Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 10 [9] August 2021 : 25-28
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Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Efficacy of Probiotics on the Growth and Survival of *Litopenaeus vannamei* from the Culture Ponds of Haripur, Gopalpur Bandar,Odisha

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ABSTRACT
The purpose of the present study is to estimate the growth and survival percentages of L. vannamei from the culture ponds of Haripur with the application of commercial probiotics. This study was conducted over a period of 120 days for each crop during the year 2019.The study was conducted in two different crops i.e. summer crop and winter crop.The standard water quality parameters were maintained throughout the study period. Experiments were conducted in two different ponds. One is treated as control pond and other one as experimental pond. It is evident from the present study findings that, the overall highest growth and survival of the shrimps were recorded in the experimental ponds than control one in both the crops. Based on the results obtained in this study the probiotics have beneficial effects on the growth and survival by enhancing gut activities and other. Hence the application of probiotics in aquaculture practices has significant impacts in positive side than negative results.
Keywords: *Probiotics, L. vannamei, Growth, Survival.*

Received 28.07.2021 Revised 06.08.2021 Accepted 08.08.2021

INTRODUCTION

Aquaculture is one of the rapidly growing sectors in the world.The culture activity of the shrimp has increased enormously throughout the world due to fast growth rate of shrimps, short duration of the culture, and great demand in the export market. The usage of probiotic in shrimp farming has been increased with the demand for eco-friendly aquaculture as reported by Wang *et al.,* [11], Balcazar*et al.,* [1] and Kesarcodi-Watson *et al.,*[5]. Kumar *et al.,* [6] provided information about the importance of probiotics in aquaculture, methods of application and mechanism of their action in the culture system. In a study revealed that when the shrimps were fed with probiotics changes occurs in the growth performance by means of feed efficiency, and feed conversion efficiency as reported by Boonthai*et al.,* [3] and Zokaeifar*et al.,* [12, 13].In addition to capability of probiotics in enhancing the growth performance, they influence on the enzymes present in the gut of the host is believed to be one of significant contribution. According to Becerra-Dorame*et al.,* [2] the nutritional condition of the cultivable animals affected on both given feed and their digestive physiology. Digestive enzymes are very much essential to breakdown the complex compounds into simple compounds and absorbable molecules that can be utilized by the host animal as reported by Lazado *et al.,* [7].Actually utilization of feed related material is greatly depends on whether they can be easily absorbed or not by the host digestive physiology. Hence in the present study an attempt has been made to evaluate the efficacy of commercial probiotics and their impacts on the growth and survival of *L. vannamei* from the culture ponds of Haripur, Gopalpur Bandar, Odisha.

MATERIAL AND METHODS

The present work was carried out in the commercial aquaculture farms which are located in Haripur, GopalpurBandar, Odisha. The experiments were performed over a period of one year i.e. 2019 in both summer and winter seasons for two crops in the control and experimental ponds. For studies on growth and survival feeding was followed according to the specifications given by the feed manufacturers in both crops during the study period. The feed used during the study was C.P. branded semi-intensive feed. The stocking density of all the ponds was uniformly followed for both summer and winter crops. The stocking density was done uniformly at the rate of 1, 00,000 seeds per hectare pond i.e. 10 pieces/sq.mt.

During culture period shrimp growth is estimated by the process of sampling the shrimps by cast nets. Periodically the live samples of the shrimps from the study ponds were taken by cast nets and estimated the weight of the shrimps by using weighing balance. The sampling was done with the help of fishermen doing the cast netting and taking the shrimps out of the culture ponds and collected in plastic containers with the respective pond water and the mesh bags are used to weigh the shrimps with the weighing scale. The process of sampling to take the average body weight of the shrimps from the culture ponds is started from the 30 days of culture period and done till the harvesting of the ponds. On an average of six nets per pond were considered and the shrimps were collected and the average body weight is estimated. The overall average weight of the shrimps made and the growth is compared between control and experimental ponds. The condition of the shrimp also observed during the sampling. The feeding is given in the form of estimated feed as per the feeding chart and also according to the growth of the shrimps and the estimated survival rate. The sampling of the shrimps is carried at every week during the culture period and the average monthly growth and survival values were recorded and tabulated.
The body weight and survival rate of the shrimp was estimated by adopting the formula
Average Body Weight of the shrimp (ABW): Weight gain = Final weight of the shrimp-Initial weight of the shrimp/ Initial weight of the shrimp x 100
% Survival rate of the shrimp: Survival rate = Number of shrimps survived/ Number of shrimps stocked x 100

RESULTS AND DISCUSSION

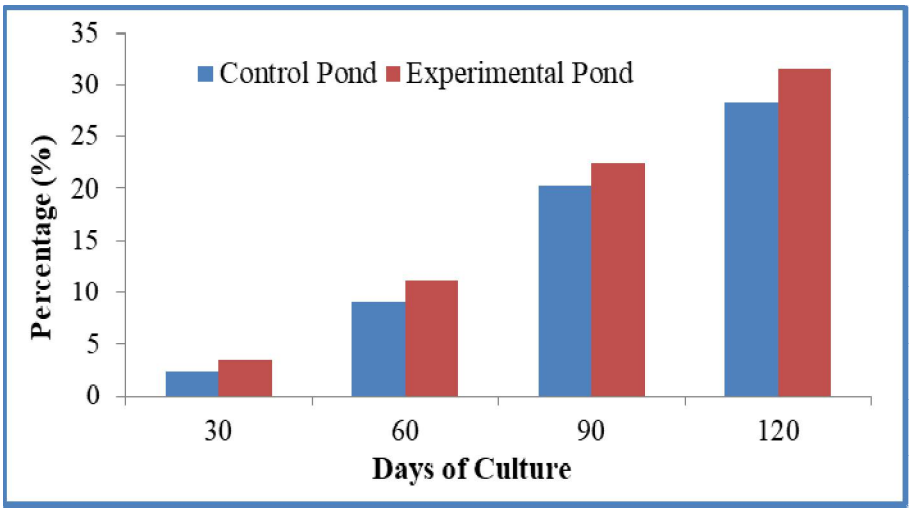

Figure 1. Growth of *L. vannamei*(in grams) in summer crop at Haripurduring the year 2019

