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Inhibition of *Aeromonas hydrophila*-induced intestinal inflammation and mucosal barrier function damage in crucian carp by oral administration of *Lactococcus lactis*

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Abstract

This study explored the immunomodulatory effect and inhibition effects of the candidate probiotic *Lactococcus lactis* 16-7, which was isolated from crucian carp, on *Aeromonas hydrophila* infection in crucian carp. The experimental fish were divided into two groups; one was fed a diet supplemented with *L. lactis*, while the other was fed the control probiotic-free diet. After feeding for 42 d with the experimental diets, the fish that received the diet supplemented with probiotics exhibited a significantly enhanced serum superoxide dismutase activity, phagocytic activities of innate immune cells, and the expression levels of immune-related genes [interferon- γ (INF- γ), interleukin-1 β (IL-1 β), interleukin-11 (IL-11), tumour necrosis factor α (TNF- α) and myeloid differentiation factor 88 (MyD88)], indicating that *L. lactis* 16-7 could activate the non-specific immune system of crucian carp. At the end of the feeding trial, the crucian carps in each group were orally infected with *A. hydrophila* NJ-35. The results show that *L. lactis* 16-7 could prevent the increase in D-lactic acid concentration and inflammatory response caused by *A. hydrophila* in crucian carp. Compared with *A. hydrophila* group, *L. lactis* 16-7 preserved the integrity of intestinal villi and mitigated *A. hydrophila*-induced reduce in the transcriptional levels of tight junction (TJ) proteins zonula occludens-1 (ZO-1) and occludin, indicating that *L. lactis* 16-7 could reduce intestinal mucosal barrier damage

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