



Analysis of Personal Hygiene, Premises Sanitation and Equipment Sanitation on Coliform Bacteria Content in Bubble Drinks

Nur Khalifah Nur*, Yulia, Susilawati

Department of Environmental Health, Poltekkes Kemenkes Pontianak, Pontianak, Indonesia

* Correspondence: khalifahn902@gmail.com

Abstract. Abstract. Ice bubble (bubble drink) is a popular ready-to-eat drink and is in great demand by the public because of the variety of flavors with a mixture of bubble topping (boba) in it. The personal hygiene of drink handlers, the cleanliness of sales locations, and the equipment used can all cause microbiological damage to bubble ice, which can lead to coliform bacteria contamination of bubble ice drinks. Coliform bacteria can cause various diseases, one of which is diarrhea. This study aims to determine the relationship between personal hygiene, place sanitation, and equipment sanitation and the content of coliform bacteria in bubble ice drinks in Pontianak City in 2022. According to the findings, coliform bacteria were present in 27 out of the 30 samples that had undergone coliform bacteria testing. This study obtained results of poor personal hygiene for as many as 26 people (86.7%), poor sanitation of selling places for as many as 27 people (90%), and poor sanitation of equipment for as many as 27 people (90%). This study also shows that there is a relationship between personal hygiene and coliform bacteria content with a value of $p = 0.039$, a relationship between place sanitation and coliform bacteria content with a p value = 0.02, and a relationship between equipment sanitation and coliform bacteria content in ice bubble drinks. with a p value of 0.039. Therefore, it is necessary to pay attention to the cleanliness of tools, the environment, and individual traders so that bubble ice is safe for consumption

Keywords: Ice bubble, Personal hygiene, Place Sanitation, Equipment Sanitation, *Coliform*

1. Introduction

Hygiene and sanitation are important to determine the quality of food, because the management of food and beverages that are not hygienic and sanitary can result in ingredients in food and drink that can cause disease in people who consume them. One of the risk factors that cause the occurrence of Extraordinary Event status of food poisoning is food hygiene and sanitation (BPOM, 2017).

One of the health problems caused by food and beverages that do not meet health requirements is diarrhea disease (Yulia, 2016). In 2018, according to the Indonesian Health Profile, the number of diarrhea patients served in health facilities was 4,274,790 patients. According to West Kalimantan Basic Health Research Data in 2018, shows the highest prevalence of diarrhea disease in West Kalimantan is in Pontianak City with a total of 3,611. The second highest was in Kubu Raya with a total of 3,235 while the lowest prevalence of the disease was in Sekadas with a total of 1,132 (Riskesdas, 2018).

The cause of diarrhea disease is the contamination of coliform bacteria in food or beverages consumed. Coliform bacteria are microorganisms that are often used as indicators

to determine whether food and beverages are contaminated with pathogens or not. Research conducted by (Ariani & Apriawan, 2018) in Banjarmasin about Coliform bacteria in chocolate ice drinks, showed that of the 13 samples of chocolate ice sold in the North Banjarmasin Region were positive for Coliform bacteria.

Bubble ice (bubble drink) is a popular ready-to-drink drink and is in great demand by the public, because of the variety of flavors with a mixture of bubble (boba) toppings in it. Bubble ice (bubble drink) traders in Pontianak City can be found anywhere from shopping centers, hawker centers, in front of mini markets to the roadside. In the initial survey conducted on 6 bubble ice traders, it was found that the six traders used equipment for processing bubble ice not properly cleaned, the tools used to process bubble ice were reused for making the next bubble ice, lack of availability of clean water to wash equipment. Of the six traders, after the coliform examination showed that the bubble ice from the six traders contained coliform bacteria. This is in line with Chung Santo Lin's research entitled "Assessment of Microbiological and Chemical Quality of Bubble Tea Beverages Vended in Taiwan" which revealed that 55 samples (52.4%) of bubble tea had an average coliform count of 10 MPN/mL.