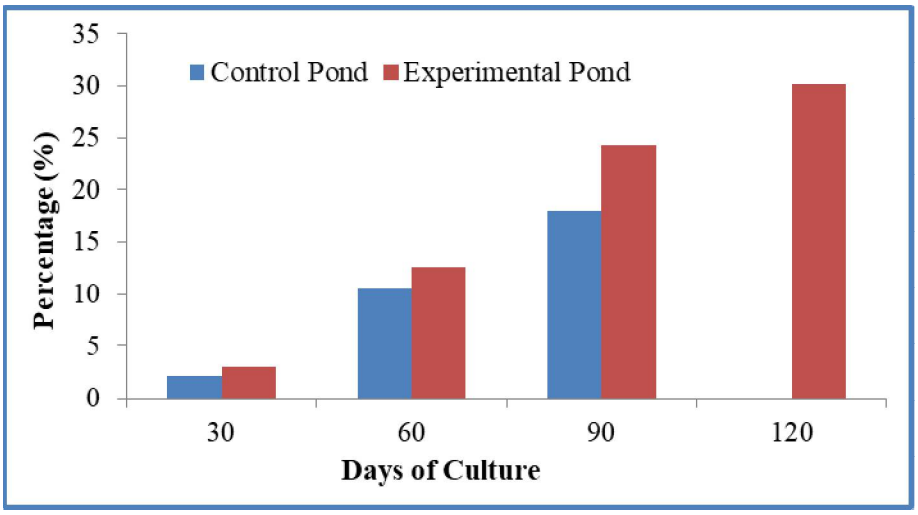

Figure 2. Growth of *L. vannamei*(in grams) in winter crop atHaripurduring the year 2019

Summer Crop

It is evident from the present results in summer crop of year 2019 at Haripur, that the growth in grams of shrimp *L. vannamei* was noticed as 2.36±0.19 at 30 days of culture in control pond, where as in the experimental pond, the growth of 3.53±0.42 was observed at 30 days of culture. Similarly the highest growth in grams was noticed as 28.21±0.55, 31.52±0.56 in control and experimental ponds at 120 days of culture respectively **(Figure 1).**

Winter Crop

It is evident from the present results in winter crop of year 2019 at Haripur, that the growth in grams of shrimp *L. vannamei*was noticed as 2.17±0.21 at 30 days of culture in control pond and this pond was harvested due to white spot disease at 19.8 g on 108th day, whereas in the experimental pond, the growth of 3.02±0.12 was recorded at 30 days of culture. Similarly the highest growth in grams was noticed as 30.17±0.22 in experimental pond at 120 days of culture **(Figure 2).**

Survival Rate

It is evident from the present results that the percentage survival of the shrimp in summer crop as 80.25%, 86.97% for both control and experimental ponds respectively. Whereas in winter crop the percentage survival of the shrimps as 72.72%, 84.72% for both control and experimental ponds respectively. In the present study an attempt has been made to compare the performance of commercially available feed probiotics on the growth and survival of *L. vannamei*. ProbioticPro-2 (selected *Bacillus* strains-concentration of bacteria:2x10^{10}cfu/g bacterial growth media-Inve Company, gut probiotic and immunostimulant 1, 3 β-Glucan, a commercial brand β-ADVANTAGE was applied in experimental ponds.Feed probiotics help in the release of digestive enzymes in the gut of the animals which enhance the metabolism and feeding rate. The feed probiotics help in the domination of useful microbial gut flora in the alimentary canal of the animals. The gut probiotics are live microorganisms applied as feed supplement with the motto of improving the health of the shrimp as reported by Tannock [10]. Srinivas *et al.,* [9] depicted that it is necessary to optimize the frequency at which the probiotics are administered. Dalmin*et al.,* [4] described about the probiotic application and could reduce pathogenic vibrio and enhance beneficial Bacilli in the culture, there by improve water quality, promoted growth, survival rate and enhanced the health status of the shrimp without stress and disease outbreaks, so that application of probiotics causes to disease free and profitable shrimp farming. In the present study the growth and survival of the shrimps in experimental ponds showed better performance than control one during the study period. Management of good water quality is very much essential for optimal growth and survival of shrimps as reported by Soundarapandian *et al.,* [8].Hence in this study we have maintained the optimal water quality levels throughout the study period in order to get better growth and survival rates.

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CITATION OF THIS ARTICLE

S Muduli, L Nayak and U Mohanty. Efficacy of Probiotics on the Growth and Survival of *Litopenaeus vannamei* from the Culture Ponds of Haripur, GopalpurBandar,Odisha.Bull. Env.Pharmacol. Life Sci., Vol10[9] August 2021 :25-28