

Identification of Potential Pollution from Liquid Waste of Micro, Small and Medium Enterprises (MSMEs) Poultry Slaughterhouses

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Abstract. The trend of world demand for poultry meat increasing by 6% could trigger an increase in the number of poultry slaughterhouses. However, there are by-products from the poultry farming process, namely solid waste and liquid waste originating from feces, residue from slaughtering activities such as poultry innards and blood which can enter water bodies around the poultry slaughtering area. Waste produced from poultry slaughtering activities generally consists of organic waste such as protein, blood and fat. This organic waste can cause eutrophication which affects the balance of the water ecosystem and can cause infections in the surrounding community. The aim of this research is to identify the potential of liquid waste from micro, small and medium enterprises (MSMEs) from poultry slaughterhouses in Banjarbaru area for pollution in the environment around that it can provide recommendations in mitigation efforts for the management of liquid waste from poultry slaughterhouses in Banjarbaru. In this research, data was collected using survey methods at two locations, namely poultry slaughterhouses in Sungai Besar and Landasan Ulin. Then followed by measurements and analysis of the potential liquid waste from poultry slaughterhouses using wastewater quality standard parameters for Slaughterhouse (RPH) businesses and/or activities based on Minister of Environment Regulation No. 5 of 2014. The indicators/parameters include TSS, BOD, COD, as well as Pb and Cd metal levels. Identification of potential pollution from poultry slaughterhouse waste in samples was carried out by testing TSS, BOD, COD levels, as well as testing heavy metal levels using Atomic Absorption Spectrophotometer (AAS) system analysis. Metal content test results in Sungai Besar poultry slaughterhouses showed that metal levels were still below the permitted limits. The test results of samples from Landasan Ulin poultry slaughterhouses showed that total cadmium (Cd) levels and lead (Pb) contents were exceeding the threshold of 0.1 mg/L based on Minister of Environment Regulation No. 5 of 2014. Meanwhile, the TSS, BOD and COD test results were very far above the threshold based on waste water quality standards for Slaughterhouse (RPH) businesses and/or activities based on Minister of Environment Regulation No. 5 of 2014, namely BOD 100 mg/l, COD 200 mg/l, and TSS 100 mg/l. Based on the research results, it can be concluded that poultry slaughterhouse waste in Banjarbaru has the potential

for environmental pollution, which is identified from the levels of heavy metals, TSS, BOD and COD that exceed the permitted limits of government regulations. Therefore, it can be concluded as well that liquid waste processing of poultry slaughterhouse waste in Banjarbaru is necessary before disposing into the environment in order it does not exceed the permitted contamination threshold.

Keywords: liquid waste, poultry slaughterhouses, identification, pollution.

1 Introduction

Industrial development in Indonesia is currently increasingly rapid. This is characterized by the increasing number of industries that produce various types of human needs. One of them is the poultry slaughterhouse industry. In order to meet people's animal protein needs, meat, especially from poultry, is one source of protein that is widely consumed and can be cultivated in Indonesia. The trend of world demand for poultry meat increasing by 6% could trigger an increase in the number of poultry slaughterhouses [1].

However, there are by-products from the poultry farming process, namely solid waste and liquid waste originating from feces, residue from slaughtering activities such as poultry innards and blood which can enter water bodies around the poultry slaughtering area. Waste produced from poultry slaughtering activities generally consists of organic waste such as protein, blood and fat [2]. This organic waste can cause eutrophication which affects the balance of the water ecosystem and can cause infections in the surrounding community.

The aim of this research is to identify the potential of liquid waste from micro, small and medium enterprises (MSMEs) poultry slaughterhouses in Banjarbaru area for pollution in the environment around that it can provide recommendations in mitigation efforts for the management of liquid waste from poultry slaughterhouses in Banjarbaru.

2 Materials and Method

In this research, data was collected using survey methods at two locations, namely from micro, small and medium enterprises (MSMEs) poultry slaughterhouses in Sungai Besar and Landasan Ulin. The materials needed in this study were samples of liquid wastes from those poultry slaughterhouses.

The methods followed by measurements and analysis of the potential liquid waste from poultry slaughterhouses in accordance with wastewater quality standard parameters for Slaughterhouse (RPH) businesses and/or activities based on Minister of Environment Regulation No. 5 of 2014 [3]. The indicators/parameters include TSS, BOD, COD, as well as Pb and Cd metal levels. Identification of potential pollution from poultry slaughterhouse waste in samples was carried out by testing TSS, BOD, COD levels, as well as testing heavy metal levels using Atomic Absorption Spectrophotometer (AAS) system analysis.

