



SANITARY HYGIENE AND ANALYSIS OF ESCHERICHIA COLI BACTERIA CONTENT IN LALAPAN KOL AT PECEL LELE TRADER

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Abstract:

The presence of Escherichia coli (E.Coli) bacteria is one indicator of food contamination that can cause food-borne diseases. Fresh vegetables have nutritional advantages because they are consumed raw so that the nutrients contained in them are not denatured or changed. Types of vegetables that are usually consumed fresh have the potential to be detrimental to health because they are susceptible to microbial contamination. This study aims to review the sanitation hygiene of traders and determine the content of E.Coli bacteria in cabbage vegetables from fried catfish traders in one of the sub-districts in the city of Pekanbaru. The type of research used is survey and laboratory analysis. Technique sampling in this study is total sampling technique with a sample of 10 fried catfish traders. The results showed that hygiene and sanitation were still low in all traders. All traders do not use running water for washing vegetables and cutlery, and vegetables are not stored in closed containers. The results of bacterial analysis, it was found that 6 samples of fresh vegetables cabbage fried catfish contained E.Coli and the rest did not contain E.Coli bacteria. It can be concluded that the application of food sanitation hygiene by food handlers at several fried catfish traders in Pekanbaru City is in the poor category, because from 10 samples of cabbage vegetables, E.coli was found in 6 samples of cabbage vegetables.

Keywords : Escherichia coli, Hygiene, Fresh Vegetable, Fried Catfish Trader.

1. Introduction

Vegetables are foodstuffs that are easily available in various places. Vegetables are also used as the main ingredient in cooking and as a side dish. Like spinach served as “*Sayur Bening*” and kale served as “*Tumis Kangkung*”, it is a cooked vegetable and while cucumbers are used as fresh vegetables. Vegetables used in cooking come from the seeds, leaves, flowers, stems, or roots of a plant. (Indrati & Gardjito, 2013).

Hygiene and sanitation are a public health effort that aims to prevent disease in humans. Hygiene is a public health effort that studies the relationship of environmental conditions to human health, efforts to prevent disease due to the health environment, and ensures environmental health maintenance. (Depkes RI, 2009). Food sanitation is an effort aimed at food hygiene and safety, so as not to cause poisoning and disease in humans (Widyati, 2002). Hygiene and sanitation are important in determining food quality, where E. coli is an indicator of food contamination that can cause food-borne diseases (Depkes RI, 2003).

One of the most common contaminants found in food are Coliform bacteria, Escherichia coli and Faecal coliform. These bacteria come from human and animal feces that infected into food. it is due to the behavior of unhygienic handlers, washing equipment that is not clean, the health of food processors and handlers and the use of washing water containing Coliform, E. coli, and Faecal coliform (Dewi, 2003).

Types of vegetables that are consumed fresh (*lalapan*) have the potential to harm health, because they are susceptible to microbial contamination.

One thing that needs to be considered is public awareness about food hygiene, because contaminated foods when consumed directly will cause food-borne illness. Foodborne illness caused by bacteria will generally cause symptoms of diarrhea (Olianovi & R.Pasaribu, 2017).

Foodborne illnesses generally cause gastrointestinal disturbances, with abdominal pain, diarrhea, and sometimes vomiting. It caused by food containing pathogenic bacteria, or toxins secreted by the bacteria themselves. The disease can attack individuals, two members or families or groups of families who have a close relationship, lasts only a few hours, or if severe lasts for days, weeks or months and requires intensive treatment. In vulnerable groups, such as children and the elderly, the disease will be dangerous (Dewi, 2003).

E. coli is a normal flora in the digestive tract of animals and humans that easily pollutes water. Therefore, the bacterial contamination of food comes from the water used. The tools used in the food processing industry are often contaminated with *E. coli*, it comes from the water used for washing. The bacterial contamination of food or processing equipment is a sign of poor sanitation practices (Imam, 1999).

Based on Purba's research (2012), it is known that the amount of *E. coli* in cabbage and lettuce from traditional markets is higher than restaurants. This was because the samples of cabbage and lettuce in the restaurant had been washed and ready to be consumed, so that the *E. coli* attached to the cabbage and lettuce were partially separated from the cabbage and lettuce. *E. coli* was still found on lettuce at restaurants even though they had been washed, it caused the vegetable washing technique was still not good, probably because the vegetables were washed in a bucket and removed the lettuce leaves one by one and the stems and shook the water.

