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The Determination Of Coliform Bacteria Numbers In Beverages Iced Cappucino Sold At Roadside Stall On Pantai Panjang Of Bengkulu City

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Abstract *- **Consuming ready-to-drink beverages is now a lifestyle. However, consuming bacteria contaminated drinks can cause a number of diseases. There are still many traders who do not understand the importance of using good ingredients and maintain the hygiene of the manufacturing process in making this beverages, this study was conducted to determine the quality of ready-to-drink beverages that are circulating microbiologically. This study aims is to detect the presence of coliform bacteria in beverages iced cappucino sold at Roadside Stall On Pantai Panjang Of Bengkulu City. The method used is descriptive method using 5 samples of beverage iced cappucino which included cappuccino with ice cubes, without ice cubes and its servingcup. Sample are tested by MPN method 5-1-1 range to determine the amount of coliform bacteria that pollute. Result : 100% samples contained coliform bacteria. To find out the source of contamination, a separate inspection of the beverage and its manufacturng process is carried out. The average MPN value in these sample with ice cube, without ice cube and its serving cup were 16.2/100 mL, 10.6/100 mL , and 2/100 mL respectively. Coclusion: Due to its bacteria contamination content, according to Ministry of Health Regulation No. 492/Menkes/Per/IV/2010 which state 0 APM/100ml sample, 100% this beverage sample were not qualified to consume. The source of bacterial contamination in this sample is from the material used (both from ice cube and water used in beverage processing), the hygiene of manufacturing process.***

Keyword - beverage Iced Cappucino, Coliform, MPN

I. INTRODUCTION

Diarrhea is a disease characterized by changes in changes in stool consistency in addition to the frequency of bowel movements. Diarrhea stools are more soft and runny than normal feces with a frequency of bowel movements three or more times a day [6].

According to the World Health Organization (WHO)'s data in 2015, 15% chlid mortality under 5 years were caused by diarrheal diseases [11]. Based on the Indonesia Health Profile's data in 2016, there were 6,897,463 cases of diarrhea in Indonesia (34 provinces) [10]. In 2016, there were 359,488 cases of diarrhea in Bengkulu City [1].

Coliform bacteria can spread through contaminated water and material. If coliform bacteria are found in food and drinks, it indicates that these foods and beverages have been contaminated by human waste both directly and indirectly. The presence of coliform bacteria in drinking water indicates the presence of other pathogenic bacteria. in addition to causing diarrhea, this bacteria can also cause fever and kidney failure [8].

Based on the survey of researchers, there were 5 roadside stalls selling beverage iced cappucino that match with the inclusion criteria, namely selling on the roadside and not using crystal ice cubes. Researchers chose Pantai Panjang in Teluk Segara Subdistrict as a sampling site due to the high incidence of diarrhea (based on data from the Health Department in 2016) [1]. Besides that, it was also a tourist area and the high level of consumption in the area, processing is done in an open kitchen by the side of the road. This can cause cappuccino ice drinks to be contaminated by microorganisms or other bacteria so that it can endanger the health of Long Beach visitors who consume these drinks. In previous studies, coliform bacteria contamination was examined on ice orange drinks sold at restaurants on the long coast of Bengkulu.

In previous study, the examination of coliform bacteria contamination on ice tea drinks sold in restaurants at Pagar Dewa Distric of Bengkulu City was conducted by Sinta (2017) , the results showed 100% sample were contaminated with coliform bacteria.

Based on the description above, the researcher was interested in studying the determination of Coliform bacteria on beverage iced cappuccino sold at roadside stalls in Pantai Panjang, the City of Bengkulu in 2018.

II. METHOD

This is adescriptive researches. Data obtained are tabulated with displays table and MPN value calculated based on 3 series tube and described

Samples taken from 5 roadside stalls at Pantai Panjang Bengkulu city, selling beverage iced cappucino that match with the inclusion criteria, namely selling on the roadside and not using crystal ice cubes. The samples examined were 5 samples which included beverage cappuccino with ice cubes, without ice cubes, and its serving cup (plastic cup)

Determination of contamination of coliform bacteria using the MPN method, consisting of estimator test and assertion test with a range of 5: 1: 1. the test is positive if gas is formed in a durham tube. the number of positive tubes in the stress test is adjusted to the Most Probably Number (MPN). Total the numbers obtained in the MPN table shows that the number of coliform bacteria contained in each gram / ml of the sample tested

