USE OF THE BACTERIA *Pediococcus acidilacti* MA18/5M AS A PROBIOTIC FEED ADDITIVE IN POSTLARVAE AND JUVENILES OF BLACK TIGER SHRIMP *Penaeus monodon*

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Introduction

In Vietnam intensive shrimp farming has become a break-through business recently, with black tiger shrimp (*Penaeus monodon*) being the major culture species. However, the trend in global shrimp farming was not able to rise as expected since the shrimp aquaculture industry is beset by diseases, mostly due to bacteria (especially the luminous *Vibrio harveyi*) and viruses (Moriarty, 1999). A whole range of antibiotics and other chemotherapeutants have been used widely to control bacterial and viral diseases in shrimp hatcheries and farms. Particularly, the prophylactic use of antibiotics gave rise to multiple antibiotic resistance among bacterial pathogens (Moriarty, 1999). Moreover, there is a growing concern in transfer of antibiotic resistance to human pathogens, and the antibiotic accumulation in shrimp has been found to be health hazards to human consumers (Primavera, 1994).

The application of probiotics, appearing as a solution to these problems, has launched into aquaculture quite recently, since the 1980s. Recently there has been a growing number of studies reporting the implication of lactic acid bacteria to improve health and quality of fish and shrimp larvae, although this group of bacteria is not dominant in the normal intestinal microbiota of fish (Ringo and Gatesoupe, 1998). However, no attempt of using lactic acid bacteria as probiotics in shrimp has been reported so far.

The present study aimed to evaluate the possible effects of a commercial probiotic feed additive bacteria *Pediococcus acidilactici*, on growth, and survival of black tiger shrimp juveniles *Penaeus monodon*.

Material and Methods

Black tiger shrimp (*Penaeus monodon*) PL15 were reared in 1-m³ tanks with conical bottom. Initial stocking density was 200 larvae per tank. The probiotic preparation tested was *Pediococcus acidilactici* CNCM MA 18/5M. The three treatments were dispatched at random in triplicates among 6 larval rearing tanks: 3 control tanks & 3 treated tanks with a probiotic dose of 10^6 CFU/g of feed. The probiotic was mixed with the feed prior to feeding. The experiment was conducted for two months. Survival was determined at the end of each month by counting all the shrimps in each tank. Growth rate was determined every two weeks by measuring weight and length for 10 shrimp individuals from each tank. Every week 10 shrimps were sampled from each tank for determining *Pediococcus* counts in the gut. The treated group was not supplemented with antibiotics.

Results &Discussion

In treated group, the molting and feeding activities of shrimps under trial were more pronounced compared to shrimps in the control treatment. Moreover Pediococcus counts in the gut has shown the gut colonization of probiotics (population of $10^4 – 10^5$ CFU/g gut) during the trial. The survival of treated group was increased by 30% compared to the control group in the 1st and 2nd month of experiment. The addition of *Pediococcus* into the feed has shown a significant effect on the shrimp growth in both weight and length. In the second month, mean weight (+52%) and length (+15%) of shrimp in treatment were significantly higher ($p<0.05$) than those in the control group.

Conclusion

The introduction of *Pediococcus acidilactici* (BACTOCELL®) gave optimistic results in improving survival and growth of the shrimp larvae, thus improving the resistance to stress and disease. There's a need to further work to assess how the *Pediococcus acidilactici* can interact with pathogenic bacteria species.