MUKHTABAR
JOURNAL OF MEDICAL LABORATORY TECHNOLOGY

VOLUME 1 (1), 2023, 1-5 | RESEARCH ARTICLE

Identification Coliform Bacteria In Student Drinking Water In The Al-Mu'aawanah Boarding School, District Rajadesa, Ciamis District

Undang Ruhimat[1*], Rivana Ariyadi[1], Rahayu Nirmatul[1], Fatna Agnianisa Salsabila[1]

[1] Diploma Medical Laboratory Technology, STIKes Muhammadiyah Ciamis, West Jawa, Indonesia
*Corresponding author : undangruhimat29@gmail.com

SUBMITTED 24 Februay 2023 **REVISED** 17 March 2023 **ACEEPTED** 14 April 2023

ABSTRACT

Background & Objective: Drinking water is a very important human need. Drinking water that is suitable for consumption must meet established standards, among others, according to the Minister of Health of the Republic of Indonesia No.492/Menkes/IV/2010. This study aims to determine the presence or absence of coliform bacteria in the drinking water of students using the Most Probable Number method.
Methods: This type of research is descriptive. The sampling was carried out at the Al-Mu'aawanah Islamic boarding school.
Result : The results showed that the samples of drinking water for male and female students for microbiological parameters showed that the samples were positive for coliform bacteria. The sample for female students was 22/100 mL, and the sample for male students was 2 MPN/100 ml. Based on Permenkes No.472/Menkes/IV/2010, the maximum total concentration of coliform bacteria is 0 MPN/100 ml, which means that it is not in accordance with the standards of Permenkes No.472/Menkes/IV/2010, and the growth of fecal coliform bacteria was found in Eosin Methylene Blue media in both samples.
Conclusion : Namely the metallic green *Escherichia coli bacteria*, this indicates that the sample does not meet the microbiological requirements of drinking water.

Keywords: Coliform; MPN; drinking water.

Introduction

Drinking water is the most important human need. The water content in the human body can reach 68%. To still be able survive each person 2.1 liters to 2.8 liters per day depending on the activity of organisms in the water there are very living things determine the characteristics of the water, both chemically, physically, and microbiology (Agustina, 2021).

According to the Regulation of the Minister of Health of the Republic of Indonesia

(Permenkes RI) No.492/Menkes/Per/IV/2010 concerning Quality of Drinking Water stated that Drinking water must meet physical, chemical and health requirements microbiology. Drinking water consumed is categorized as good if meet the requirements of physical quality, namely not cloudy, colorless, taste fresh, clear, not frothy, and odorless. Deep water chemistry Neutral pH, does not contain toxic chemicals, does not contain salt, or metal ions and does not contain organic matter. Microbiological requirements does not contain pathogenic and non-pathogenic bacteria (Alifia & Aji, 2021).

Maximum microbiological requirements for allowable microbial contamination The quality of drinking water is based on its microbiological quality, namely total bacteria coliform maximum 0 colonies/g (per 100 ml sample) and total bacteria Maximum *Eschericia coli* 0 colonies/g (per 100 ml sample) . The higher the level of pollution coliform bacteria, the higher the risk of the presence of these bacteria other pathogens that commonly live in human and animal feces. One of examples of pathogenic bacteria that may be present in contaminated water feces of humans or warm-blooded animals are *Escherichia coli* bacteria, are microbes that cause symptoms of diarrhea, fever, stomach cramps, and vomiting (Casmitun et al., 2020).

Data from the World Health Organization (WHO), approximately one third The world's population suffers from various water-borne diseases drink contaminated with microorganisms. Annually around 13 million people die from infections originating from drinking water, 2 million including infants and children. Consume water contaminated by pathogenic microorganisms, either drinking water or drinking water added to food, can cause various diseases gastroenteritis such as vomiting (Rahayu & Gumilar, 2017).

Based on the description above, it is very important to identify the presence of coliform bacteria in the drinking water of students to prevent the occurrence re-contamination of pathogenic bacteria in some students, so researchers conducting research related to "Identification of Coliform bacteria in drinking water students at the Al-Mu'aawanah Islamic boarding school, Rajadesa District, Regency Nice".

Objective

This research is to know there is no coliform bacteria in students' drinking water.

Method

This research method uses a descriptive method, namely research conducted to observe the presence of coliform bacteria in source of drinking water for students at the Al-Mu'aawanah Islamic Boarding School, District Rajadesa, Ciamis Regency. The population in this study the object under study was drinking water at the Al-Mu'aawanah Islamic boarding school, Rajadesa District, Regency Ciamis. The sample was carried out by taking samples of drinking water from male and female students. Processing and analysis of data obtained from the results of the examination of coliform bacteria in the drinking water of the students are presented in tabular form and explained in a narrative manner.

Processing and analysis of data obtained from the results of examining coliform bacteria in students' drinking water is presented in tabular form and explained narratively. ethics of this research the researcher asked permission first to the office of political nation unity (Kesbangpol) Ciamis district through a letter of introduction approved by the head of STIKes Muhammadiyah Ciamis to do research. The

researcher asked permission from the district Rajadesa and the chairman of the Al-Mu'aawanah Islamic boarding school via letter from Kesbangpol to conduct research. And researchers asked permission to the boarding school for its willingness to become the object of research, after obtain approval and obtain permission to conduct research, researchers provide information about the purpose, why choose water samples drinking at the Islamic boarding school, also explained the procedures or procedures sampling and explaining the benefits for Islamic boarding schools and secrecy of the boarding school. The location of the water sample was carried out at the Al-Mu'aawanah Islamic boarding school, Rajadesa District, Ciamis Regency, and when the researcher asked permission from the boarding school, and given an explanation of the purpose research, why was selected as a sample, procedures or procedures, the benefits of data confidentiality research and research conducted in January until June 2022.

