Effects of propolis on the immune enhancement of the formalin-inactivated *Aeromonas salmonicida* vaccine

Shaowu Li
Department of Aquatic Animal Health, Heilongjiang River Fisheries Research Institute, Chinese Academy of Fishery Sciences, Harbin, China

Abstract

Furunculosis caused by *Aeromonas salmonicida* is a major threat to salmonids throughout all their life stages. Vaccination against *A. salmonicida* has been shown to provide effective protection in aquaculture. The success of many vaccines relies on their association with the appropriate adjuvant to increase their immunogenicity and ensure long-term protection. In this study, the effects of vaccines using propolis as adjuvants against furunculosis in rainbow trout (*Oncorhynchus mykiss*) were evaluated. The parameters evaluated included the relative percent survival (RPS), the specific IgM antibody level and the expression profiles of several immune-related genes in four tissues following immunization and challenge. The results showed that the experimental vaccines containing propolis as adjuvants (ExpVacPro group) could effectively protect the experimental fish against *A. salmonicida* infection with an RPS of 89.47%. The gene expression data revealed that ExpVacPro could induce the differential expression of the pro-inflammatory cytokines, MHC class I, T-cell markers and Ig markers in immunized fish, with higher levels in liver and spleen than in head kidney and gill. ExpVacPro initially increased the expression of MHC I and IL8 genes in related pathways, and then gradually increased the expression of IL-1β and IgT genes for about 2 weeks. During the post-vaccination challenge, the expression levels of all detected genes were up-regulated especially for CD8 and IgT genes. The specific IgM antibody titres were significantly induced following immunization and challenge. In conclusion, the results indicated that propolis could improve potency and efficacy of formalin-inactivated *A. salmonicida* vaccine as adjuvants.

lishaowu@hrfri.ac.cn