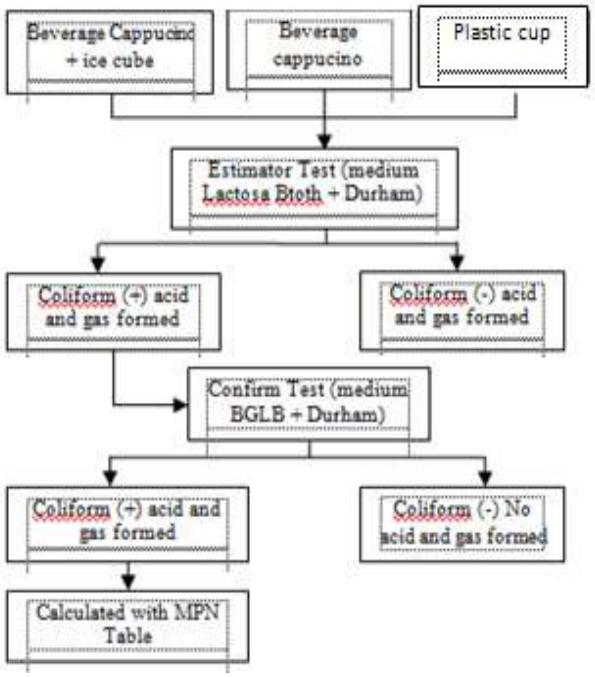

Figure 1. Experiment Design Scheme

III. RESULT

The results of the coliform contamination test on beverage cappuccino that use ice cubes and do not use ice cubes sold in Pantai Panjang City of Bengkulu with a total of 15 samples of frequency distribution results are presented in (Table 1)

TABLE I. FREQUENCY DISTRIBUTION OF BACTERIA TEST ON *COLIFORM BEVERAGE ICED CAPPUCCINO* SOLD AT ROADSIDE STALLS IN PANTAI PANJANG BENGKULU CITY

Result	Frequency	Persentace
Contaminated by coliform bacteria	5	100%
Not Contaminated	0	0%
Total	5	100%

Based on Table 1, it shown that 100% sample contaminated by coliform bacteria

TABLE II. MPN VALUE FROM *BEVERAGE ICED CAPPUCCINO* SOLD AT ROADSIDE STALLS IN PANTAI PANJANG BENGKULU CITY

Seller	MPN Average value		
	with iced cube	No iced cube	serving cup
1	16	10	0
2	16	10	0
3	21	16	8
4	12	5	0
5	16	12	2
Average	16.2	10.6	2

To find for sources of contamination, a separate examination of samples with ice cube, without es cube and its serving cup was carried out. Table 2 shown that all of the sample with and without iced cube are 100% contaminated by coliform bacteria with MPN average value was 16.2/100 mL and 10.6/100 mL respectively. MPN average value for empty serving cup was 2/mL, where there were 60% of uncontaminated plastic containers found.

IV. DISCUSSION

Coliform bacteria are microbes commonly used as indicators of sanitation in water and food. The presence of Coliform (E. coli) in food products is important to note because it is an indicator of faecal contamination. Escherichia coli can also be an indication of the presence of pathogens that may be found in feces, these pathogens cause foodborne disease or food poisoning (foodborne diseases) if swallowed with food or drink. Some strains of E. coli are also pathogenic and can cause various diseases, including bloody diarrhea, acute kidney failure, and meningitis [3].

Distribution of water pollution and the environment and materials that come into contact with it. In the food processing process, this bacteria usually contaminates the tools used in processing. If bacterial contamination of a food is obtained, it is said that the food has been contaminated by human waste. In addition to contamination of materials used for sanitation, food sanitation and beverages, the factors that cause bacterial pollution are mainly water treatment before consumption. Such conditions allow ice cubes to be polluted. Pollution can also occur from all stages of the production process that is passed both from the processing process to the presentation of the hand of the consumer [2].

