بحث رقم (2)

Research Title :	**Nano-Curcumin/Chitosan Modulates Growth, Biochemical, Immune, and Antioxidative Profiles, and the Expression of Related Genes in *Nile tilapia, Oreochromis niloticus.***
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Abstract: This study aimed to evaluate the effects of dietary supplementation with nano-curcumin (NCur) and a nano-curcumin/chitosan blend (NCur/Ch) on growth performance, digestibility, immune response, antioxidant status, intestinal morphometric characters, and gene regulation in *Nile tilapia*. Fish (n = 180, initial body weight = 12.0 ± 0.53 g) received supplementary NCur at rates of 0 (control), 0.00625, and 0.0125, and NCur/Ch at rates of 0.00625 + 0.5 g/kg diet for 4 weeks. Growth performance parameters (final weight and length, body mass gain, specific growth, and length gain rates) were markedly increased, and the feed conversion ratio was significantly decreased in the NCur- and NCur/Ch-supplemented groups. Digestive enzyme (amylase), immune response markers (immunoglobulin M, nitrous oxide, and lysozyme activity), plasma albumin, and total protein were increased significantly, mainly with a diet supplemented with 0.00625 g NCur/kg. Aspartate aminotransferase (AST), alanine aminotransferase (ALT), glucose, and cortisol levels decreased in the supplemented groups compared to the control. Significantly increased glutathione peroxidase (GPx) and decreased malondialdehyde (MDA) levels were observed in the NCur/Ch group. Superoxide dismutase (SOD) activity was improved in the 0.0125 NCur group. Intestinal morphometric characters, including villus length, width, interspace, and goblet cell abundance, were increased to cope with improved growth performance and were associated with upregulation of insulin-like growth factor 1 (*igf-1*) and complement C-5 (*cc5*) compared to the control group. Therefore, NCur and an NCur/Ch blend could be supplemented in the *Nile tilapia* diets as a natural alternative to promote growth, digestion, immune status, liver function, antioxidant status, and related gene expression in *O. niloticus*.

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