantly inhibited when mucus were obtained from fish fed MP extract -supplemented diet, compared to the values find from fish of control group. The inhibition was always higher in those mucus samples from fish fed the higher MP extract concentration (2 and3%). The results of the MIC of rainbow trout skin mucus were similar to those of antimicrobial activity. Furthermore, dietary MP extract supplements have no significant effect on alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, glucose, triglyceride, lymphocytes and monocytes levels of rainbow trout. After 8 weeks the cessation of feeding with MP extract, survival rates of 54.4%, 63.6% and 75.2% were recorded in groups which received 1, 2 and 3% of MP extract of feed, respectively, compared to 34.6% survivals in the control. This study underlying several positive effects of dietary administration of MP plant extract to farmed fish.

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