Microbial immunostimulants reduce mortality in whiteleg shrimp (*Litopenaeus vannamei*) challenged with *Vibrio sinaloensis* strains

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The effect of microbial immunostimulants on the survival and immune response of juvenile *Litopenaeus vannamei* challenged with *Vibrio sinaloensis* strains was evaluated. Dead microorganisms were added to feed with the attractant Dry Oil® and consisted of four lactic acid bacteria (Lta2, Lta6, Lta8, and Lta10) and one yeast (Lt6). *V. sinaloensis* strains or saline solution were inoculated to shrimp by injection. The bioassay was conducted for 21 days with five treatments in triplicate: (I) shrimp fed with commercial feed+sterile saline solution at 2.5% NaCl (control group I); (II) shrimp feed with commercial feed+LD50 *Vibrio* (control group II); (III) shrimp fed daily with experimental diet+LD50 Vibrio; (IV) shrimp fed every 3 days with experimental diet+LD50 *Vibrio*; and (V) shrimp fed every 6 days with experimental diet+LD50 *Vibrio*. Shrimp (8.1±1.4 g) were cultured in 120-L plastic tanks and fed twice a day. The activity of lysosomal enzymes in plasma and hemocytes were determined with the API ZYM kit and lysoplate assay. Survival of shrimp in treatment IV was significantly higher than those of control II. Total hemocyte count in treatment III was significantly higher than control II. The activity of nine hydrolytic enzymes was found in plasma and six in the hemocyte lysate supernatant (HLS). Shrimp fed with immunostimulants every six days were not protected against *V. sinaloensis*. The results indicate that these microbial immunostimulants administered every three days is a good feed additive against *Vibrio* spp. in shrimp culture.