Results

TABLE 1. Preliminary test results on Lactose Broth Media at 40°C for 24 hours

No	Code Sampel	Total germ index			
		5x10mL		1x1mL	1x0,1mL
1	A	g+ g+ g+ g+ g+		g+	g -
2	B	g+ g+ g+ g+ g+		g -	g -

Table 1 above is if it shows growth Lactose fermenting bacteria are characterized by the formation of gas in the tube durham, from a positive gas result, proceed to the confirmation test with BGLB media at 40°C for 24 hours to burn whether the fermentation and gas formation in the initial test is caused by lactose fermenting bacteria.

TABLE 2. Affirmation test results on BGLB Media at 40°C for 24 hours

No	Code Sampel	Total germ index				MPN/ 100mL sampel
		5x10mL		1x1 mL	1x0, 1mL	
1	A	g+ g+ g+ g+ g+		g+	g -	22 MPN/ 100ml
2	B	g+ g+ g+ g+ g+		g -	g -	2 MPN/ 100ml

Table 2. is the interpretation of the results that there is growth Coliform bacteria on BGLB media which produce gas in the tube durham.

TABLE 3. Complementary test results on EMB Media at 37°C for 24 hours

No	Observation Results of Coliform Bacteria Strengthening Test	+/-
1	A (2a,5a)	+
2	B (5a)	+

Table 3 is the interpretation of the results that fecal coliform is characterized with metallic green results on EMB media.
+ : Positive results on EMB media caused by microbes that can ferment lactose
- : Negative results on EMB media caused by microbes that cannot ferment lactose
Information:
Sample code A: Drinking water for female students.
Sample code B: Drinking water for male students.

Discussion

Based on the results obtained using the MPN formula according to Thomas Formula, 2

male and female santri drinking water samples showed results with a value of 5 MPN/ 100 mL (male students) and 22 MPN /100 mL (female students) which means that they do not meet the drinking water quality requirements listed in the health ministerial regulation No.492 / Menkes / PER / IV / 2010, and found from the results of the completeness test using EMB media, namely the growth of fecal coliform bacteria which is metallic green in color, indicating Escherichia coli bacteria from male and female santri drinking water samples. This result can be caused by water contamination in the dug well which is close to the disposal pool and the lack of maintenance of RO equipment that is less than optimal which can cause pathogenic bacteria to escape. The way to prevent coliform bacteria by boarding school administrators is by carrying out good sanitation methods such as not building dug wells near the disposal pond because it will cause the dug wells to be polluted by pathogenic bacteria and it is better to build boreholes in an environment far from the disposal pond so that pollution of pathogenic bacteria does not occur (Wahyudi et al., 2020).

The next way is to prevent pollution of fecal coliform bacteria, then the manager can carry out checks on the filters and filters contained in the RO equipment periodically, which is a maximum of once every 3 months, so that the quality of drinking water remains good and safe for consumption (Wardiani & Gunawan, 2017).

Conclusion

Based on the results of the study showed that drinking water samples male and female students for microbiological parameters were known to be positive contain coliform bacteria. For female students sample 22 MPN/100 ml, and sample for male students 2/MPN/100 ml. Referring to Permenkes No. 492/ Minister of Health/ IV/ 2010, that drinking water for students at the Al-Mu'aawanah Islamic boarding school, no Meets health standards in microbiology. On the results of the study as well found *Escherichia coli* bacteria as an indicator of coliform pollution pathogenic faeces.

Acknowledgement

I thank my friends who have supported in making articles.

References

1. Agustina, A. C. (2021). Analisis Cemaran Coliform dan Identifikasi Escherichia coli dari Depo Air Minum Isi Ulang di Kota Semarang. *Life Science*, *10*(1), 23–32.
2. Alifia, E. S., & Aji, O. R. (2021). Analisis Keberadaan Coliform dan Escherichia coli pada Es Batu dari Jajanan Minuman di Pasar Tengah Bandar Lampung. *Quangga: Jurnal Pendidikan Dan Biologi*, *13*(1), 74–81.
3. Casmitun, C., Kamasturyani, Y., & Amaliah, L. (2020). Internal Construction Relationship With Quality Of Drinking Water On The Drinking Water Depot In Pemalang District. *Jurnal Kesehatan Mahardika*, *7*(1), 26–31.
4. Rahayu, S. A., & Gumilar, M. M. H. (2017). Uji cemaran air minum masyarakat sekitar Margahayu Raya Bandung dengan identifikasi bakteri Escherichia coli. *Indonesian Journal of Pharmaceutical Science and Technology*, *4*(2), 50–56.
5. Wahyudi, B., Winarko, W., & Sulistio, I. (2020). Hubungan Kualitas Fisik Depot Air Minum Dengan Kualitas Mikrobiologi Air Minum Di Kecamatan Gayam Kabupaten Bojonegoro. *GEMA Lingkungan Kesehatan*, *18*(2), 112–117.

6. Wardiani, S. R., & Gunawan, D. (2017). Aktualisasi Budaya Terapi Air Sebagai Media Pengobatan Oleh Jamaah Di Pesantren Suryalaya–Pagerageung Tasikmalaya. *Dharmakarya*, *6*(1).