

EFFECT OF PROBIOTICS ON GROWTH AND SURVIVAL OF *PENAEUS MONODON* IN THE CULTURE PONDS OF BHIMAVARAM, ANDHRA PRADESH, INDIA

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ABSTRACT

The study was carried out for 120 days to know the growth and survival rate of *P. monodon* by applying commercial probiotics in shrimp farms located at Bhimavaram, Andhra Pradesh, India. In summer crop of 2010, the survival rate of *P. monodon* was recorded as 73%, 85% and 82% respectively. Similarly, in the winter crop the survival rate of *P. monodon* were recorded as 72%, 80% and 84% respectively. It is evident from the present results that application of probiotics has improved the growth and survival rate of *P. monodon* in experimental ponds than control one.

KEYWORDS: Probiotics, growth and survival rate, *P. monodon*.

Introduction

Now-a-days shrimp culture practices are rapidly growing and establishing industries in different parts of the world and contributing to good economic source worldwide. The use of probiotics in the culture of aquatic organisms is increasing rapidly with the advent of environment friendly aquaculture practices (Gatesoupe, 1999). Generally, probiotic strains have been isolated from indigenous and exogenous microbiota of aquatic animals. Gram-negative facultative anaerobic bacteria such as *Vibrio* and *Pseudomonas* constitute the predominant indigenous microbiota of a variety of species of marine fish (Onarheim *et al.*, 1994).

The present study is aimed to evaluate the growth and survival rate, both in control

and experimental culture ponds of *P. monodon* from Bhimavaram, Andhra Pradesh, India.

Materials and Methods

The present study was conducted in commercial shrimp farms located at Bhimavaram during the year 2010. Three ponds of 0.5ha water spread area were selected. One treated as control; another two ponds were probiotic treated ponds. The commercial feed probiotics selected for the present study were applied as per the feed chart specified in the product.

Probiotics

In this study, commercially available probiotics species manufactured by Ecoforce, produced by Tablets India Ltd. India were used. The application dosage was calculated as 10g

of probiotics per kg of feed. The major components of Ecoforce Probiotic were *Streptococcus faecalis* (T110) *Streptococcus faecium* (T120) 10g (3.5×10^9), *Bacillus mesentericus* (TO-A), *Bacillus subtilis* (TO-A) 10g (1.5×10^8), *Clostridium butyricum* TO-A 10g (1.0×10^8), *Saccharomyces cerevisiae* 5g, Alkaline Protease 5g (500,000 units), Lipase 5g (20,000 units)

Pond Preparation and Feeding Procedure

Initially the culture ponds of the current study were allowed to dry and crack to promote the capacity of the hydrogen sulphide and to eradicate the fish eggs and other predators. Then the pond bottom was thoroughly ploughed at a depth of 35 cm to remove the obnoxious gases existing in the soil. Ponds ready for after 21 days of time period. The healthy seeds were purchased from a local commercial hatchery and were stocked at a density of 13/m². In order to acclimatize the seeds to pond atmosphere seed bags were allowed to float on water surface in each pond for 35 minutes. After that the seed bags were slowly opened and released into the pond water.

The shrimps were fed with CP feed (Charoen Pokhpond Aquaculture India Pvt. Ltd.). The feeding schedule was based on the feed chart given by the CP Company. Four check trays were installed in ponds and the feeding was adjusted based on the check tray observation and body weight sampling. The total feed used per day was monitored at the rate of 18%, 23%, 18%, 23% and 18% in the morning (6:00 AM), noon (10:00 AM), afternoon (2:00 PM), evening (6:00 PM) and night (10:00 PM) time respectively. For feed broad casting the rope method was employed for the present study.

Usually the water exchange was not practiced for the first 30 days, later on 15-18

cm of water was exchanged in ten days intervals. Sampling was done for regular intervals of time and the individual weights of the shrimps and survival rate and average body weight of the animals were estimated. The recorded values were tabulated.

The average body weight and survival rate of the shrimp was estimated by adopting the following formulae

Average Body Weight (ABW)

Weight gain (%) = (Final Weight-Initial weight)/Initial weight x 100

Survival Rate

Survival (%) = Nos. of animals survived/Nos. of animals stocked x 100

Results and Discussion

In the present study an attempt has been made to compare the performance of commercially available feed probiotics on the growth and survival of *P. monodon*. Commercial probiotics applied in pond A, and pond B, one pond treated as control.

