

**Effect of a commercially available probiotic on survival, growth and
quality of hatchery produced *Penaeus monodon* post larvae.**

By

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Abstract

Pathogenic *Vibrio* species cause vibriosis in larvae and post larvae of cultured shrimp, which is a constraint to consistent production of post larvae. In order to control Vibriosis broad spectrum antibiotics and antibacterial chemicals are indiscriminately used in shrimp hatcheries in Sri Lanka which could destroy useful microbes also causing environmental problems while allowing development of resistant species that might ultimately affect human health as well.

Use of probiotic is accepted as an eco-friendly way of disease management. The present study was carried out to investigate the effect of a locally produced, probiotic containing a strain of *Bacillus subtilis* on survival, growth and quality of hatchery produced post larvae of *Penaeus monodon*.

Three groups of larval rearing tanks (LRTs, 10 tonnes) and three groups of nursery rearing tanks (NRTs, 16 tonnes; each group with six replicates) tanks were used. The probiotic was added to six replicate tanks at the concentration of 1×10^4 CFU ml⁻¹ while Tetracycline and Erythromycin (at dosage used in commercial hatcheries) were added to six replicates. Culture water in negative control tanks did not receive the probiotic or antibiotics. Nauplii were stocked in larval rearing tanks at 200 larvae per liter. Feeding, cleaning and water exchange were carried out according to normal practice in hatcheries. Survival at the end of larval rearing was recorded and resulted 5 day old post larvae were stocked in out-door nursery tanks and same treatments (probiotic, antibiotic and no treatments) were given to culture water of relevant replicates. Post larvae were reared up to 15 days (PL₁₅). Random samples of larvae (from LRTs) and post larvae (from NRTs) were taken at regular intervals to measure growth. Pathogenic and non pathogenic *Vibrio* count and water quality parameters

of culture water were recorded. Quality of post larvae at PL₁₅ was assessed using an assessment scale.

There was no significant difference in time taken by shrimp larvae to complete larval stages ($P > 0.05$) and in total body length achieved ($P > 0.05$) under probiotic, antibiotic and no treatment. Percentage survival of larvae (in LRTs) and post larvae (in NRTs) for probiotic treated and antibiotic treated group (81%, 80% and 81%, 83% respectively) was significantly higher ($P < 0.05$) than that of the group did not receive any treatment (63%, 68%). Significantly higher pathogenic *Vibrio* population was recorded while having significantly higher total ammonia concentration in culture water of LRTs and NRTs that did not receive either probiotic or antibiotic treatment. Quality score received by the post larvae produced under probiotic treatment was higher (92%) compared to the post larvae produced under antibiotic (90%) and no treatment (83%). Therefore, it could be concluded that the probiotic used for the present study could replace the use of antibiotic in *Penaeus monodon* hatcheries in Sri Lanka.