PREVENTION OF *Vibrio harveyi* INFECTION AT THE FRESH WATER SHRIMP (*Macrobrachium rosenbergii)* USE OF BIOFLOCKS AGGREGATION

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Abstract

Bioflocs acts as a purifier in culture medium and is an important contributor to carbon and nitrogen cycle as it can decipher protein polymers such as starch and pectin. Heterotrophic bacteria are present in flocks utilizing the feed is not eaten, faeces, and other organic materials as a source of protein to be converted into inorganic ammonia. Thus, there will be reduction of inorganic nitrogen in water and microbial protein produced can be utilized as an efficient protein source for fish. This research conducted in the Central Seed Development of Brackish Water and Marine Fish (BPBIAPL) Pamarican, Ciamis, for three month, starting in May 2011 until July 2011. The research method used Completely Randomized Design Experimental (CRD). The treatments are the addition of bioflocs media as much as 0 %, 5 %, 10 %, 15 % and 20 % of the total media. Then media culture infected with bacterium Vibrio harveyi with a density of 10^5 CFU / ml. Parameters observed is the survival rate and water quality. Results showed that addition of bioflocs media give positive effects on survival rate. The addition of 10 % bioflocs produced the highest survival rate (73.75 %). The temperature of the aquarium during the study ranged from 25.75^{0}C - 27.88^{0}C; DO range from 5.69 to 8.89 ppm, and pH ranged from 5.7 to 6.8.

Key words: Bioflocs, Fresh water shrimps, Vibrio harveyi, Survival rate

INTRODUCTION

The main factors causing pathogens developed is the reduction of water quality, which usually caused the contaminants from outside the culture media or food remains and faeces of shrimp. Decrease in water quality will have an impact on the appearance of both pathogenic viruses, bacteria, fungi and protozoa that disrupt and damage the seed shrimp. Treatment can be done up to now is the administration of antibiotics, but the use of antibiotics can lead to bacterial resistance to antibiotics, as well as standards on the export of shrimp that will not be allowed to use antibiotics. Therefore, prevention of diseases and pathogens that can be done is by improving the quality of water as the medium of cultured shrimps. Among the types of diseases that attack the shrimps, usually this is caused by bacteria. According [11], direct effects of the attack of pathogenic bacteria can cause disease, spoilage and toxins that can cause the shrimps death. One type of bacteria that attack the shrimp and fish that Vibrio sp., which is an opportunistic pathogen that can develop from saprophytic become pathogenic if the conditions are right. Pathogenic vibrio bacterium that can live outside the body of an organism with a attached or within the body [5]. The presence of Vibrio sp. shrimp in captivity do not always lead to mass mortality of shrimp, but a certain level of density and environmental conditions unfavourable larvae cause opportunistic pathogen vibrio turned into [10]. One way to improve the environmental conditions of the best in pond aquaculture shrimps is to use media as a medium of cultivation bioflock. Bioflock can transform inorganic nitrogen from the wastewater through assimilation by the microbial cultivation of a protein by the addition of carbon material [2]. This technology is able to prevent the accumulation of nitrogen waste in the form of toxic ammonia and nitrite compounds into harmless levels. The basic principle is to change

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bioflock formation of organic compounds and inorganic compounds containing carbon (C), hydrogen (H), oxygen (O), nitrogen (N), with a bit of phosphorus (P), Into the mass of sludge bioflock using flock-forming bacteria that synthesize biopolymers polyhydroxy alcanoat as bioflock bond [1].

Flock biomass formed in the body of water can be used as feed additives and serves as a purification (purification) of water in the pond, establish nitrification, and limiting the growth of plankton. In general, the organic material is oxidized in aerobic water by gas-forming bacteria bioflock into CO2 and H2O as well as the mass of sludge residue (flock) [9]. The provision of carbon into the water can support microbial metabolic processes [3]. Microbes will utilize low-carbon materials to take nitrogen from the nitrogen and water to produce a protein. Hence, there will be a reduction of inorganic nitrogen in water and microbial protein produced can be utilized as an efficient source of protein for fish. This process will improve the water quality becomes better, so inhibiting the emergence of pathogens that can reduce seed quality shrimps and provide seed survival of shrimps be better. When O2 supply slightly, causes bioflock not grow well; but it needs a major cause aeration techniques bioflock only economically feasible for intensive high stocking [8]. According to [7], media flock density of 10% produces the best quality bioflock, so that utilization can be optimized and can produce the best water quality. Flock density exceeds 200 ml / L concentration must be lowered, so that flocks can be optimally used. Flock density affects the quality of bioflock, therefore necessary to know the optimal level of flock density to produce the best water quality [8].

