



Content of E.Coli, Coliform and Iron (Fe) Bacteria with A Refill Drinking Water Treatment System in Tinggimoncong District

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Abstract

Drinking water is water that has gone through a processing process or without a processing process that meets health requirements and can be drunk directly. Drinking water is safe for health if it meets the Physical, Microbiological, Chemical and Radioactive requirements contained in the mandatory parameters and additional parameters. The purpose of this study was to determine the content of E.coli, Coliform and Iron (Fe) Bacteria with a Refill Drinking Water Treatment System in Tinggimoncong District. This type of research is quantitative research with a descriptive approach, namely the type of research used to analyze data by describing or describing the data that has been collected as it is. This sampling technique is total sampling. This research was conducted on August 12-13 2022. The sample in this study was refill drinking water in Tinggimoncong District. In examining the laboratory test, the researcher used the Sanitarian Kit. Drinking water samples were taken from 11 drinking water depots spread across Tinggimoncong District. The results of this study indicated that of the 11 samples of drinking water that did not contain E.coli, and 7 samples of drinking water that contained coliform, 11 samples contained iron (Fe) according to the permissible levels and 4 samples of drinking water were free of microbiological and chemical content. From the results of this study, it is suggested that the Health Service and Community Health Centers improve supervision of the quality of DAMIU not only checking the quality of AMIU but also the feasibility of DAM and PHBS of employees and DAMIU quality is not only checked on processed products but on DAMIU that is ready to be distributed because contamination can occur during packaging.

Keywords: E.coli, Coliform, Besi(Fe), DAMIU.

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1. Introduction

Water is a part of human life, water is nothing new and no life on this earth can take place without water for the life of everyday living things such as for drinking, cooking and washing water for people who rely more on water from drilled wells and PDAMs, rivers, and If this water source is not close and cannot be accessed, there are many ways to get water, so water is considered as a necessity in human life. Water is used for the growth process of the human body. Experts point out that the human body is mainly composed of water, and the rest consists of solid substances such as flesh and bones. Water content in the body is about 70% of body weight, 75% in the brain, 75% in the heart, 86% in the lungs, 86% in the liver, 83% in the kidneys, 75% in the muscles, and about 75% in the blood. (Suparman, 2006).

Water must comply with water quality standards set by the state or region so that it interferes with health for the purposes of protecting and utilizing water in the country or region concerned. To determine the level of water quality, an analysis is carried out in the laboratory on the physical, chemical and bacteriological parameters according to standards. Water quality can be grouped into several groups, namely:

- a) Water that is used as drinking water directly without prior treatment is called Class A water.
- b) Water that is used as raw water, drinking water that must be treated before drinking is called Group B water.
- c) Water used for fishery and animal husbandry purposes is called Class C water.
- d) Water used for business agriculture, urban, industrial, and hydroelectric purposes is called Group D

As a result of water quality that is not in accordance with the regulations, there will be health problems in humans and aesthetic problems.

Refill drinking water depot (DAMIU) is a business that processes raw water into drinking water in bulk form and sells directly to consumers. The water treatment process in principle must be able to remove all types of pollutants, both physical, chemical and microbiological. Refill drinking water depots (DAMIU) must guarantee quality standards or quality requirements for drinking water according to statutory provisions and meet sanitation hygiene requirements in drinking water management (Ministry of Health of the Republic of Indonesia, 2014).





2. Research Method

This research is a quantitative research with a descriptive approach, namely the type of research used to analyze data by describing or describing the data that has been collected as it is. Researchers conducted observations (surveys) and tested the content of E.coli, Coliform Bacteria and Iron (Fe) content in refill drinking water at depots in the Tinggimoncong District area.

