

Dietary supplement of *Enterococcus faecalis* on digestive enzyme activities, short-chain fatty acid production, immune system response and disease resistance of Javanese carp (*Puntius gonionotus*, Bleeker 1850)

ABSTRACT

This study investigated the effects of *Enterococcus faecalis* on digestive enzyme activities and short-chain fatty acid production in fish intestine, resistance against *Aeromonas hydrophila* and humoral immunity response by 3 experiments on Javanese carp (*Puntius gonionotus*). The experiment 1 revealed that diet supplemented with *E. faecalis* significantly ($P < 0.05$) increased protease and lipase activities compared to control fed fish. Moreover, *E. faecalis* supplementation significantly enhanced the production of propionic and butyric acid in the intestine, while no significant difference ($P > 0.05$) in acetic acid production was observed. In the challenge study (experiment 2), fish were injected (intraperitoneal) with 10^7 *A. hydrophila* per ml and survival was significantly improved when fish were fed diet supplemented with *E. faecalis* compared to control fish. In experiment 3, dietary *E. faecalis* affected immune system response as fish fed the probiont and exposed to 10^6 *A. hydrophila* per ml displayed significantly elevated antibody levels compared to control fed fish. Fish fed diet supplemented with *E. faecalis* but not exposed to the pathogen revealed significantly higher antibody level than control fish ($P < 0.05$). Therefore, *E. faecalis* can be used as a probiotic in Javanese carp farming.

Keyword: Challenge; Digestive enzyme; *Enterococcus faecalis*; Immune system; Probiotic; Short-chain fatty acid