## **ITEX 2021 - SILVER MEDAL**

## VIVAC UPM AQUAFEED VACCINE: ORAL FEED-BASED VACCINE FOR VIBRIOSIS IN AQUACULTURE



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ViVac UPM Aquafeed Vaccine is a feed-based vaccine against vibriosis in fish, particularly marine fishes. It comprises of an antigen, which is the inactivated V. *harveyi* strain VH1 mixed with 10% palm oil before being incorporated into commercial fish feed. The vaccine is administered orally via feeding at 4-5% bodyweight and the vaccination regimen consist of three phases of vaccination. The first vaccination is by feeding of the feed containing the vaccine, the second phase is a booster dose at week 2, and the third is the last booster on week 6.

This vaccine confers high protection in fish with relative percentage survival (RPS) of 70-85% post-infection with virulent Vibrio spp. under experimental conditions. The oral vaccine was later tested for field efficacy and showed 70-80% survival in farmed hybrid grouper Epinephelus fuscoguttus × E. lanceolatus and Asian seabass Lates calcarifer.

This oral vaccine is unique in terms of its cost-effectiveness, easy delivery and safe to the environment. Rather than applying antibiotics that are unsustainable to prevent bacterial diseases, this oral vaccine can stimulate both mucosal and systemic immune responses that prevent infection by Vibrio harveyi, V. parahaemolyticus and V. alginolyticus. Generally, from the existing technologies, all vaccines are targeting V. harveyi with slight modifications of the preparation methods, while the administration is by injection, either intramuscular or intraperitoneal. However, injectable vaccines require trained personnel, handling that stressed the fish and time-consuming. Since most of the aquaculture products are from Asia and Asian farmers are small to medium-sized holders, injectable vaccines are not their favour. Not only that, all existing vaccines against warm water vibriosis are actually monovalent that are effective against only V. *harveyi* and not against other Vibrio spp. Besides, some of these vaccines use commercial adjuvants, which contributes to the high cost of vaccine preparation and vaccine price.

To solve the problems, our vaccine is a feed-based vaccine, which is administered orally through feeding. In other words, vaccination is done while the farmers are feeding their fish. Therefore, trained personnel are not needed, no fish handling is required, and the fish could be vaccinated in a short period of time. Moreover, the vaccine uses palm oil as an adjuvant. Locally abundant palm oil contains a high level of Vitamin E that is essentials in enhancing the efficacy of this feed-based vaccine. The cheap palm oil will eventually result in a cheaper vaccine.

This newly developed feed-based vaccine uses locally isolated V. *harveyi* strain VH1 as the antigen. It has been shown that the strain used in this vaccine provides cross-protection against other species of Vibrio, including V. *harveyi*, V. *parahaemolyticus*, and V. *alginolyticus*. Thus, with one vaccine application, infection by almost all-important Vibrio spp. in this region is controlled or could significantly reduced.