In this study using the MPN method because the MPN method is used to calculate the number of bacteria, especiallybacteria *coliform.* In this MPN method examination is used with two test stages, namely estimator test and assertion test. Samples obtained from traders were directly planted into LBSS and LBTS media [3]. In the estimator test which was marked by the presence of gas bubbles in the durham tube flew from LBTS and LBSS media because

thebacteria *coliform* in the sample can ferment lactose to produce acid and gas. The tube that gives positive results is continued to the stress test. The prepared BGLB media is used to carry out the next test, namely the stress test. The assertion test was positive when there was a gas bubble on a durham tube from BGLB media, there was a gas bubble in this test because it showed that thebacteria *coliform* in the sample could ferment lactose to produce acid and gas. Furthermore, the results obtained were compared with the MPN table to determine the amount of bacteria *coliform* in each tube [12].

Based on the MPN value of samples using ice cube (16.2/100 mL), it was seen that the source of the contamination came from the ice cube used, which was thought to be from uncooked water. Besides that, contamination also caused from the processing process, whether it is from a water source used to dissolve the drink ingredient or hygiene in processing. This can be seen from the high number of contaminants (10.6 / 100 mL) from samples that do not use ice cube. In addition, serving cup can be a source of contamination. In the study, there were 2 sellers who use contaminated containers (plastic cup), this has an impact on the higher MPN value in the sample using the beverage container. According to Ministry of health regulation No. 492/Menkes/Per/IV/2010 which state 0 APM/100ml sample, all of this beverage sample were not qualified to consume.

One source of contamination comes from ice cubes. Ice cube is a complementary product that is often served with cold drinks and is considered safe for consumption. In society, ice cubes are known as frozen water. This freezing occurs when water is cooled below 0º C. The water used in making ice cubes must be hygienic water. Until now, there are no regulations for granting licenses or recommendations for the feasibility of standard ice cube businesses in terms of hygiene and sanitation, because ice cube business is still on a small scale and is a household business, so hygiene and sanitation are still in doubt [2].

Low temperatures do not kill microorganisms but inhibit their proliferation (dormancy). Freezing causes a little damage to microorganisms. This damage can be reversible or cause cell death. This damage depends on the type and speed of the freezing process. Fast freezing with very low temperatures does not or only slightly causes damage to bacterial cells, so if in favorable conditions the bacteria can return to activity [4].

The quality of water that is suitable for consumption must meet the requirements physically, chemically and microbiologically. Physically, the water used for consumption must be clear or not cloudy, colorless, tastes tasteless, odorless and the temperature is normal. The presence of contaminating bacteria causes low quality ice cubes which may come from various things such as: raw materials (water) and tools used in the process of making ice cubes [2].

The potential for ice and ice drinks to cause disease in humans is greater because ice is included in food products that are ready to eat and do not require a heating process before being consumed. Although the raw material used has been heated or cooked first, the handling or distribution is often not done well. Good handling and distribution is to pay attention to sanitation and hygiene of a food product. This is what can be a source of disease in humans [4].

In this study researchers used Negative control with treatment without using a sample, which aims to ensure that the results of research that are positively contaminated with Coliform bacteria really come from the sample rather than from the media or the way it works.

The presentation of food and beverages is carried out with supervision and determination of health efforts that are carried out through several types of activities, one of which is supervision of food and beverage sanitation to support the improvement of community health status. Supervision of food and drink sanitation is an effort to control the place, eating and drinking equipment that can cause health problems or poisoning in humans. Supervision is carried out on the factors that cause bacterial emergence in food and beverages such as equipment, personal hygiene, and water which is a source of contamination[2]. The use of ingredients that have been contaminated with coliform bacteria and the lack of hygiene of the manufacturing process is the cause of the contamination of coliform bacteria in food and beverages [9].

The results of this study are in line with the research conducted by Sinta (2017), the reslut showed that 100% of samples of ice tea drinks sold at restaurants in the Pagar Dewa Distric of Bengkulu City were contaminated with coliform bacteria [12].

Consuming drinks or foods that contain bacteria *coliform* can cause diarrhea, vomiting and poisoning. Processing of drinks should use water that is cooked with a temperature of 100^0C. This is done to prevent contamination of water frombacteria *coliform* [4].

V. CONCLUSION

100% of samples of baverage iced cappucino sold at Roadside Stall On Pantai Panjang Of Bengkulu City are contaminated with coliform bacteria. The average MPN value in these sample with ice cube, without ice cube and its plastic cup were 16.2/100 mL, 10.6/100 mL , and 2/100 mL respectively. The source of bacterial contamination in this sample is from the material used (both from ice cube and water used in beverage processing), the hygiene of the container and manufacturing process. Based on the contamination bacteria content, this drink is not suitable for consumption

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