

DEVELOPMENT OF IMMERSION SUBUNIT VACCINE AGAINST GROUPEL IRIDOVIRUS (GIV)

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ABSTRACT

Iridovirus is one of the most devastating viral pathogens in groupers (*Epinephelus* spp). The viral infection could often lead to near 100% mortality in hatcheries, thus a bottleneck to the development of the grouper aquaculture industry. Vaccination is an important and efficient strategy against viral infection. The most common delivery method for commercially available fish vaccines is injection, which is both time-consuming and labor intensive despite the high efficacy. We report here the development of a new adjuvant NE and its application in an immersion GIV subunit vaccine. The adjuvant NE can form low viscosity nanoparticles with average size of about 168 nm and are safe to grouper. When co-delivered with NE, green fluorescent protein (GFP) can be detected in gills and the digestive tract at 20 min post-immersion. Subsequently, an immersion subunit vaccine was generated by combining NE with recombinant major capsid protein (MCP) of GIV. After vaccination by immersion, MCP-specific antibodies could be detected at 2 weeks post-vaccination. Furthermore, the subunit vaccine enhanced the survival rate of infected fish in a dose-dependent manner. We further evaluated the vaccination protocol of this subunit vaccine. The results showed that boosters (at 1 or 2 weeks after the initial vaccination) enhanced the yield of specific antibodies and the protection against GIV in the vaccinated grouper at both 3 and 4 weeks after initial vaccination. Booster at 1 week had a greater impact than booster at 2 week did. At 10 weeks after initial vaccination, the fish were resistant to GIV in all groups; however, the viral loads in the booster groups was lower than those in the single-vaccination and control groups. In conclusion, our study indicates the potential application of this immersion subunit GIV vaccine as an effective and easy-to-handle vaccine for the grouper aquaculture industry.

KEYWORDS

grouper, iridovirus, major capsid protein, immersion, subunit vaccine

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