

# AN ANALYSIS OF LIQUID WASTE PROCESSING AT PUBLIC HEALTH CENTERS IN BENGKULU CITY

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## **Abstract**

*Wastewater is a discharge liquid from households, industries and public places including Health center (public health center). Liquid waste Processing at care public health center in the city of Bengkulu has not been done so that the liquid waste is directly discharged to the receiving water body. Therefore, the researcher was interested in conducting research on Analysis of Liquid Waste Processing at care public health center of Bengkulu City. This research used descriptive method that aim to raise the facts, the circumstances and make a picture about the treatment of liquid waste at the Health Center of Bengkulu City. The samples used were three sources of liquid waste from three public health centers in Bengkulu. The result of the research shows that the Liquid Waste Treatment that already exist in the Health Center of Bengkulu City Municipality has not been processed properly. Level of parameters of COD, BOD on Liquid Waste at Health Center of Bengkulu City 100% did not meet the quality standard of the minister of the environment's regulation Number 05 Year 2014, while the level of parameters of TSS in Liquid Waste in care public health center of Bengkulu City 100% has met the minister of the environment's regulation quality standard. It is suggested to the care public health center to pay more attention to the Liquid Waste Processing well and to improve the condition of the liquid waste duct so that it will not have negative impact to human health and environment, beside that the health center can also increase the skilled and trained sanitarian workforce to monitor the Liquid Waste Processing and budgeting the Routine Fund for the operation and maintenance of Waste Water Treatment Installation in care public health center.*

*Keywords: Liquid Waste Processing, COD, BOD, TSS*

## **Introduction**

According to World Health Organization (WHO) criteria, waste management of hospital is good categorized when the percentage of medical waste is 15%. However, in Indonesia it reaches 23.3%, welds 20.5%, conveyance 72.7% of hospital waste. Research Institute of University of Indonesia in 2013 conducted a study of hospital waste treatment in Maluku Province showed only 53.4% of hospitals that implement liquid waste management and from hospitals that manage the waste 51.1% do with Waste Water Treatment Installation and septic tank. Wastewater quality checks were performed only by 57.5% of hospitals, and from hospitals conducting such examinations have largely inspected and most have met the quality standard requirements.

According to the Decree of the Minister of Health of the Republic of Indonesia Number 1204/MENKES/SK/X/2004 on the requirements of Environmental Health of the Hospital, Hospital wastewater is all waste generated from hospital activities in solid, liquid and gas form, from solid medical waste, non-solid medical wastes, cir wastes, infectious waste, pharmaceutical waste, cytotoxic waste, radioactive waste and waste gas derived from combustion activities in hospitals such as; incinerators, kitchens and cytotoxic drug-making.

There are 20 units of health center in Bengkulu city with details of 17 non-nursing and 3 care (inpatient) health center ie Ratu Agung Health Center, Beringin Raya Health Center and Betungan Health Center (Health Office of Bengkulu City, 2013). Proper waste disposal is fundamental to environmental harmony. This has consequences for the need for hospital waste treatment as part of

the hospital's environmental sanitation activities aimed at protecting the public from the dangers of environmental pollution sourced from hospital waste (Aris Budi Setyawam.2012).

Wastewater is a liquid discharged from households, industries and other public places and usually contains materials or substances that can endanger human life and disrupt environmental sustainability (Aris Budi Setyawam.2012). Similar to hospitals, health center certainly also generates public healthcare wastes obtained from health service activities by the *health center* to the general public. Wastes in health centers can be classified into two types namely liquid waste and solid waste. Liquid waste can be blood, sputum, and reagents from the laboratory, whereas solid waste is divided into two kinds: medical waste including syringes, vaccine bottles, cotton, sputum pots and bandage (bandages) and non-medical waste paper and plastic.

## Research Method

This research is a descriptive research aimed to lift facts, circumstances, phenomena, variables and circumstances that occur when research takes place and present what it is.

## Findings and Discussion

This research was conducted on March 5 to April 4, 2015. The researchers conducted a study by looking directly from the description of liquid waste treatment at three Bengkulu City Care Public Health Centers and the samples of liquid waste was taken in each Health center by using grab sampling and sample examination was done at the Regional Health Laboratory of Bengkulu province to analyze the levels of COD, BOD, and TSS on the Liquid Waste.

