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CHARACTERISTICS OF LIQUID WASTE PROCESSING MUJAIR (OREOCHROMIS MOSSAMBICUS) FILLET IN PANGANDARAN, WEST JAVA

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ABSTRACT

Fishery production which has increased every year in all provinces of Indonesia has an impact on the amount of waste produced. The largest waste generated in the processing of fishery products is liquid waste. Liquid waste is generated at every stage of the process, such as washing and boiling. One treatment that produces liquid waste in the washing process is the fish filet industry. Tilapia fish is a cultivated commodity in West Java. Tilapia fish filets produce liquid waste from the washing process. The purpose of this study was to determine the characteristics of the liquid waste in the processing of tilapia fish filets. The study was conducted by taking samples from the tilapia fish filet industry in Pangandaran, West Java. The parameters tested in this study were pH value, Biological Oxygen Demand (BOD), and total suspended solids (TSS) on day 0 and day 5. Waste parameter testing was carried out at the tropical fisheries and marine laboratory, PSDKU UNPAD Pangandaran. The results showed that the pH value decreased. The pH on day 0 was 9 and on day 5 was 7. The amount of TSS was 10 mg/L, while the amount of BOD was 1.06 mg/L.

Keywords : Mujair fish, liquid waste, pH, BOD, Total suspended solids

INTRODUCTION

The production of tilapia aquaculture in West Java is the second highest after East Java. In 2020, the production of tilapia aquaculture commodities was 16,857, while for the East Java area it was 21,196 tons. The total production of tilapia aquaculture in Indonesia is 2,163,674 tons [1]. One of the industries that utilize aquaculture and capture fisheries resources is the filet industry. Filet is fish meat that has been removed from the head, entrails, tail, scales, bones and skin [2]. Fish filet is a processed fish product where this product can be reprocessed into a follow-up product. Crushed meat and surimi are further processed products from filets so that the market segment is narrower. Filet can not only be used as a raw material for the food processing industry, but is also needed by household consumers, hotels, restaurants and catering. In terms of technology, fillet ranks first because the technology used in making filets is relatively simple but

can produce products with high added value, while in terms of human resources, filets rank first, which is 0.43 because this industry does not really require skills. technical human resources (HR) is too high. In terms of product value added, filet ranks first.

The high protein content of Mujair fish also encourages an increase in industrial production of fillets and processed products such as meatballs and nuggets. Protein in Mujair fish has a higher value than meat and eggs (the protein content in every 100 g of Mujair fish samples is 20 g; eggs 12.8 g; chicken meat 18.2 g; and beef 18.8 g) [3]. The fish filleting industry produces residual products in the form of fish skin by 8.7% of the total weight of fish [4].

The production of liquid waste in fish processing industry activities comes from several sources, such as water used for washing fish and washing production equipment. Wastewater from fish washing has a relatively large portion and contains high organic matter. This condition is caused by the remains of feed and fish metabolism, such as urine and feces. Disposal of liquid waste directly and continuously into environmental agencies causes pollution. Liquid waste is water consisting of 0.1% solid objects in the form of organic and inorganic substances. Organic substances contained in liquid waste include nitrogen, carbohydrates, fats. These substances can cause unpleasant odors, and inorganic substances are not harmful. The presence of high organic matter content in waste is a source of food for microbial proliferation. Handling of waste before it is released into nature must be a concern, because it is predicted that in the waste there are still many toxic compounds, containing compounds needed for the growth of bacteria, viruses and protozoa. Thus, it can be a good medium for the propagation of micro [5].

The high market demand for fish fillet products is directly proportional to the number of industries engaged in processing fish fillets. The fillet processing process produces liquid waste and solid waste. The solid waste generated in the fish filet industry that is rarely reused is fish skin. Of the several fish fillet processing industries encountered, most of these industries dispose of the liquid waste from the processing directly into water bodies. If this continues, it will cause pollution to water bodies because this liquid waste contains many nutrients that can cause eutrophication. Therefore, it is necessary to observe and calculate the content in the liquid waste from the filet industry to find out how far the liquid waste from the fishing industry has the potential to pollute the environment.

METHODOLOGY

The research on the characteristics of the waste from the production of tilapia fish fillets was carried out and tested in the laboratory. Samples of liquid waste produced by tilapia fish fillets came from Pangandaran. This research on the characteristics of liquid waste was carried out in November 2021-December 2021. The research was carried out at the Tropical Fisheries and Marine Laboratory, Fisheries Study Program, Pangandaran Campus at PSDKU Unpad Pangandaran.

