Original Article

Effect of Some Probiotics and Synbiotic Dietary Supplementation on Growth Performance and Some Health Parameters of Common Carp, Cyprinus Carpio

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Abstract

The study was conducted to show the effect of using the prepared synbiotic and comparing it with the local Iraqi probiotic and the commercially imported synbiotic as a feed additive in the diets of common carp for the period of 70 days. 75 fingerlings with a starting weight of 11.15±.00 g, live mass of 55.94±1.5 g and an average length of 9.1 ± 1.5 cm were randomly distributed among five treatments (three replicates for each treatment and five fish for each replicate) and cultured in the closed rotating system. A standard diet was prepared and added to 0.1% each of the Iraqi probiotic (T2), commercial imported probiotic (T3), commercial import synbiotic (T4) and the synbiotic (T5) from lactic acid bacteria (*Streptococcus themophilus* and *Lactococcus bulgaricus*). The experimental diets were 3% of the body weight and the fish were weighed every 14 days. The results showed the superiority of the fifth treatment (T5) for the studied traits and the results indicated a significant difference ($P<0.05$), between them and the experiment's parameters in growth criteria, which included a final weight rate of 130.48 g, weight gain of 73.65 g, daily growth rate of 1.05 g/day, specific growth rate of 1.19 g/day, condition factor of 1.69 and ration evaluation criteria that the amount of feed included 167.48 g, the feed conversion ratio 2.28. The best protein ratio was 18.28% and the lowest fat percentage was 4.22% in the chemical analysis of body components. Increasing the intestinal content of the total bacterial count and the counts of lactic acid bacteria (63.33×10^6 and 11×10^6) cfu/g, respectively, and improving the lipid profile in the blood serum, which included total cholesterol, triglycerides and both high- and low-density lipoproteins (117.81, 74.63, 56.96 and 45.92) mg/dL respectively.

Keywords: Common Carp, Growth Performance, Health Parameters, Probiotics and Snybiotic.

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INTRODUCTION

Aquaculture, which includes the cultivation of aquatic plants and animals (such as fin fish, shellfish and seaweed), is one of the fastest growing food production sectors in the world, with an average annual growth rate of 5.3% during the period from 2001 to 2018, and production increased by more than 600% since 1990 (FAO, 2020), It has an important role in enhancing food production to contribute to food security and human nutrition, despite the growth of aquaculture, the difficulty of feeding the world's ever-increasing population and expected to reach 9.7 billion by 2050 (United Nations, 2019), It is a living reality, which calls for political, scientific and global discussions due to population growth and stagnation in natural fisheries, and this is a challenge to aquaculture as a global production to achieve remarkable goals, and it is estimated to reach 109 million tons in 2030 (FAO, 2020). It is expected to achieve the required additional increase in global production that aquaculture will be the only available solution, but it can produce additional adverse environmental impacts, if its expansion is not based on sustainable farming systems (Cottrell et al., 2020).

The recirculating aquaculture systems (RAS) allows fish to be cultured in a controlled and controlled environment to reduce direct interactions between production processes and the environment (Ahmed and Turchini, 2021). Intensive culture systems are used to increase production, and here fish in such systems may be exposed to infection and stress, which weakens their health and these systems, may fail due to a lack of resources or difficulty controlling the improvement of culture conditions. When intensive culture systems fail, fish and aquatic organisms stop feeding gradually, this leads to deterioration in their physiological state, which leads to a decrease in immunity (Nie et al., 2021). There are some strategies, including improving the nutritional diet by using feed additives that stimulate growth and the use of balanced feeding programs, as these additives have a role in improving fish productivity and improving their health status (Paray et al., 2021).

The inclusion of appropriate additives to raise the level of nutritional value provided to fish, such as adding lactic acid bacteria and through the important microbial fermentation process in organisms that follow a diet rich in fiber, fermentation is a simple and cheap process that has been practiced for a long time, and leads to the improvement of the nutritional value of many crops Agriculture (Verni et al., 2019).

Bacterial fermentation of foodstuffs has been used for several centuries to preserve the nutritional value and extend