MATERIAL AND METHODS

The research was conducted at Central fish-seed Development of Brackish and Sea-water (BPBIAPL) Pamarican, Ciamis Regency, West Java, Indonesia, for one month, in June 2011.

The research materials used shrimps, molasses (sugar drops: 58% carbon), as carbon source. sugar, Bacillus bacteria, *Vibrio harveyi* (isolates nr. b4), nutrient agar, sterile physiological saline, pellets crumble with 35% protein. The research tools are used aquarium size of 65x40x40 cm^3, blower, thermometer, pH meter, do meter, digital scales, Erlenmeyer tube, tube, hot plate & stirrer, autoclave, Petridis, Bunsen, micro pipettes, incubator, cotton, needles use, aluminium foil.

Research conducted using descriptive methods, with five treatments and four replications. Observations were made every day and the treatments are:

Treatment A: addition of media bioflock 0% (no bioflock);

Treatment B: addition of media bioflock 5%;

Treatment C: addition of media bioflock 10%;

Treatment D: addition of media bioflock 15%;

Treatment E: addition of media bioflock 20%.

Parameters observed are clinical symptoms, by observing the damage the outside of the shrimp body; marked with wounds on the body, fins, gill rot and sometimes bulging eyes and changes in behaviour; testing the reflexes and responses to food [6].

RESULTS AND DISCUSSIONS

Observation of clinical symptoms of *Vibrio harveyi* infected shrimp that looks after seven hours of infection, the damage the outside of the shrimp body marked with wounds on the body, fins, the appearance of white patches on the shrimp's body and protruding eyes. Looked stress shrimps, white patches appear on the body of the shrimp until the colour changes from transparent to white body pale, whitish colour eyes that stand out, when the dark body of the fish will emits light or fluoresce, as well as behavioural changes such as slowed movement, shrimp swim without direction and tend to stick to the walls of the aquarium (Figure 1).

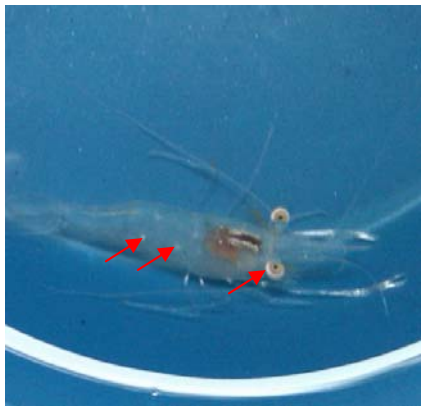

Figure 1 The clinical symptoms after 7 hours of infected bacterium *Vibrio harveyi*.
White patches appear and Prominent eyes

Table 1 Return time to normal, Response To Food

No	Treatments	Return Time To Normal (Rapid Feed Runs Out)
1	0 %	7 Days
2	5 %	6 Days
3	10 %	4 Days
4	15 %	7 Days
5	20 %	6 Days

From table 1, 10% bioflock in medium has 4 days return time to normal, compared to others treatments, it means that the shrimp feeding with 10% bioflock, there will be reduction of inorganic nitrogen in water and microbial protein produced can be utilized as an efficient protein source. According to [2], bioflock can transform inorganic nitrogen from the wastewater through assimilation by the microbial cultivation of a protein by the addition of carbon material.

From Table 2 return time to normal, as response to the knocking, on the shrimp feeding with 10% bioflock only in 4 days. The healthy shrimp has good appetite and will more active than the sick one. Microbes will utilize low-carbon materials to take nitrogen from the nitrogen and water to produce a protein. Hence, there will be a reduction of inorganic nitrogen in water and microbial protein produced can be utilized as an efficient source of protein for fish. This process will improve the water quality becomes better, so inhibiting the emergence of pathogens that can reduce seed quality shrimps and provide seed survival of shrimps be better [8].

Table 2 Return time to normal, Response to the Knocking

No	Treatments	Return Time To Normal (Normal Reaction To The Knocking)
1	0 %	7 Days
2	5 %	7 Days
3	10 %	4 Days
4	15 %	6 Days
5	20 %	6 Days

CONCLUSIONS

Addition 10% of bio flock on media concentration is the best for prevention of infection with *vibrio harveyi* in shrimp, the clinical symptoms of sick shrimps, become more quickly recovery (return to normal condition) within 4 days.

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