Tools and Materials

The tools used in measuring the quality of liquid waste processing tilapia fish fillets are as follows: DO meter to measure the DO content of wastewater, litmus paper to measure the pH of wastewater, sampler bottles as a waste water container, digital scales to weigh total suspended solids , Test tube To accommodate wastewater, Test tube rack to put test tubes, Centrifuge for wastewater centrifugation, Dropper pipette to take water samples, and Centrifugation

tube to precipitate solid waste water. The material used in measuring the quality of fishery processing wastewater is liquid waste from the processing of tilapia fish fillets.

Methods

Methods Research on the characteristics of wastewater from fishery processing was carried out descriptively and by observation. The sampling procedure is that the liquid waste from washing fish fillets is taken as much as 15 ml and put into a sample bottle. The sample bottle used is a dark colored bottle. Samples were incubated for 5 days at room temperature. Then the test is carried out. Tests were carried out on day 0 and day 5. Tests carried out on tilapia fish fillet processing liquid waste, namely measuring pH, Total Suspended Solids, and Biological Oxygen Demand (BOD).

Testing Procedure

a. pH testing [6]

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

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b. BOD Test

The procedure is to measure the initial dissolved oxygen content (DO) of the sample immediately after sampling, then measure the dissolved oxygen content of the sample that has been incubated for 5 days in the dark at constant temperature (20 0C) which is often referred to as DO5. The difference between DOi and DO5 (DOi - DO5) is the BOD value expressed in milligrams of oxygen per liter (mg/L) using a DOmeter. The condition of the sample was incubated in the dark. DO5 cannot be zero.

c. Total Suspended Solid (TSS) Test [7]

Determination of the empty weight of the filter paper was carried out by rinsing the filter paper with 20 mL of distilled water and then heated in an oven at 105°C for 1 hour. The filter paper was cooled in a desiccator for 30 minutes and then weighed. The procedure was repeated until a constant weight was obtained. Empty filter paper that has been weighed is placed into a funnel and then moistened with distilled water. A total of 50 mL of the sample was filtered and then rinsed three times with 10 mL of distilled water. The filter paper containing the residue was heated in an oven at 105°C for 1 hour. The filter paper containing the residue was cooled in a desiccator for 30 minutes and then weighed. The procedure was repeated until a constant weight was obtained.

RESULTS AND DISCUSSION

Liquid waste is a complex substrate consisting of various types of organic materials, both biodegradable and not. The production of liquid waste in fish processing industry activities comes from several sources, such as water used for washing fish and washing production equipment. Wastewater from fish washing has a relatively large portion and contains high organic matter [5].

Table 1. Results of measuring the quality of tilapia fish fillet liquid waste

Parameters	Day-0	Day-5
pH	9	7
TSS	10 mg/L	10 mg/L
BOD		1,06 mg/L

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In the waste from washing tilapia fish fillets, TSS, BOD, and pH parameters were calculated and then compared based on the quality standard compared to the two based on the quality standard class PP No. 82 of 2001 and the Quality Standard Kep-51/MENLH/10/1995 regarding wastewater quality standards for In industrial areas, the waste produced has a different value from the quality standard class except for the pH which is still within the range of the quality standard class, which is 9 on the first day then drops to 7 on the 5th day. DO on the first day has a lower value than class the first quality standard and further decreased on the fifth day, reaching 0.86 mg/L. TSS calculation is only done on the first day. The TSS value is much lower than the quality standard class I, which is 10 mg/L.

The pH of the wastewater treatment of tilapia fish fillets ranged between 7 and 9. The pH value of wastewater was not much different from that of tilapia processing which varied from 6.0 to 7.8 (mean 6.9 ± 0.9) [8]. These values are similar to those reported for Trout processing wastewater [9], and are similar to 6.9; pH values are reported for abattoir wastewater [10]. This indicates that there is less use of chemicals such as detergents, which change the pH of the effluent.

The total suspended solids in wastewater washing tilapia fish fillet was 10 mg/L. The TSS result shown by tilapia processing liquid waste was 5.58 mg/L. In the study of tilapia processing, wastewater contains a high solid content of which more than 95% is volatile. These values were also calculated with those reported for trout processing wastewater by [9]. This indicates that most of the solids in fish processing wastewater are of organic origin and have high energy production potential if efficiently decomposed through anaerobic digestion [8].

