INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

Short Communication

STUDIES ON PRODUCTION OF COMMON CARP (*CYPRINUS CARPIO*) IN FRESH WATER BIOFLOC AQUACULTURE SYSTEM

Saugata Sasmal[1], Goutam Roy[1] & Lincoln Mandal[2]
[1]Krishi Vigyan Kendra, Raipur, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India
[2]Department of Agriculture and Biotechnology, Chhattisgarh, India

ABSTRACT
Biofloc technology (BFT) is one of the innovative methodologies for waste management and nutrient retention that offers a solution to solve environmental problems in aquaculture, because it doesn't use water exchange to solve nitrogen compound elimination, but it utilizes microbial assimilation, stimulated for addition of material rich in carbon, to transform those compounds. However, trials of biofloc system in fresh water aquaculture have not been undertaken in India for common carp. A trial of six months period was performed to investigate the growth and production of common carp in fresh water Biofloc System at Krishi Vigyan Kendra, IGKV, Raipur, Chhattisgarh, India. Three rectangular cemented tanks (5,000 liter capacity) were used in this purpose. Probiotic was used for developing beneficial bacterial colonies and controlling ammonia in confined water system. Healthy fingerlings (Avg. weight 62.0 g) were stocked @ 5 kg/tank with treatment of potassium permanganate. Floating feed with 28-32% protein level was fed in once in a day @1% body weight. Molasses was applied for proper microbial growth. Physico-chemical parameters were studied daily and maintained properly during whole period. Floc volume range was recorded between 12-47 ml/1000 liter water sample. The average yield was recorded 218 Kg/tank after a period of 6 months from stocking and FCR was found to be 0.9. Experimental period was October 2018 to March 2019, so the variation of temperature was very high. The other important parameters recorded were, average pH value 7.7, dissolved oxygen 5.9 ppm, TDS 454 ppm and C:N ratio 12:1. The results obtained in this experiment suggest that the biofloc system in fresh water aquaculture improves growth performances of the common carp in almost zero-water exchange system.

KEY WORDS: Biofloc technology (BFT), Probiotics, Lactic acid bacteria (LAB), Fish culture.

INTRODUCTION

Biofloc is comprised of various beneficial microbial communities, but the mechanism of action of some probiotics which leads to increase in biofloc is unknown in aquaculture system. On the other hand, probiotics are single, known live microbial strains and their actions to farm animals and humans are well established. Probiotic is a Greek word derivative of pro and bios; "pro means promoting and bio means life". Probiotics are considered bio-friendly agents that can be administered in aquatic culture environments to control pathogens and enhance feed utilization, survival, and growth rate of farmed species (Mahapatra *et al*., 2015; De *et al*., 2014 and Huynh *et al*., 2017). The first probiotics discovered is the fermented milk, which contains lactic acid bacteria (LAB). Lactic acid bacteria (LAB) such as some Lactobacillus species (*e.g*., *Lactobacillus plantarum*, *Lactobacillus acidophilus*, *Lactobacillus thermophillus*, *Lactobacillus bulgaricus*, *Lactobacillus casei etc*.) are frequently used as probiotics in fish nutrition (Nayak, 2010). The use of LAB has been shown to have the most promising effects on disease resistance, survival, and growth parameters for a wide variety of fish species (Muñoz-Atienza *et al*., 2014; Ringø, E. and Dawood *et al*., 2016; Sahoo *et al*., 2015). In Biofloc systems, nitrogen compounds transformation is more efficient, because this process is made by facultative heterotrophic bacteria that correspond principally to *Bacillus* and *Pseudomonas* species, which allow increasing their population abundances quickly and oxide-reduction process (Monroy *et al*., 2015).

MATERIALS AND METHODS

The trial was conducted in the KVK Raipur Fish Farm, between October 2018 to March 2019. Three rectangular cemented tanks (5000 lit) were brought in use. Proper aeration was provided throughout the culture period and it was made by magnetic air pump (80 Watt) with air stone (2.5''). Liquid Probiotic mainly composed of bacillus and lactobacillus groups was used to maintain the floc and control of ammonia in culture tanks. Common carp fish seed (avg. weight 62.0 gm) was stocked @ 5 kg/ tank treated with potassium permanganate @10gm/100 liter of water. On the stocking day, feeding to the fishes was stopped, next day onwards, floating feed with 28-32% protein level was fed in once in a day @1% body weight. Molasses was applied @50-100 gm/day for proper microbial growth. Physico-chemical parameters were studied through analysis kits daily and maintained properly during whole period. Floc volume range was recorded in imhoff cone. Growth of fish was randomly recorded on a fortnightly basis.

RESULTS AND DISCUSSION

In this trial, three rectangular tanks (each 5000 liter capacity) were used for six months culture of common carp and average yield was 218 kg/tank. Stocking density was too low only @ 5kg/tank it can raised upto double in future study. Feed conversion ratio (FCR), in its simplest form a comparison of the amount of feed used per unit weight gain of the species being grown, offers a measure of aquaculture production efficiency (Waite *et al*., 2014).Typical FCRs for raised using commercial feeds and intensive production farmed fish and shrimp: 1.0–2.4 (Tacon and Metian, 2008). In convection method of fish culture, the FCR value which is very high compare to FCR value 0.9 in the present study. Floating feed with 28-32% protein level was fed in once in a day @1% body weight. Feed conversion ratio of major carp *cirrhinus mrigala* fingerlings calculated for three treatments was highest for barley (2.59), followed be fish meal (2.02) and cotton seed meal (1.55) (Browdy, 2006). During whole study period, the water temperature was very much fluctuated, lowest temperature was recorded 7.8 ^{o}C in December and 31.2^{o}C in March. The recorded pH range was 6.8-8.6 and average pH value was 7.6. There was no problem of Dissolved Oxygen because of 24 hours running blowers in the tanks, the average value was 5.9 ppm recorded. The recorded average TDS was 454 ppm where as the C:N ratio was 12:1 during culture period. Initially the floc density was 12 ml and the highest density was 47 ml/1000 liter sample recorded.

CONCLUSION

The trial was conducted in small three tanks with common carp species, the result was satisfactory. Biofloc technology application offers benefits in improving aquaculture production that could contribute to the achievement of doubling of farmer's income in short period of time. This technology could result in higher productivity with less impact to the environment. In places where water is scarce or land is expensive and possibility of theft increases vulnerability of profitable aquaculture exists more intensive forms of aquaculture like biofloc technology has been reported to be a cost-effective production system previously as observed by the present trial. This technology needs more investigation with high value fishes under different agroclimatic conditions.

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