Host-derived probiotics Enterococcus casseliflavus improves resistance against Streptococcus iniae infection in rainbow trout (Oncorhynchus mykiss) via immunomodulation

The present study evaluated the benefits of dietary administration of host-derived candidate probiotics Enterococcus casseliflavus in juvenile rainbow trout Oncorhynchus mykiss. Experimental diets were prepared by incorporating the microorganisms in the basal feed at 3 inclusion levels (i.e. 107 CFU g-1 of feed [T1], 108 CFU g-1 of feed [T2], 109 CFU g-1 of feed [T3]). The probiotic feeds were administered for 8 weeks, with a group fed with the basal diet serving as control. The effects on growth performance, gut health, innate immunity and disease resistance were evaluated. Results showed that growth performance parameters were significantly improved in T2 and T3 groups. Activities of digestive enzymes such as trypsin and lipase were significantly higher in these two groups as well. Gut micro-ecology was influenced by probiotic feeding as shown by the significant increase in intestinal lactic acid bacteria and total viable aerobic counts in T2 and T3. Humoral immunity was impacted by dietary probiotics as total serum protein and albumin were significantly elevated in T3. The levels of serum IgM significantly increased in all probiotic fed groups at week 8; with the T3 group registering the highest increment. Respiratory burst activity of blood leukocytes were significantly improved in T2 and T3. Hematological profiling further revealed that neutrophil counts significantly increased in all probiotic fed groups. Challenge test showed that probiotic feeding significantly improved host resistance to Streptococcus iniae infection, specifically in T2 and T3 where a considerable modulation of immune responses was observed. Taken together, this study demonstrated E. casseliflavus as a potential probiotics for rainbow trout with the capability of improving growth performance and enhancing disease resistance by immunomodulation.