3 Result and Discussion

Based on SNI 01-6160-1999, a poultry slaughterhouse is defined as a building complex with special design and construction that meets certain technical and hygienic requirements and is used as a place to slaughter poultry for consumption by the general public [4]. In general, meat poultry is a type of bird such as chicken, duck, turkey, goose, pigeon or quail which is bred and used to provide food for the community. Fig. 1 shows a portrait of one of the poultry slaughterhouses in South Kalimantan which is located right above a body of water (swamp). This condition has the potential to cause serious pollution to water bodies if the waste treatment process is not carried out effectively and efficiently. For example, consumption of fresh water during slaughtering activities is an average of 20.5 liters per bird, which can produce liquid waste of the same amount [5].



Fig. 1. A portrait of the conditions around a poultry slaughterhouse in South Kalimantan

Identification of potential pollution from poultry slaughterhouse waste in samples was carried out by testing TSS, BOD, COD levels, as well as testing heavy metal levels using Atomic Absorption Spectrophotometer (AAS) system analysis. Test results on metal levels, TSS, BOD, and COD in liquid waste from poultry slaughterhouses are shown in Table 1 and Table 2.

Table 1. The Content of Poultry Slaughterhouse Liquid Waste Location 1 (Sungai Besar)

No.	Parameter	Unit	Result	
			Sampel LU 1	Sampel LU 2
1	TSS	mg/L	2917	73
2	BOD	mg/L	1931.4	<0,28

3	COD	mg/L	3446.7	60.1
4	Lead (Pb)	mg/L	<0,0019	<0,0019
5	Cadmium (Cd)	mg/L	<0,0019	<0,0019

Table 2. The Content of Poultry Slaughterhouse Liquid Waste Location 2 (Landasan Ulin)

No.	Parameter	Unit	Result
1	TSS	mg/L	3856.,9
2	BOD	mg/L	1.245
3	COD	mg/L	781
4	Lead (Pb) Total	mg/L	5.398
5	Cadmium (Cd) Total	mg/L	0.373
6	Zinc (Zn) Total	mg/L	0.015
7	Iron (Fe) Total	mg/L	0.113

Metal content test results in Sungai Besar poultry slaughterhouses showed that metal levels were still below the permitted limits. While the test results of samples from Landasan Ulin poultry slaughterhouses showed that total cadmium (Cd) levels of 0.373 mg/L and lead (Pb) contents of 5.398 mg/L were exceeding the threshold of 0.1 mg/L based on Minister of Environment Regulation No. 5 of 2014. This certainly needs further attention. Heavy metals with high toxicity are dangerous for living things, especially if consumed by humans. They can be contained through waste streams that enter and contaminate the river so that animal and plant ecosystems are affected by this heavy metals [6].

Meanwhile, the TSS, BOD and COD test results were very far above the threshold based on waste water quality standards for Slaughterhouse (RPH) businesses and/or activities based on Minister of Environment Regulation No. 5 of 2014, namely BOD 100 mg/l, COD 200 mg/l, and TSS 100 mg/l. Therefore, further studies need to be carried out on liquid waste management at poultry slaughterhouse MSMEs in Banjarbaru. BOD is used as a measure of the amount of oxygen used by microbial populations contained in waters in response to the entry of biodegradable organic matter or as a description of the amount of biodegradable organics in the waters. The next chemical parameter observed was Chemical Oxygen Demand (COD). COD is the amount of oxygen needed to decompose all organic matter contained in water, so that organic wastes in the water can be oxidized through chemical reactions. COD value is a measure for the level of pollution by organic matter [7].

4 Conclusion

Based on the research results, it can be concluded that poultry slaughterhouse waste in Banjarbaru has the potential for environmental pollution, which is identified from the

levels of heavy metals, TSS, BOD and COD that exceed the permitted limits of government regulations. Therefore, it can be concluded as well that liquid waste processing of poultry slaughterhouse waste in Banjarbaru is necessary before disposing into the environment in order it does not exceed the permitted contamination threshold. One of recommended methods for processing poultry slaughterhouse waste is an adsorption treatment by using activated carbon, which is a continuation of this preliminary research.

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