Based on the results of surveys and preliminary tests that have been carried out, researchers are interested in conducting research on analyzing personal hygiene, place sanitation, and equipment sanitation on coliform bacteria content in bubble ice drinks in Pontianak Kota.

2. Metode

2.1 Research Design

The research method used in this research is observational research using a cross-sectional research study design. This research is descriptive analytical, the average percentage of quantitative data aims to determine the relationship between personal hygiene of traders and sanitation of traders in the selection of raw materials, storage of materials, and processing of bubble ice to the content of Coliform bacteria. The research was conducted in Pontianak Kota District, Pontianak City in 2022.

2.2 Population and Sample

The population in this study were bubble ice traders who were on the roadside of Pontianak Kota with a total of 43 bubble ice traders. The sample in this study is data from a portion of the population to be studied, calculated using the Slovin formula (Pambudi, 2017). The sampling technique used by researchers is using the Random Sampling technique.

2.3 Data Analysis

Data that have been obtained from observations are processed and analyzed descriptively, then presented in the form of distribution tables and narrated. Bivariate analysis is an analysis conducted to determine two variables, namely seeing the relationship between the independent variable and the dependent variable. The statistical test used is chi-square with a confidence level of 95% and a meaning limit of 0.05. The hypothesis will be accepted if $p \leq 0.05$ then H_a is accepted, which means that there is a relationship between personal hygiene, place sanitation, and equipment sanitation to the content of coliform bacteria in bubbly ice drinks. The hypothesis will be rejected if $p > 0.05$ then H_a is rejected, which means that there is no relationship between personal hygiene, place sanitation, and equipment sanitation on the content of coliform bacteria in bubble ice drinks.

3. Results

Based on the results of observations that have been made of 30 bubble ice traders, it shows that as many as 26 or 86.7% of bubble ice (bubble drink) traders have poor personal hygiene,

27 or 90% of bubble ice (bubble drink) traders have poor place sanitation, and as many as 26 or 86.7% of bubble ice (bubble drink) traders have poor equipment sanitation.

Table 1. Distribution of Personal Hygiene, Sanitation of Premises and Sanitation of Equipment of Bubble Ice (bubble drink) Traders in Pontianak Kota in 2022

No	Categories	Total			Percentage (%)		
		PH	ST	SP	PH	ST	SP
1.	Less Good	26	27	26	86.7	90	86.7
2.	Good	4	3	4	13.3	10	13.3

Based on the results of laboratory examinations that have been carried out on 30 ice bubbles, it shows that as many as 27 or 90% of ice bubbles (bubble drinks) do not meet the requirements, namely containing coliform bacteria (table 1).

Table 2. Distribution of MPN Coliform Content in Bubble Ice Drinks in each Village in Pontianak Kota Year 2022

No	MPN Coliform	Total	Percentage (%)
1.	Eligible	3	10
2.	Not Eligible	27	90
	Sum	30	100

4. Discussion

Personal hygiene is important for food and beverage handlers, because personal hygiene greatly affects the onset of coliform bacterial contamination in processed beverages. Although the processing of bubble ice is assisted by tools in the form of spoons, and is not directly spread by hands, the personal hygiene factor as a whole is a unity that cannot be separated to create a hygiene drink. From the results of the personal hygiene research, bubble ice traders in Pontianak Kota still have poor personal hygiene, so traders should pay more attention to personal hygiene such as hand washing and PPE completeness when processing drinks.

From observation, the materials of the hawkers' facilities are good enough, namely made of materials that are easy to clean. Based on the results of interviews, traders clean their carts before starting to sell. However, there are other requirements regarding hawker facilities that have not been met, such as the absence of clean water stations, equipment storage, hand washing stations and tools. Most bubble ice traders do not have hawker facilities that have complete facilities as stipulated in the Decree of the Minister of Health of the Republic of Indonesia Number 942/Menkes/SK/2003. Only a few traders have a place to clean equipment and wash hands with those that are used repeatedly or not replaced.