3. Results And Discussions

a. Result

1) Filtration Observation Results (Treatment System) on Refill Drinking Water in Tinggimoncong District

Table 1
Results of Filtration Observations (Treatment System) on Refill Drinking Water in Tinggimoncong District

No	Drinking Water Depot	Observation Results		Information
		It works	Does not work	
1	A	√		Qualify
2	B	√		Qualify
3	C	√		Qualify
4	D	√		Qualify
5	E	√		Qualify
6	F		√	Qualify
7	G		√	Qualify
8	H		√	Qualify
9	I	√		Qualify
10	J	√		Qualify
11	K	√		Qualify

Source: Primary Data 2022

Based on table 1, the results of observations on the filtration facilities in the processing system carried out by the testers showed that 3 DAMIU of the filtration facilities were not functioning and 8 DAMIU of the filtration facilities were functioning properly.

2) Observation Results of Disinfection (Treatment System) on Refill Drinking Water in Tinggimoncong District

Table 2
Results of Observation of Disinfection (Treatment System) on Refill





Drinking Water in Tinggimoncong District

No	Drinking Water Depot	Observation Results		Information
		It Work	Does not work	
1	A	√		Qualify
2	B		√	Not eligible
3	C		√	Not eligible
4	D		√	Not eligible
5	E		√	Not eligible
6	F	√		Qualify
7	G	√		Qualify
8	H	√		Qualify
9	I	√		Qualify
10	J	√		Qualify
11	K	√		Qualify

Source: Primary Data 2022

Based on table 2, the results of disinfection observations in the processing system carried out by the testers showed that 4 DAMIUs did not function as disinfection facilities and 7 DAMIUs functioned properly.

3) Observation Results of Filling Process (Processing System) on Refill Drinking Water in Tinggimoncong District

Table 3

Observation Results of Filling Process (Treatment System) on Refill Drinking Water in Tinggimoncong District

No	Drinking Water Depot	Rinsing	Observation Results			Information
			Washing	Filling water Closing	Rinsing Washing Filling water Closing	
1	A	√	√	√	√	Qualify
2	B	√	√	√	√	Qualify
3	C	√	√	√	√	Qualify
4	D	√	√	√	√	Qualify
5	E	√	√	√	√	Qualify
6	F	√	√	-	√	Not eligible





7	G	√	√	-	√	Not eligible
8	H	√	√	-	√	Not eligible
9	I	√	√	√	√	Qualify
10	J	√	√	√	√	Qualify
11	K	√	√	√	√	Qualify

Source: Primary Data 2022

Based on table 3, the observation results of the filling process in the treatment system carried out by the testers showed that 3 DAMIU did not carry out the procedure for filling water and 8 DAMIU implemented the steps for the filling process according to the procedure. This research was conducted at the Tinggimoncong Health Center's Environmental Health Laboratory on August 12, 2022. This study used drinking water from 11 drinking water depots spread across Tinggimoncong District as a research sample which used raw water from springs and PDAM. This research was conducted by taking water samples that had been processed and ready to be distributed to consumers, then examined for the presence of E.coli, Coliform and Iron (Fe) bacteria.

b. Discussion

1. Based on the results of the interviews in table 1 Observation Results of Filtration (Treatment System) at 11 drinking water depots refill water that goes through a gradual filtering process consisting of filters derived from sand or other effective materials with the same function, the materials used are silica grains of at least 80% which function to filter coarse particles. Activated carbon filter derived from coal or coconut shells which functions as an absorbent for odor, taste, color, residual chlorine and organic matter. The last filter is a filter that functions as a fine filter with a maximum size of 10 microns, the observation results obtained 3 DAMIU (F,G,H) do not function properly filtration this is due to the infrequency of owners and employees changing and maintaining materials and water filters in the depot.
2. 2. And in table 2 Observation results of disinfection (Treatment System) this process is carried out by Ozonation and UV light in 11 refill drinking water depots after being observed 7 DAMIU with properly functioning disinfection facilities and 4 DAMIU (B, C, D, E) the disinfection facility is not functioning properly / the disinfection tool is damaged which is indicated by the water that comes out after the filling process is not hot and the UV lamp also does not emit light and was last treated several years ago.





