

# INHIBITORY CAPACITY OF A NOVEL MICROBIAL ENHANCED PROTEIN AGAINST *Vibrio* spp. IN PACIFIC WHITE SHRIMP *Penaeus vannamei*

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Recent studies on the development of practical diets for shrimp production systems using a novel microbial enhanced protein, ME-PRO®, have shown to be a promising solution to produce eco-friendly aquafeeds. The protein is processed at a state-of-the-art plant using non-GMO (non-genetically modified) soybean meal and a natural occurring, non-toxicogenic, fungi, *Aureobasidium pullulans*. The fermented co-product also offers significant amounts of short-chain peptides and free amino acids that confer excellent attractability and palatability properties.

The objective of this study was to evaluate the inhibitory capacity of ME-PRO® at different concentrations (0.5%, 1% and 2%) against *Vibrios* spp. extracted from the midgut of Pacific white shrimp *Penaeus vannamei*. Shrimp post larvae (0.1 g) were weighed, macerated, and dissolved in 200ul sterile distilled water. A 50 uL sample was inoculated in TCBS agar and ChromAgar. All *Vibrio* and probiotic bacteria were resuspended in TSB medium. A 50 ul sample was inoculated in TSA agar plates in the case of probiotics and on ChromAgar for the *Vibrio* species. The results of bacterial growth count in agar were expressed in CFU/g for larvae. In addition, PCR analysis was conducted using the AP4 method with three sequences: F1 (ATGAGTAACAATATAAAACATGAAAC), R1 (ACGATTTTCGACGTTCCCAA) and F2 (TTG AGAATACGGGACGTGGG).

Results showed that inhibitory capacity of ME-PRO® was present at inclusion levels of 0.5%, 1% and 2% against *Vibrio* bacteria in macerates of shrimp larvae and inclusion in culture media ChromAgar *Vibrio* and TCBS. When the microbial enhanced protein was incorporated in TCBS and ChromAgar culture media, results indicated inhibitory activity for *Vibrio* type 1 (yellow colonies) between 38%, 48% and 57% respectively. For type 2 *Vibrio*, the inhibition rate was 78% and 100% for the 1 and 2% doses and for *V. parahaemolyticus*, 38%, 45% and 62% respectively. The evaluation of shrimp larvae macerates using TCBS agar indicated an inhibitory activity of *Vibrios* in the presence of the protein. Similarly, in ChromAgar a reduction in *V. parahaemolyticus* occurred when the 0.5% dose was used.

The assessment in this study indicated that an inclusion level as low as 1% ME-PRO® improves resistance to *V. vulnificus* and *V. parahaemolyticus* associated with high mortalities in shrimp aquaculture. Similar to previous studies, the results confirmed that supplementation into the diet of *P. vannamei* will confer a protective effect against the *Vibrio* species associated with Early Mortality syndrome (EMS).