Most of the bubble ice traders do not wash the equipment with clean water and soap, the equipment is not dried with a dryer and directly reuse the equipment that has been used without washing. Equipment that is not washed with clean water and soap can potentially become a gathering place for pathogenic bacteria, thus increasing the amount of bacterial contamination in the ice bubble drinks produced.

Based on the results of research on bubble ice drinks in Pontianak City using the MPN method, it was found that out of 30 samples, 27 bubble ice drink samples (90%) contained coliform bacteria. Total bacterial colonies showed MPN index between 17 to ≥ 1600 in 100 ml/sample. Therefore, based on the Regulation of the Ministry of Health of the Republic of Indonesia in 2010, bubble ice drinks in Pontianak do not meet microbiological health

requirements, because the number of MPN Coliform that meets the requirements should be 0/100 ml sample. This study is in line with Novia (2018) which shows that all samples of chocolate ice drinks (100%) are positive for coliform bacteria, as well as research on the presence of coliform bacteria (Supomo, 2016) which states that all samples of Ice Coffee Blended drinks (100%) also contain coliform bacteria. In addition, the results of Chung Santo Lin's research entitled "Assessment of Microbiological and Chemical Quality of Bubble Tea Beverages Vended in Taiwan" stated that 55 bubble tea samples (52.4%) had an average coliform count of 10 MPN/mL.

According to Permenkes No.942 of 2003 personal hygiene of bubble ice traders in Pontianak Kota does not meet the personal hygiene standards of the handlers because based on the statistical results of Fisher's exact test there is a relationship between personal hygiene and the content of coliform bacteria in bubble ice drinks. The results showed that there was a relationship between personal hygiene and microbiological quality in bubble ice drinks, namely the presence of coliform bacteria in bubble ice drinks in Pontianak Kota. This happened because from this study it was found that pedagans had poor personal hygiene. This research is in accordance with research conducted by (Nurtriyana, 2019) which shows that there is a relationship between personal hygiene of the handler with the presence of coliform in thai tea ice drinks in Tembalang District with $p=0.043$.

Point-of-sale sanitation also plays an important role in determining the success or failure of overall food sanitation efforts. Clean and well-maintained premises sanitation can improve sanitary conditions in a better direction. (Sandika & Mulasari, 2019). According to Permenkes No.942 tahun 2003 The sanitation of the place in bubble ice traders in this study did not meet the standards on peddling facilities. Peddling facilities are facilities used for handling snacks both sedentary and mobile.

Poor equipment sanitation conditions are a supporting factor for bacterial pollution in beverages. Poor handling of drinks can cause illness for consumers. The results of statistical tests using Fisher's Exact Test on equipment sanitation of bubble ice traders showed a relationship between equipment sanitation and coliform bacteria content in bubble ice drinks. This study is in line with (Christian, 2018) which states that there is a correlation between equipment sanitation and *Escherichia coli* bacteria content in Thai mango drinks. Equipment that is not washed with clean water and soap has the potential to become a gathering place for pathogenic bacteria, increasing the risk of bacterial contamination in the ice bubble drinks produced. Food and beverage processing is a crucial stage in ensuring its quality, so the role of personal hygiene, cleanliness of the sales environment, and cleanliness of equipment has a major influence on the cleanliness of the drinks served.

5. Conclusion

From the results of the research that has been done, it can be concluded that 86.7% of personal hygiene of bubble ice traders is still not good, 90% of the sanitation of bubble ice traders' premises is still not good, and 86.7% of equipment sanitation in bubble ice traders is still not good, and as many as 90% of bubble ice that is examined for coliform does not meet the requirements of the Ministry of Health Regulation No.492 of 2010. Based on the results of statistical tests, there is a relationship between personal hygiene, place sanitation, and equipment sanitation with coliform content in bubble ice drinks. Therefore, it is expected that the Health Office can conduct monitoring and counseling to traders regarding sanitary hygiene of hawker food and supervise traders of bubble ice drinks in Pontianak City.

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