

Effectiveness of Septic Tanks Floating in Reducing COD, TSS, Temperature and pH of Waste Water Black

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Abstract

Sanitation is the provision of facilities and services for disposal of human waste such as urine and feces. To reduce diseases arising from poor environmental sanitation, efficient technology that can be utilized by communities in coastal areas and small islands is one of the facilities what is needed for access to sanitation is a septic tank. This study aims to determine the sanitary conditions of communities in coastal areas and small islands and to determine the effectiveness of appropriate technology for floating septic tanks in coastal areas and small islands. The quality of wastewater that is important to know is Total Suspended Solid (TSS), Chemical Oxygen Demand (COD), Temperature and Hydrogen Power (pH).

Keywords: *Effectiveness; Septic Tanks; Floating; Coastal; Small Islands.*

Introduction

Sanitation is a public health effort that focuses on supervision of various environmental factors that affect the degree of human health, so it prioritizes efforts to prevent various environmental factors so that the emergence of disease can be avoided.¹ Sanitation is also a process to maintain a clean and hygienic place, especially the availability of clean water, solid and liquid sewage systems.²

People living in coastal areas and small islands everyday life they are exposed to health risks, among others, the lack of availability of clean water.³ Human behavior in using latrines and adapting to the environment is one of the factors in shaping the culture of society.² Healthy water is a necessity for people on this planet. This includes people who live on the coast and on small islands. People on the coast and small islands, however, find healthy water very difficult to find because of limited

water resources. In addition, available surface water also appears to have been polluted by domestic wastewater.⁴ Water quality has a direct effect on health, given the nature of water which is easily contaminated by various microorganisms and easily dissolves various materials.⁵ The nature of such conditions is very easy to function as a medium for distribution or spread of disease. There are several diseases that fall into the category of water borne disease, or diseases carried by water. While the types of microbes that can spread through water are quite a lot including bacteria, protozoa and metazoan.⁶

Based on the results of laboratory tests conducted on cutlery samples, it was found that all samples contained bacteria. This is caused by several factors that cause the presence of germs (bacteria) in eating utensils, namely the quality of washing water.⁷ Well water on these small islands is vulnerable to contamination, especially on small islands and densely populated areas where the limited availability of land prevents people from building standard septic tanks.⁴

The impact of waste disposal is not only for humans but also for biota in marine waters, aquatic ecosystems are being degraded by anthropogenic pollution on a global scale.⁸ Such as Hg concentration in mackerel. Hg concentration in mackerel is 1.346 mg/kg while blood clams range from 0.772 to 3.111 mg/kg.⁹

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It is important to evaluate the level of groundwater threats posed by the on-site system and review the strategies available to limit further groundwater degradation.¹⁰ To minimize the occurrence of contamination of water in the area of small islands and coastal areas, it is necessary to treat domestic wastewater before being discharged into water bodies, one of which is the re-engineering of septic tanks with an appropriate technology approach. Septic Tank Engineering with the appropriate technology approach is an urgent need to address the problem.¹¹ A septic tank that is commonly used in the community is a conventional septic tank. However, the use of septic tanks 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.¹²

The quality of wastewater that is important to know is Total Suspended Solid (TSS), Chemical Oxygen Demand (COD) and Hydrogen Power (pH). The level of treatment carried out before the waste is discharged into water can contain organic and inorganic materials which are generally measured by parameters, COD, TSS and others.¹³ COD describes the total amount of oxygen needed to chemically oxidize organic material, both biodegradable and biodegradable (non-biodegradable) biodegradable to CO₂ and H₂O. The results of COD research in waters in the upstream, middle and downstream successively value is 62.176 mg/l; 69.176 mg/l and 64.48 mg/l. COD values in uncontaminated waters are usually less than 20 mg/l, whereas in polluted waters can be more than 200 mg/l. pH indicates the need for pretreatment to prevent interference with conventional wastewater treatment processes.¹⁴

Method and Materials

This research was carried out on the coast and

small islands. This type of research is descriptive research based on the quality standards set in PUPR PERMEN No. 4 of 2017 which refers to the planning of the building under the septic tank according to the Indonesian National Standard (SNI).

Floating septic tank prototype planning includes, the criteria for planning a black water effluent treatment tank consisting of two parts. Based on the source of waste, the first tub is a reservoir of waste water from the toilet. Solid and liquid waste that enters through a small pipe that enters tub 1 and is station 1 (inlet). Station 1 is connected to the goose neck closet from the household toilet will be decomposed in tub 1 which is station 2 at the top. This section is where the aerobic process takes place and the middle is the path and the bottom part is where the anaerobic process occurs. During crossing at station 2, the waste will decompose into gas, water and mineral mud with a breakdown time of at least 3 days. Station 2 is like two connected by a tub 1 by using pipe model of T.

The top part of the tub is where the aerobic process takes place, the middle part is the path and the bottom part is where the anaerobic process takes place. During crossing the tub, waste will decompose into gas, water and mineral mud.

