



CHARACTERISTICS OF LIQUID WASTE IN AQUACULTURE OF CATFISH (*Clarias sp*)

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ABSTRACT

Aquaculture is the highest fishery production in Indonesia. One of the freshwater aquaculture in Pangandaran is catfish cultivation. The end of catfish farming activities will produce waste. The waste generated from cultivation is in the form of liquid waste. This liquid waste can have a negative impact on the environment if it is not in accordance with the quality standards of the liquid waste so that it needs to be characterized by the liquid waste from fish farming. The purpose of this study was to determine the physical and chemical characteristics of fish culture waste. The raw material used is liquid waste from catfish farming with tarpaulin ponds. The parameters for testing liquid waste are physical appearance, pH, temperature, DO, and BOD. The test was carried out on day 0 and day 5. The results showed that the color of the liquid waste was cloudy brown, the smell of the waste was like ammonia, the pH of the liquid waste was around 7-8, the temperature was between 28.1 - 28.7°C. The DO value on day 0 was 12.35 mg / L and day 5 was 9.4 mg / L and a BOD₅ value was 2.9 mg / L.

Keywords: Aquaculture, wastewater, water quality

Introduction

development of aquaculture in Indonesia will certainly have positive and negative impacts [1]. The positive impact obtained by the development of cultivation is to provide added value, especially if exports abroad which of course increase the country's foreign exchange, there are many jobs available, thereby reducing unemployment. Meanwhile, the negative impact of the fishery industry is that many aquaculture ponds dispose of waste directly into the environment without being treated first.

Waste is all kinds of residue from activities that are no longer used for further production activities, for consumption or distribution and the residue is then discarded. Waste components in cultivation consist of feed, feces and antibiotics. These components consist of carbon, nitrogen, and phosphorus which are predominantly sourced from fish feed and fish feces, these components are released into water bodies depending on the levels of carbon, nitrogen and phosphorus present in the feed [2].

Most of the waste produced by fish farming is liquid waste. Liquid waste from fish farming contains high organic material. This is caused by food waste and fish metabolism such as urine and feces [3]. The continuous disposal of liquid waste will certainly cause

pollution. This condition can be prevented through waste water treatment efforts. The high content of organic nutrients in water bodies will cause eutrophication which will then lead to the death of organisms in the water, silting and unpleasant odors. Therefore, it is necessary to know the characteristics of the waste in waste treatment. The characteristics of waste generated from aquaculture will of course be different from waste generated from other fisheries industries. Therefore, it is necessary to test the pH, DO, temperature and BOD parameters to determine the characteristics of liquid waste from the results of catfish farming activities.

Material and Methods

This research was conducted in December 2020 at the Fisheries Laboratory of PSDKU Unpad Pangandaran. The raw material needed in this study is liquid waste from catfish farming in a tarpaulin pond in Pangandaran. The liquid waste used is water when harvesting catfish. While the tools used are analytical scales, DO meters, pH meters, black plastic, small bottles as waste containers. The research method for the characteristics of liquid waste in catfish farming is carried out by taking water from the tarpaulin pond of catfish culture at the time of harvest, the sample is put into a small bottle and covered with black plastic and then stored. The test procedure is as follows:

a) pH testing (SNI 06- 6989.11: 2004) [4]

The pH measurement procedure is carried out by first calibrating the pH meter with a pH buffer of 4, 7, and 10 then the electrodes are rinsed and then immersed in the sample solution and read the measurement results listed on the screen.

b) Temperature Testing (SNI 06-6989.23, 2005) [5] The

Thermometer is immediately immersed in the test sample and left for 2-5 minutes until the thermometer shows a stable value. Readings on the thermometer scale are recorded without the thermometer being lifted from the water.

c) DO

Testing Testing using a probe and meter with a portable model that is easy to bring to the field, Use the probe and meter that have been calibrated 6, After the probe is turned on, wait 15 minutes for the meter to reach its balance.

d) Testing of Biochemical Oxygen Demand (BOD) (SNI 06-6989.14-2004) [6]

The test is carried out by examining dissolved oxygen on the 0th day of the waste sample which is added with diluting water. Sample bottles were incubated for 5 days at 20oC. Furthermore, the dissolved oxygen examination was carried out on the 5th day according to the DO testing method. Then it is titrated with sodium thiosulfate solution.