In summer crop of year 2010 the growth in grams of shrimp *P. monodon* was noticed as 2.51 ± 0.15 at 30 days of culture in control pond and this pond harvested due to white spot disease at 21.7 g on 105th day, whereas in the experimental ponds such as pond A & pond B, the growth was 3.35 ± 0.14 , 3.53 ± 0.29 respectively. Similarly, the highest growth in grams was noticed as 29.92 ± 0.37 in pond B at 120 days of culture (Figure 1, 2). Similarly in the winter crop of year 2010 the growth in grams of shrimp *P. monodon* at 30 days of culture in control pond was observed as 2.29 ± 0.27 and this pond was harvested due to white spot disease at 18 g on 96th day. Similarly, the growth in grams was 2.87 ± 0.15 & 2.57 ± 0.33 recorded in experimental pond A & pond B respectively. The highest growth in grams of

26.52±0.59 was observed in pond B at 120 days of culture (Figure 1, 2).

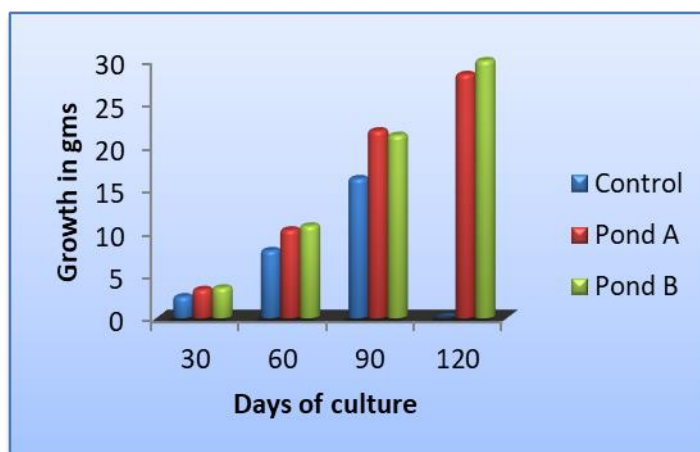


Figure. 1. Growth of *P. monodon* (in grams) in summer crop of the year 2010

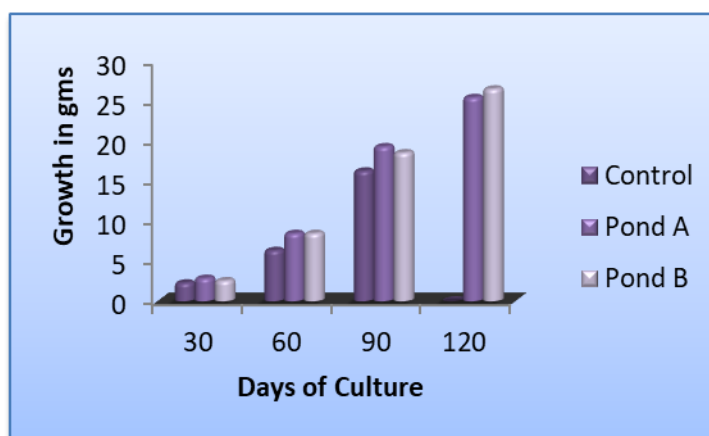


Figure. 2. Growth of *P. monodon* (in grams) in winter crop of the year 2010

The survival rate of shrimps was calculated according to the standard equations. In summer crop of 2010, the survival rate of *P. monodon* was recorded as 73%, 85% and 82% respectively. Similarly, in the winter crop the survival rate of *P. monodon* were recorded as 72%, 80% and 84% respectively. In *Fenneropenaeus indicus* the highest growth and survivals were recorded when shrimps were fed with *Bacillus* probionts in the feed (Moriarty 1998). Rengpipat *et al.*, (1998) also reported an increase in survival rate of shrimps fed with probiotics. Similarly, Rengpipat *et al.*, (2000) also examined an increased survival and growth of *P. monodon* fed with probiont *Bacillus* S11 for 90 days of culture period.

The probiotic Ecoforce used for the study consist of active microbial strains like *Streptococcus faecalis*, *Streptococcus faeciu*, *Bacillus mesentericus*, *Bacillus subtilis*, *Bacillus natto*, *Clostridium butyricum* and *Saccharomyces cerevisivia*. Rengpipat *et al.*, (1998; 2000) suggested that the *P. monodon* was fed with these active ingredients has improved growth and survival rates. Shrimps were fed with *Bacillus* spp. as probionts showed increased growth and survival of the shrimps by enhancing the functions of both cellular and humoral immune system (Rengpipat *et al.*, 2000).

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