Efficiency Comparison of Conventional Septic Tank and Septic Tank Modification In Reduce Level Of Bod, TSS coliform and Household Waste

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Abstract

Background. Septic tanks that are commonly used in the community are conventional septic tanks. The use of this septic tank is still not optimal because the processing efficiency has only reached 65%, causing only 22.5% of the total organic pollutants that can be processed (Said, 2005). In addition, low efficiency causes rapid accumulation of sludge which reduces the service life of the septic tank. Aim. This study aims to determine the differences in the efficiency of conventional septic tanks and modified septic tanks in reducing levels of BOD, TSS, and Coliform in household wastewater. Method. This research is an experimental study using a one group pretest-posttest research design. Results. The results showed that conventional septic tanks were not efficient in reducing BOD (-38.21%) and Coliform (0%), as well as very small efficiency in reducing TSS content (5.09%) in wastewater, modified septic tanks had little efficiency for reducing BOD content (2.4%), but it is very efficient for reducing TSS content (89.44%) and inefficiency to reduce coliform content (0%) in wastewater. Conclusion. There was no significant efficiency difference between conventional septic tanks and modified septic tanks in reducing BOD and Coliform content, but there were significant efficiency differences between conventional septic tanks and modified septic tanks in reducing TSS content in the wastewater.

Keywords: Septic Tank, TSS and Coliform BOD levels, Household waste

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INTRODUCTION

Increasing population growth has an impact on increasing human activity. But the increase inactivity population is often not followed by improved environmental sanitation. Antara (2008) states that Indonesia is a country with the third worst domestic wastewater management sanitation system in Southeast Asia after Laos and Myanmar.

At present, the use of septic tanks is always considered the best solution in dealing with household wastewater problems. The septic tank (septictank) is an underground tank used for the deposition of domestic / household waste. However, many results of research suggest that septic tanks (septictank) are one of the causes of groundwater pollution in densely populated areas. If groundwater has been contaminated, it will have a negative impact on public health.

Septic tanks that are commonly used in the community are conventional septic tanks. The use of this septic tank is still not optimal because the new processing efficiency reaches 65%, causing only 22.5% of the total organic pollutants to be processed (Said, 2005). The mud quickly reduces the service life of the septic tank.

the use of conventional septic tanks is actually not suitable for use in densely populated cities. Especially for a very simple house with a narrow yard, it is impossible to build a conventional septic tank that meets the requirements in each house.

METHODS AND MATERIALS

Type of research is an experimental study using the one group pre-test post test design to determine the difference in efficiency of conventional septic tanks and modified septic tanks in reducing levels of BOD, TSS and Coliform in household wastewater. The method of collecting data on the manufacture of conventional septic tanks is made in market sizes of glass material while still following the guidelines for making actual septic tanks, collection of waste water for research objects is collected from households. The waste is a mixture of black water and gray water, conducting research.

RESULTS

This research was conducted in the workshop of the Kupang Polytechnic Health Department. The source of raw waste comes from domestic waste from households that are usually processed in septic tank houses. The use of this type of waste is intended to test the tool really close to the real condition. The results of the study can be seen in the following table:
Table 4.1
Average Content of Parameters of BOD, TSS and Coliform on Raw Waste, Results of Conventional Septic Tank Processing and Septic Tank Modified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limbah Baku</th>
<th>Septik Tank Konvesional</th>
<th>Septik Tank Modifikasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>523,94 ppm</td>
<td>724,18 ppm</td>
<td>511,32 ppm</td>
</tr>
<tr>
<td>TSS</td>
<td>583 ppm</td>
<td>559 ppm</td>
<td>62,2 ppm</td>
</tr>
<tr>
<td>Coliform</td>
<td>120000 koloni</td>
<td>120000 koloni</td>
<td>120000 koloni</td>
</tr>
</tbody>
</table>

Table 4.1 shows that in the BOD parameter there was an increase in the average concentration of the waste before being processed ie 523.94 ppm in raw waste into 724.18 ppm in conventional septic tanks and a slight decrease in concentration to 511.32 ppm in modified septic tanks.

Table 4.2
Average Efficiency of Conventional Septic Tanks and Modified Septic Tanks in Reducing BOD, TSS and Coliform Waste water

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Septik Tank Konvensional</th>
<th>Septik Tank Modifikasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>-38,21%</td>
<td>2,4%</td>
</tr>
<tr>
<td>TSS</td>
<td>5,09%</td>
<td>89,44%</td>
</tr>
<tr>
<td>Coliform</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 4.2 shows that in this study conventional septic tanks were not efisein in reducing the content of BOD (-38.21%) and Coliform (0%), and very small efficiency in reducing TSS content (5.09%) in water waste. Whereas modified septic tanks have little efficiency to reduce BOD content (2.4%) but are very efficient for reducing TSS content (89.44%) and inefficient to reduce coliform content (0%) in wastewater.

DISCUSSION
Waste liquid becomes a serious problem to be discussed at this time. This is because almost every human activity produces liquid waste. One of the biggest sources of waste production is households. This is serious because almost all household waste, especially in Indonesia, is not managed properly and properly, which results in increases in pollution of water sources and the surrounding environment.
The results of the study based on visual observations show that the ability of conventional septic tanks to treat wastewater and reduce the content of pollutant parameters is very small. This can be seen from the physical appearance of waste which is almost the same in terms of color, odor, although it is somewhat different in terms of turbidity. This is possible because the conventional tank only undergoes a deposition process. Even if there is a process of decay by bacteria, that is only done by bacteria that live suspended in the waste. This is certainly very small in efficiency.

The results of this visual observation are in line with the results of laboratory tests where the BOD content actually increased by 38% after being treated with conventional septic tanks. Conventional septic tanks also have very little efficiency to reduce TSS content and are not efficient in reducing coliform. Regarding the incidence of increasing BOD levels in this study, although it was strange and out of the ordinary, it can be assumed that this incident was caused by the addition of chicken stomach as a source of waste processing bacteria into the septic tank.

In the modified tank, the results of visual observations show that there is a significant difference in quality between the raw waste previously treated with waste from modified tank processing.

The results of this study go straight with the theory which states that in modified septic tanks, the incoming wastewater is not only deposited but also degraded by microorganisms that attach to contact media (biofilms) (Mara, 2003). At a glance, there is no noticeable difference in the efficacy between conventional septic tanks and modified septic tanks in reducing BOD and Coliform levels in wastewater. This can be seen from the increase in BOD content in waste after being treated with conventional septic tanks and very small decreases in BOD content in modified septic tank processing. However, if you look carefully, it can be seen that there is a 40.6% efficiency difference between conventional septic tanks and modified septic tanks in reducing BOD content. Where after being given chicken belly, the BOD number in conventional septic tanks becomes larger than the raw waste, but in modified septic tanks, the BOD number continues to decline even though it is very small.

CONCLUSIONS AND SUGGESTIONS

Based on the results of this study, it can be concluded several things, namely the conventional septic tank is not efficient in reducing the BOD content (-38.21%) and Coliform (0%), and very low efficiency in reducing TSS content (5.09%) in wastewater, modified septic tanks have little efficiency to reduce BOD content (2.4%), but are very efficient for reducing TSS content (89.44%) and inefficient to reduce coliform (0%) in wastewater, There was no significant efficiency difference between
conventional septic tanks and modified septic tanks in reducing BOD and Coliform content, but there were significant efficiency differences between conventional septic tanks and modified septic tanks in reducing TSS content in wastewater.

REFERENCES