Beringin Raya Public Health Center, Ratu Agung Health Center, and Betungan Health Center already have wastewater processing installation (IPAL) but not utilized properly so that the health center has not treated the liquid waste treatment and the liquid waste disposal must be repaired. Factors that make wastewater processing installation does not work are:

- a. The absence of skilled and trained personnel to run the waste water processing installation (IPAL); The staff at the Health center should participate in special training on Liquid Waste Processing to be able to operate IPAL or receive educated personnel such as health of environment.
- b. The absence of training or knowledge transfer from the party making the IPAL to the existing staff at the health center; After the construction of IPAL, the workers must be given knowledge about the procedure of operation of IPAL, then the Health Office should give training and education of sanitarian personnel in the health center so that sanitarian personnel at *Health center* have the ability to process waste water and process the *IPAL*.
- c. Unavailability of routine funds for the operation of the IPAL: To the City Health Office to budget regular funds for the operation and maintenance of IPAL in each *Health center*. Routine funds are separated from routine health funds every year. And routine funds are used for electricity costs, disinfectant purchase costs (chlorine) and other maintenance costs.
- d. The unavailability of IPAL Operational Manual Book so that *Health center* employees cannot know the flow of liquid waste processing process built by the City Health Office; To the executor of IPAL development or the Municipal Health office should be at the completion of IPAL construction, the drawings and the IPAL Book Manual are submitted to the *Health center* where the IPAL is built.

Results of Examination of Parameters Level of BOD, COD, TSS of Liquid Waste at Health centers in Bengkulu City

No.	Parameter	Quality Standard Book of Indonesian Environmental Ministry Regulation Number 05 2014	Assessment Result		
			Beringin Raya Care Public Health Center	Ratu Agung Care Public Health Center	Betungan Care Public Health Center
1.	BOD	50mg/l	1345.5	268.8	795.13
2.	COD	80mg/l	3844.2	768	2271.8
3.	TSS	30mg/l	1.29	0.96	1.37

The table above shows the results of examination of liquid waste of three Health centers in Bengkulu City. They are Beringin Raya Health center with BOD 1345.5 mg / l, COD 3844.2 mg / l, TSS 1.29 mg / l, Ratu Agung Health center with BOD 268.8 mg / l, COD 768 mg / l, TSS 0.96 mg / l, and Betungan Health center with BOD 795.13 mg / l, COD 2271.8 mg / l, and TSS 1.37 mg / l.

Frequency Distribution of BOD Liquid Waste Parameters at health centers in Bengkulu City

Liquid Waste	Frequency	Percentage
Qualified	0	-
Not Qualified	3	100%
Total	3	100%

The table above shows the results of the measurement of liquid waste at the health centers for 100% BOD that are not eligible the parameters.

Frequency Distribution of COD Parameter of Liquid Waste at Health centers in Bengkulu City

Liquid Waste	Frequency	Percentage
Qualified	0	-
Not Qualified	3	100%
Total	3	100%

The table above shows the results of liquid waste measurements health center for COD parameters 100% that are not eligible.

Frequency Distribution of TSS Parameter of Liquid Waste at Health centers in the city of Bengkulu

Liquid Waste	Frequency	Percentage
Qualified	3	100%
Not Qualified	0	0
Total	3	100%

The table above shows the results of liquid waste measurements of Health centers 100% TSS parameters that have been eligible.

### Analysis

Observation on BOD parameter value and linked between samples, then the result of the three samples with the value of Health center Beringin Raya is 1345.5 mg / l, Ratu Agung Health Center 268.8 mg / l, and Betungan Health Center 795.13 mg / l. Has exceeded the permissible threshold

value for waste water quality standard for business/activity of health service facility is 50 mg/l. Biological Oxygen Demand (BOD) is the need for oxygen for some bacteria to decompose all dissolved or partially suspended organic matter in water into a simpler organic material. This value is only the amount of organic material consumed by bacteria. The decomposition of these organic substances occurs naturally. With consuming consumable oxygen makes other biota that need oxygen to be deficient and consequently the biota that needs this oxygen can not live. The higher the BOD number the harder it is for the water creatures that need oxygen to survive.

