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IJPBS |Volume 1| Issue 4 |OCT-DEC |2011|625-627

EFFECT OF PROBIOTICS ON WATER QUALITY PARAMETERS IN *PENAEUS MONODON* CULTURE PONDS OF KAKINADA, ANDHRA PRADESH, INDIA

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Biological SCIENCES *Research Article*

RECEIVED ON 12-08-2011 **ACCEPTED ON 01-10-2011**

ABSTRACT

The study was carried out for 120 days to assess the water quality parameters of P. monodon by applying probiotics in the culture ponds. Two ponds (0.8 ha) were selected of which one is control and second one is probiotic treated pond. The total amount of ammonium nitrogen levels was significantly reduced in the experimental ponds than control one. Hence the findings of the current study suggest that the application of probiotics in culture ponds of P. monodon has glorious future in terms of water quality.

KEYWORDS: *Probiotics, water quality, pH, salinity and Dissolved oxygen.*

Introduction

In recent days shrimp culture has gained importance, though it is frequently affecting by viral and bacterial diseases which leads to massive loss to the farmers (Karuna Sagar et al., 1994). To prevent the infestations caused by several kinds of microorganisms, farmers routinely using antibiotics and other chemicals beyond the recommended levels. Hence in recent days attention has paid towards the application of probiotics for sustainable aquaculture practices. Based on the previous research results on probiotics suggest that the use of probiotic bacteria in aquaculture has tremendous scope and the study of the application of probiotics in aquaculture have a glorious future (Moriarty, 1997; Chen et al., 1992). Keeping in view of above context, the present study was aimed to examine the effect of a probiotics on the water quality parameter of the shrimp P. monodon was studied.

Materials and Methods

The study was carried out in the commercial shrimp farms located at Kakinada, Andhra Pradesh, India. For this study we have selected two culture ponds, in which one treated as control and another as Experimental pond (Probiotic treated) each pond with 0.8 ha area.

Monitoring water quality parameters

In control and experimental pond (probiotic treated) the salinity, dissolved oxygen, pH and total ammonia nitrogen (TAN) were monitored regularly during study period. The water salinity was measured by using a hand refractometer (Erma, Japan). The Dissolved oxygen was estimated by modified Winkler's method as described by Strickland and Parsons (1972).

The pH of the pond water was measured by using electronic pH pen (Erma-Japan). Total ammonia nitrogen (TAN) of the pond water recorded by using ammonia test kit (Advance Pharma, Thailand).

Results and Discussion

Table 1. Water quality parameters in commercial shrimp culture ponds of Kakinada

	Salinity (Avg ± SD)		pH (Avg ± SD)		Dissolved oxygen (Avg ± SD)		Total ammonia Nitrogen (TAN) (Avg ± SD)	
Sampling (In days)	Treated	Control	Treated	Control	Treated	Control	Treated	Control
15	13.2±0.89	13.7±0.80	8.1±0.3	8.2±0.3	6.2±1.2	5.3±0.3	0.43±0.1	2.1±0.1
30	14.0±0.94	14.5±0.63	8.5±0.1	8.7±0.2	5.9±1.2	4.2±1.2	0.32±0.1	2.5±0.4
45	14.7±0.86	14.8±0.55	8.4±0.3	8.8±.02	4.8±1.3	4.1±1.2	0.41±0.2	2.7±0.2
60	15.5±0.94	15.6±0.89	8.2±0.2	8.5±0.3	5.9±1.2	4.5±1.2	0.53±0.4	2.4±0.4
75	17.5±0.98	17.4±0.78	8.3±0.4	8.1±0.5	6.5±0.4	5.1±1.2	0.58±0.2	2.5±0.5
90	18.3±0.83	18.8±0.88	8.5±0.3	8.5±0.5	5.9±0.1	4.6±1.7	0.61±0.1	2.1±0.3
105	20.5±0.74	20.5±0.69	8.7±0.1	8.6±0.1	6.2±0.3	5.3±1.7	0.65±0.2	2.6±0.2
120	22.7±0.56	24.8±0.59	8.1±0.2	8.2±0.3	5.7±0.5	5.1±1.2	0.71±0.1	2.3±0.1

Water quality of any aquatic body promotes the growth and survival of the organisms in it. Adequate dissolved oxygen, pH, temperature, salinity reflect the quality of water. According to Soundarapandian and Gunalan (2008) the quality of the water in shrimp culture ponds are influenced by excess feed, faecal matter and metabolites. In the present study salinity was ranged between 13.2±0.89 to 22.7±0.56 ppt and 13.7±0.80 to 24.8±0.59 ppt in probiotic treated and control ponds respectively. Soundarapandian and Gunalan (2008) and Karthikeyan (1994) recommended a salinity range of 10-35 ppt was ideal for Penaeus monodon culture.

In the present study pH values were ranged between 8.1±0.3 to 8.7±0.1 and 8.1±0.5 to 8.8±0.2 in probiotic treated and control ponds respectively. Soundarapandian and Gunalan (2008) recorded pH values in between 7.6-8.0 in P. monodon culture. Ramanathan et al., (2005) was maintained the range of pH 6.8 to 8.7 for maximum growth and production of penaeid species. Reddy (2000) was recommended pH of 7.5 to 8.5 for P. monodon culture. In the present study the pH was alkaline throughout the culture period and did not show any significant difference between control and probiotics treated ponds.

Optimum ranges of dissolved oxygen tension in the water body is essential for the respiration of aquatic organism. Low levels of dissolved oxygen alter the metabolic activates in shrimp leads to growth retardation and cause mortality (Gilles Le Molluae, 2001). Soundarapandian and Gunalan (2008) recorded dissolved oxygen levels in between 3.9 ppm to 4.2 ppm in P. monodon culture. In the present study the dissolved oxygen values were ranged between 4.8±1.3 to 6.5±0.4 and 4.1±1.2 to 5.3±1.7 in probiotic treated and control ponds respectively. In the present study total ammonia nitrogen was 0.32±0.1 to 0.71±0.1 and 2.1±0.1 to 2.7±0.2 in probiotic treated and control ponds respectively. It is evident from the present results that the application of probiotic helps in maintaining good water quality. Thus, maintaining the ammonia level probiotic helps in maintaining good water quality and minimize the disease outbreaks in culture ponds. Soundarapandian et al., (2010) suggested that the optimum ammonia level should be less than one ppm (1) in culture ponds of shrimps.

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