At outlet or station 3 is part of the outermost pipe or large pipe is a pipe overflow. A waste quality inspection sample will be conducted at the outlet. One of the factors that become a balance in choosing the type of floating septic tank is the limited land.

Septic tank design is made by utilizing a drum with a volume of around 200 liters, which is equipped with pipes and pipe accessories for complementary components and design improvements (Figure 1).

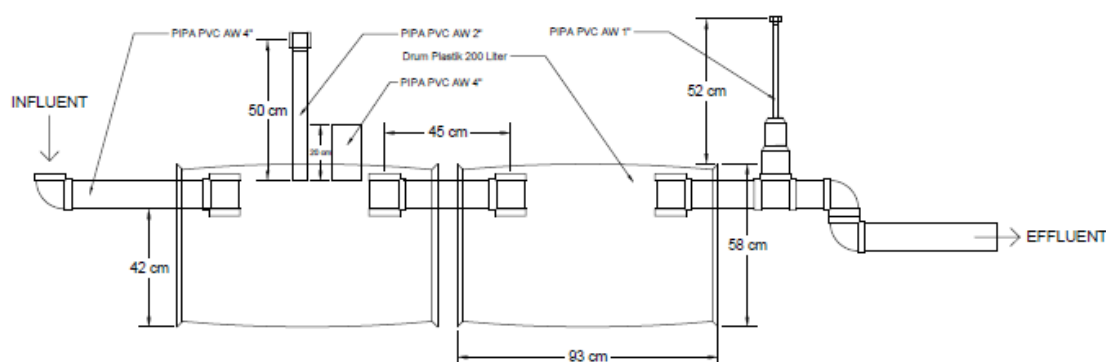


Figure 1. Floating Tank Septic Tool Design

Characterization in waste management from biological, physical, chemical and fluorescence types is combined with information about the system, design, tank type, tank management and number of users. From various studies that have been conducted several biological characterizations show that the total concentrations of coliform and Escherichia coli (E. coli) are: 103-108 and 103-107 MPN/100 mL.¹⁵

Other research results also provide new quantitative evidence that septic tanks are a real problem for water quality in coastal areas during ecologically sensitive periods, especially where waste is discharged directly into the flow network.¹⁶

Results and Discussion

From the results of interviews with people in the research area, the level of public knowledge about waste treatment, especially liquid waste, is still very low (Table 1). The survey found that 85% of the residents directly disposed of domestic liquid waste directly into water bodies and 15% were channeled into drainage. Based on the level of knowledge and habits of the community, using the instrument ask respondents about the need for fulfilling clean water that is used daily.

Table 1. Survey Results Based on Clean Water Sources.

Indicator	PDAM/ Gallon	Groundwater (Well)
Clean Water Source	44%	64%
Drinking/cooking water sources	88%	12%
Water Source for Washing/Bathing	25%	75%

The condition of community houses still does not meet these health requirements because of land limitations and the economic conditions of the community. Most people work as fishermen and scavengers used goods. The lack of sanitation in the community greatly influences the emergence of various diseases caused by the environment such as diarrhea and skin diseases.

For defecation, most residents make facilities without septic or directly discharged into water bodies. At low tide the dirt will stay and become a place to fly flies, dirt will disappear at high tide.

To reduce the risk of diseases arising from community sanitation conditions that are still lacking

in need of good handling include the procurement of integrated waste treatment facilities that can be used by all local communities (Table 2).

Table 2. Types of Diseases Often Affected in the Community

Diseases Often Experienced by Communities	Diarrhea	Skin disease	Fever
Percentage of respondents	45%	36%	19%

Table 3. Survey Results of Domestic Liquid Waste Management in the Study Area

Type of Liquid Waste	Disposed of directly into water bodies	Streamed Through Drainage/Septic Tanks
Gray Water	75%	25%
Black Water	70%	30%

The results of waste management are still very lacking, this is due to lack of public awareness, land conditions and inadequate facilities of the waste management system (Table 3).

One of the main threats to groundwater and surface water quality is the impact of poorly designed, constructed or maintained wastewater treatment systems.⁵ Sources of pollutants originating from septic tanks are recognized as significant contributors to pathogen flow and nutrient loads, but there is little research data in the UK that assesses the potential risks posed by septic tank effluents (STE) on water, human and health quality.¹⁵ In recent years, the potential for groundwater pollution from septic systems on site has emerged as a serious problem in the United States.¹⁰

Conclusions

From the results of research on obesity that has been carried out the sanitary conditions of communities in coastal areas and small islands are still very lacking so that diseases arising from the environment are still very high, waste management with floating septic tanks in the management of domestic black water waste is effectively used, the levels of the parameters COD, TSS, temperature and pH are safe to dispose of into water bodies. Environmental management and appropriate technology is needed to minimize the occurrence of environmental pollution due to direct disposal of waste into water bodies.

Ethical Clearance: No ethical approval is needed.

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Conflict of Interest: Nil

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