Observing the result of COD parameter value examination and linked between samples, the COD result from the three samples with the value of Health center Beringin Raya is 3844.2 mg/l, Ratu Agung Health center 768 mg / l, and Betungan Health Center 2271.8 mg / l. It Has exceeded the permissible threshold value for waste water quality standard for health facility / business activity is 80 mg/l. Chemical Oxygen Demand (COD) is the amount of oxygen required to oxidize inorganic and organic substances in wastewater. The COD figure is a measure for water contamination by organic substances and results in reduced oxygen dissolved in water.

Based on observations on TSS parameter values and the relationship between samples, such as the previous BOD and COD measurements, the sample was obtained from the same location with the value of Beringin Raya Health center that is 1.29 mg / l, Ratu Agung Health center 0.96 mg / l, and Betungan Health center 1.37 mg/l . It has fulfilled the standard value of waste water quality for business / activity of health service facility is 30 mg / l. Total Suspended Solid (TSS) is a solid that causes water turbidity, is not soluble and can not be directly settled, consisting of particles of size or weight smaller than the sediment.

The value of BOD content, COD and TSS of wastewater after examination from three health centers were BOD 1345.5 mg / l, COD 3844.2 mg / l, TSS 1.29 mg / l, Health center Ratu Agung BOD 268.8 mg / l, COD 768 mg / l, TSS 0.96 mg / l, and Health center Betungan parameters BOD 2271.8 mg / l, COD 2271.8 mg / l, TSS 1.37 mg / l. Where obtained values that have met the quality standards of the three health center care are TSS parameters with values below 30 mg / l in accordance with the quality standard according to Ministerial Decree of RI Environment Number 05 Year 2014.

This research is in line with Aris Budi Setyawam (2012) entitled "Evaluation of Hospital Liquid Waste Processing with Natural Bio System at Kelet Jepara General Hospital". where the results of examination of COD levels, BOD does not meet the quality standards.

## **Conclusions**

Based on the results of research and discussion on the analysis of Liquid Waste Processing at Health Centers of Bengkulu City, the results are obtained:

1. Liquid Waste Processing Installation (IPAL) that already exist in Health centers inBengkulu city has not done well.
2. The parameters of BOD, COD in Liquid Waste at Health Centers of Bengkulu City 100% did not meet the minister of the environment's regulation (PERMEN LH RI) quality standard. 05 Year 2014 while the level of parameters of TSS in Liquid Waste in Health Center of Bengkulu City 100% has met the quality standard of PERMEN LH RI. 05 Year 2014.

## **Suggestions**

Based on the results of research and discussion, researchers want to provide suggestions to some related parties, among others:

1. For the Health centersInstitution

The Care Public Health Center (*Health center Perawatan*) is suggested to pay more attention to Liquid Waste Processing and to improve the condition of liquid waste duck so it has not negative impact to human health and environment. Beside that the health center also can add skilled and trained sanitarian labor to monitor Liquid Waste Processing and budgeting Routine Fund for the operation and maintenance of wastewater processing installation in Health center.

## 2. For the Academy

The academy can add library reference and can give information and knowledge about liquid waste processing and qualified waste water quality standard according to the rules of environmental ministry of Indonesian Republic (PERMEN LH RI. 05 Year 2014).

## 3. For Other Researchers

This study will be an information material to conduct further research on the processing of liquid waste that meets the requirements according to the rules of environmental ministry of Indonesian Republic (PERMEN LH RI. 05 Year 2014) by adding some parameters such as ammonia (NH<sub>3</sub>), phosphate (PO<sub>4</sub>), oils and fats.

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## Biography



Haidina Ali was born on October 06<sup>st</sup> 1976 in Sukarami Village Bengkulu Selatan. He earned His Bachelor's degree in North Sumatrera Utara University in 2002. After the graduation, he is involved of health polytechnic of the health ministry of Bengkulu.

After presenting his Journal about an Analysis of Liquid Waste Processing at Health centersin Bengkulu City.Haidina Ali a Lecturermajoring in Environmental Health Polytechnic Bengkulu.