3. In table 3 the results of observations on the filling process at 11 DAMIU according to the procedure from rinsing to closing according to the results of observations of DAMIU and the results of interviews with depot owners, the depot owner explains the process of processing Refill Drinking Water through several stages until the water is ready to be distributed to consumer. Before being processed, raw water is collected in tanks or storage tanks that are free from materials that can contaminate water.), this is due to the high demand for water from consumers so that employees feel tired and take steps to use a hose, and these employees do not know the procedures and dangers of using the hose.

4. Conclusion

Based on the results of research and discussion it can be concluded as follows:

1. Results of laboratory tests conducted at the Environmental Health Laboratory of the Tinggimoncong Health Center from 11 drinking water samples did not contain E.coli bacteria
2. Results of laboratory tests that have been carried out at the Environmental Health Laboratory of the Tinggimoncong Health Center from 11 drinking water samples, 7 samples containing Coliform Bacteria.
3. Results of laboratory tests that have been carried out at the Environmental Health Laboratory of the Tinggimoncong Health Center from 11 samples of drinking water containing Iron (Fe) according to the permissible level of <0.3 mg/l.
4. Observation results at the refill drinking water depot in the Tinggimoncong sub-district during the processing process, namely filtration at 3 DAMIU did not work, disinfection at 4 DAMIU did not work and the filling process at 3 DAMIU did not carry out according to the procedure.

5. Compliance with ethical standards

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Disclosure of conflict of interest

This research collaboration is a positive thing for all researchers so that conflicts, problems and others are absolutely no problem for all writers.

Statement of informed consent

Every action we take as authors is a mutual agreement or consent.





References

1. Anggraeni D.M, S. (2013). Qualitative and Quantitative Research Methodology in the Health Sector. In Nuha Medika. Yogyakarta.
2. Dewanti, H. (2005). Drinking Water Sanitation and Safety Indicator Bacteria. IPB. Bogor.
3. Entjang. (2000). Public Health Sciences. Bandung: PT. Image Aditya Bakti.
4. Jawetz. (2007). Medical Microbiology (Medical Microbiology). Edition 23. Jakarta.
5. Ministry of Health of the Republic of Indonesia. (2019). HSP E-Monev.
6. The Kacaribu Group. (2008). The content of zinc (Zn) and iron (Fe) levels in drinking water from the Sibolangit Mountain Water Refill Drinking Water Depot in Medan City. Medan
7. Minister of Health of the Republic of Indonesia. (2014). Drinking Water Depot Sanitation Hygiene.
8. Maulana Malik Ibrahim, 39(1), 1–15. <http://dx.doi.org/10.1016/j.biochi.2015.03.025%0A>.
9. Minister of Health of the Republic of Indonesia. (2010). Regulation of the Minister of Health of the Republic of Indonesia Number 492/Menkes/Per/IV/2010 Concerning Drinking Water Quality Requirements. In Regulation of the Minister of Health of the Republic of Indonesia (p. MENKES).
10. Nurcahyo. (2007). Deficiency and Excess of Iron.
11. Pelczar. (2005). Fundamentals of Microbiology. University of Indonesia Press.
12. Pracoyo. (2006). Refill Drinking Water Bacteriology Research in Jabodetabek Area. The Mirror of the World of Medicine, Vol. 15 (2, 37–40).
13. Ancient. (2011). Implementation of Hygiene Sanitation Depot in Medan Johor District.
14. Sembiring FY. (2008). Management of Environmental Sanitation Monitoring and Bacteriological Quality at Refill Drinking Water Depots. Batam city. USU.
15. Soekidjo Notoatmodjo. (2002). Health Research Methodology.
16. Sugiyono. (2008). Quantitative Qualitative Research Methods and R&D. London: ALPHABETA.
17. Suharsimi, A. (2002). Research Procedures: A Practice Approach. Jakarta: Rineka Cipta.
18. Superman. (2006). Traditional Water Purification System. In Azka Press.
19. Todar. Kenneth. (2008). Intestinal Diseases Caused by E. Coli.
20. Yum. (2009). Most of the refilled drinking water is polluted by coliform bacteria.

