The Asian Journal of Animal Science (June to November, 2009), Vol. 4 Issue 1 : (117-122)

RESEARCH PAPER

Influence of commercial probiotics on bacterial (Vibrio) load and total yield in semi intensive Penaeus monodon culture ponds

CH. VENKATRAYULU, V. KALA RANI AND D.C. REDDY

Accepted : April, 2009

See end of the article for authors' affiliations

Correspondence to :
CH. VENKATRAYULU
Department of Fishery Science and Aquaculture, Sri Venkateswara University, TIRUPATI (A.P.) INDIA

ABSTRACT

The major limiting factor - the mass mortality in Penaeus monodon culture has been attributed to the presence of pathogenic bacteria Vibrio in the rearing environment. This study presents results on the effect of commercial water and feed probiotics (Wunapuo-15; Aqualact) on the population density of Vibrio (yellow and green colonies) bacteria in rearing pond waters and total yield in semi intensive shrimp culture ponds. The results showed that the use of probiotics has reduced Vibrio bacterial count and improved total yield of shrimp. The average Vibrio bacterial (yellow and green colonies) counts were found to be significantly ($P<0.01$) lower in probiotic treated (PB) ponds compared to control ponds (CP). The total yield (TY), survival rate (SR%) and average body weight (ABW) were significantly ($P<0.01$) higher but food conversion ratio (FCR) was significantly ($P<0.01$) lower in probiotic treated (PB) culture ponds than in the control ponds (CP). Cumulative feed (CF) did not differ ($P>0.05$) significantly between control (CP) and probiotic treated (PB) culture ponds. Possible impact of using probiotics on sustainable shrimp culture is discussed.

Key words : Probiotics, P. monodon, Vibrio, Total yield, Survival rate, FCR

Semi-intensive farming of the black tiger shrimp, Penaeus monodon, is widely practiced in India and other South East Asian countries. However increasing intensity of shrimp farming was inevitably paralleled by an increase in the incidence of diseases in the farming system (Balakrishnan *et al.*, 2003). Of late shrimp culture all over the world is being increasingly affected with pathogenic microbial diseases inflicting considerable economic losses in several countries (Vaseeharan *et al.*, 2003). Opportunistic shrimp pathogenic bacteria present in sea water cause of ecological changes when the water is used in aquaculture (Moriarty, 1998). Vibrios which are members of the normal bacterial flora of shrimps, induce mass mortalities in affected shrimp populations (Lightner, 1993). Bacterial diseases caused by members of genus Vibrio such as V. parahemolyticus, V. alginolyticus, V. angnillarum have often been reported among cultured penaeid shrimps (Sung *et al.*, 1999). V. harveyi is the major cause of luminous vibriosis in crustaceans world wide (Austin and Austin, 1993). It has emerged as a serious pathogen of penaeid shrimp in hatcheries and farms in South America, Australia and SE Asia (Lavilla–Pitogo *et al.*, 1990; Liu *et al.*, 1996a,b). It produces green colonies on TCBS agar medium. Vibrio have been studied for many years and have been reported to cause serious infections and lower shrimp production (Lightner 1996). It has been implicated as being the major cause of disease problem in shrimp culture. Although the use of antibiotics to control vibrios in shrimp farming system leads to the development of antibiotic resistant pathogenic bacterial strains, an alternate method for control of vibrios in shrimp farming system is the use of probiotics (Moriarty, 1997). Probiotics are mainly composed of groups of Bacillus spp. and are being increasingly used aquaculture systems to promote the health of shrimp. The beneficial bacteria have the capacity to breakdown complex organic matter, oxidize toxic substances from water (Arunkumar Nayak and Pawar, 2003) and inhibit wide range of pathogens (Irianto and Austin, 2002). While in most cases only water or feed probiotic effects have been studied separately over short periods, synergistic effects of both water and feed probiotics have not been studied in parallel over long periods exclusively under natural field conditions.

Unfortunately most published work on the influence of probiotics was confined only to a single beneficial bacterial strain rather than to multiple strains. Consequently this study aims at studying the long term synergistic effects of multiple beneficial bacterial strains having commercially available water and feed probiotics on Vibrio bacterial load and total yield in P. monodon culture ponds exclusively in natural field conditions.