Wastewater based on its source can be divided into domestic waste and non-domestic waste. Domestic waste is waste water in household activities, hotels, offices and so on, while non-domestic waste is waste water originating from industrial activities, for example the food industry. Broadly speaking, the substances contained in wastewater can be grouped as follows: wastewater contains 99.9% water and 0.1% solids. Solid materials are divided into two, namely organic and inorganic. Organic is divided into protein (65%), carbohydrates (25%), and fat (10%). While inorganic consists of granules, salt, and metal [11].

Fishery product processing industry consumes water reaches 20 m3 / ton of product produced depending on the technology used, the type of fish that is processed and the resulting product. The resulting liquid waste containing organic matter with loads up to 20 kg BOD / ton [12]. A large enough amount is disposed of as processing waste with a large volume of water, namely the washing and processing stages. Fish and shrimp processing waste is very high in biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), fats-oil-fats (FOG), pathogenic and other microflora, organic matter and nutrients, etc. Therefore, fish and shrimp processing effluents are very likely to produce adverse effects on the coastal environment [13].

CONCLUSION

processing of tilapia fish fillets in Pangandaran produces liquid waste in each processing process. Liquid waste is generated from the washing process. Characteristics of tilapia fish fillet washing wastewater on day 0 and day 5 had different values. The wastewater quality parameters are pH value, total suspended solids (TSS), and BOD. The pH value on day 0 was 9 and on day 5 was 7. The amount of TSS was 10 mg/L, and the BOD value was 1.06 mg/L.

REFERENCES

[1]. Ministry of Marine Affairs and Fisheries (KKP), “Fisheries Production”, Statistics-KKP, https://statistik.kkp.go.id/home.php?m=prod_ikan_prov&i=2. 2020

[2]. USDA, “Standards for Grades of Fish Fillets”. Vol. 33(4), pp. 399-406., 2017. http://www.seafood.nmfs.noaa.gov/pdfs/generalfillets.pdff

[3]. Widodo S, "Analysis of the Effect and Improvement of the Nutritional Status of Elementary School Students with the Mujair Flour Biscuit Intervention". Proceedings of the National Seminar on Multidisciplinary Synergy in Science and Technology, 1, pp. 84-90, 2018

[4]. Nurhayati, N. T, “Extraction and Characterization of Acid Soluble Collagen from the Skin of Tilapia (Oreochromis niloticus)”, Postharvest Journal and Biotechnology, vol 8 (1), 2013

[5]. Ginting, P. *Waste Treatment Technology.* Jakarta: Sinar Harapan Library, 2002

[6]. Indonesian National Standard (SNI) 06-6989.11-2004 . Water and wastewater Section 11: How to test the degree of acidity (pH) using a pH meter. National Standardization Agency, 2004

[7]. Indonesian National Standard (SNI) 06-6989.3-2004. Water and wastewater- Part 3: Test method for total suspended solids (TSS) gravimetrically. National Standardization Agency, 2004

[8]. Gumisiriza R, Mshandete AM, Rubindamayugi MST, Kansiime F, Kivaisi AK “Nila perch fish processing waste along lake Victoria in East Africa: Auditing and Characterization. African Journal of Environmental and Technology, Vol 3(1), pp.13-20, 2009.

[9]. Hwang S, Hansen CL, “Formation of organic acids and ammonia during Acidogenesis of trout-processing wastewater”. ASAE. 41: pp. 151-156, 1998

[10]. Masse' DI, Masse L, “Characterization of wastewater from hog slaughter houses in Eastern Canada and evaluation of their in-plant wastewater treatment systems”. Canadian Agriculture. eng. 42: pp. 38-46, 2000

[11]. Fitria Y, *Making Liquid Organic Fertilizer from Fishery Industry Liquid Waste Using Acetic Acid and EM4 (Effective Microorganism 4*). Bogor: Fishery Products Technology Study Program, Faculty of Fisheries and Marine Sciences, 2008

[12]. Muflih A, “Industrial liquid waste processing systems fisheries product”, Samakia: Journal of Fisheries Science, Vol. 4(2), 2013

[13]. Islam MS, Khan S, Tanaka M, “Wate loading in shrimp and fish processing effluents: potential source of hazards to the coastal and nearshore environments”. Marine Pollution Bulletin, Vol. 49(1), pp. 103-110, 2004

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