Results and Discussion

The liquid waste used is waste from catfish farming activities in a tarpaulin pond. The results of testing the characteristics of catfish culture liquid waste are presented in Table 1. The physical characteristics of the waste samples on day 0 are brownish cloudy color, food residue and fish metabolism with a dark brown color settles at the bottom of the sample bottles. Smells bad like the smell of ammonia. For the measurement of water quality, the pH value is obtained. The pH value is still considered good for organisms. Based on Government Regulation Number 82 of 2001, the pH value range must be between 6-9, for class II and class III. According to [7], the value in the pH range 7 - 8.5 is the ideal value range for biological productivity, while a pH value below 4 will be detrimental to aquatic life, this is in

line with the opinion developed by Boyd (1998). good for growth, namely the number range 6-9.

The temperature obtained is in the range of 28.1 ° C, the temperature can show a tendency for chemical and biological activity in a water. According to [8], the optimal temperature for fish life in tropical waters is between 28 ° C-32 ° C. So the temperature value is still categorized as good for the survival of aquatic biota (fish). The value of dissolved oxygen or DO indicates the number 12.3 mg / L this amount of dissolved oxygen is very important for a water. According to Government Regulation no. 82 of 2001, where the minimum threshold for dissolved oxygen concentration is 4 mg / L for class II and 3 mg / L for class III. This is because DO can affect the growth, distribution, survival of aquatic organisms and can affect their behavior and physiology. The temperature on the 5th day was 28.7 ° C, this figure is still good for the waters.

Table 1.Characteristics of catfish aquaculture

Parameters	Waste water H-0	Waste water H-5
Color	Brown	Dark brown
Aroma	Ammonia	Ammonia
pH	8	7
Temperature	28.1 °C	28.7 °C
DO	12.3 mg/L	9.4 mg/L
BOD ₅	-	2.9 mg/L

The pH value obtained on day 5, which is 7, has decreased from the pH value the previous day, this pH value is still in a good category if the waste is directly disposed of into the water (river). The characteristics of the waste produced on day 5, smells of ammonia which is very pungent, if someone inhales this smell, they will feel nauseous, this is because anaerobic degradation has occurred, for color there is no very significant change by day 1, food residue and metabolism accumulates at the bottom of the sampel container. According to [9], based on the pH value, it will be known whether there has been a change in the acid-base properties of the waters from its natural pH value, if the value is higher than one unit above normal it means the water becomes too alkaline, conversely if there is a decrease then the waters become too sour. When this happens, besides disturbing the biota or aquatic ecosystem, it will also reduce the water use.

The dissolved oxygen value has decreased and the result is 9.4 mg / L, this drop in DO value is thought to be due to disruption of diffusion from free air and the photosynthetic process carried out by organisms in sample bottles. The BOD₅ value obtained is 2.9 mg / L according to Government Regulation No. 82 of 2001 where the maximum BOD₅ concentration threshold is 3 mg / L for class II and 5 mg / L for class III. This indicates that the BOD₅ generated is still in the good category. Low or high BOD values are influenced by the input of organic matter into the waters. BOD indicates the amount of dissolved oxygen required by organisms to break down and oxidize waste materials in water. If the oxygen consumption is high, the BOD value will be smaller because of the smaller dissolved oxygen. This indicates a high oxygen-requiring waste material content [10].

Conclusion

Based on the results of the research, the physical characteristics of catfish culture liquid waste are brownish cloudy color, food residue and metabolism from dark brown fish settles at the bottom of the sample bottle and smells like ammonia. While the measurement of water quality obtained a pH value of 8, water temperature of 28.7 °C, DO 9.4 mg / L and BOD₅ of 2.9 mg / L.

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