In Pasaribu's research (2017) *Escherichia coli* bacteria were found in the washing water of lettuce vegetables, it is not suitable for raw consumption. It is proven, that there has been contamination with human or animal feces, where the MPN exceeds the number allowed by BPOM-RI, this situation has the potential to cause health problems such as diarrhea.

Based on observations conducted by researchers in the area around the city of Pekanbaru, The vendors of *Pecel Lele* serve the fresh vegetables (*Lalapan*) using 4 types of vegetables, namely basil, cucumber, lettuce and cabbage. However, the vendors of *Pecel Lele* only provide 3 types of vegetables, namely basil, cucumber, and cabbage. And *Pecel Lele* sellers generally do not pay attention to food sanitation hygiene requirements.

2. Methods

Types of research

This research was survey research. This study was conducted to obtain an overview of the hygiene and sanitation of traders by observing using a questionnaire and analyzing the *Escherichia coli* bacteria in fresh (*Lalapan*) cabbage at *Pecel Lele* using the TPC (*Total Plate Count*) method.

Time and Place

The study was conducted in 2019. Analysis of *E. coli* bacteria was carried out at the UPT Health and Environment Laboratory of the Riau Provincial Health Office.

Sampling Technique

The sampling technique in this study was Total Sampling, where the sample was taken from *Pecel Lele* traders who settled in selling in one of the sub-districts in the city of Pekanbaru.

Tools and Materials

The tools used are Spiritus lamp, 16 mm - 20 mm test-tube, test-tube rack, microscope, autoclave, incubator, scales, test tube rack, sterile bottle, 10 cm petri dish, volume pipette, knife, blender/mortar, ose, label, pen/marker, Durham tube, Erlenmeyer flask 300 cc, measuring cup, tweezers, marker, water bath, ose, colony counter, magnifying glass.

The materials used were fresh vegetables samples, *Brilliant E. coli*, Mac media. Conkey, Aquades, cotton.

Sampling

Vegetables to be examined are cut with a knife weighing 200 g, put in bottles or plastic bags.

Preparation of solid food inspection materials

Specimens were crushed in a blender or sterile mortar. Put 10 g of ingredients into the Erlenmeyer flask. Pour 90 ml of phosphate buffer saline solution. Shake about 25 times until homogeneous. Prepare 3 sterile test tubes, arrange them on a tube rack. each tube is marked with 10^{-1} , 10^{-2} , 10^{-3} as the examination dilution code. Prepared 16 sterile petridish. 15 petri dishes are marked on the back according to the dilution code and the date of inspection. one other petridish marked "control". The above specimen was shaken in an Erlenmeyer flask 25 times until homogeneous. take 1 ml put in the tube to one. In the second to the fifteenth tube, filled with 9 ml of phosphate saline buffer solution. Transferred 1 ml of material from one tube to the second with a pipette, the liquid was made until homogeneous. The dilutions on the third tube are: 10^{-1} , 10^{-2} , 10^{-3} according to the dilution code that has been previously listed. From each of the above tubes, starting from the 3rd tube using a sterile pipette, 1 ml is taken and put into each sterile petri dish, according to the same dilution code. Each petri dish is poured with liquid brilliant E.coli which has been heated in a water bath of $\pm 45^{\circ}\text{C}$ as much as 15-20 ml. Gently shake the petridish, until evenly mixed and allow to cool and freeze.

E.coli examination

Put in an incubator 37°C for 1 x 24 hours in an inverted state. Control is made from physiological saline water (phosphate buffered salt solution, put into petridish "control" and poured with Brilliant E.coli liquid as much as 15-20 ml. Next, the reading process is carried out for 1 x 24 hours by calculating the number of colonies growing on each petri dish.

Reading of results

The colonies growing on each petri dish were counted. Colonies that merge into one will form a row / colony which is seen as a thick line or the number of doubtful colonies is counted as one bacterial colony. Count the number of colonies growing on the petri dish containing the control. If the number of colonies in the petri dish control is greater than 10, the examination must be repeated because the sterility is considered not good. re-examination must use Plate Count Agar from another manufacture

Reporting

Calculations were only carried out in the petri dish which resulted in the number of colonies between 30-300 colonies and if the number in the control petri dish was less than 10 colonies. The number of colonies in each of these petri dishes must first be reduced by the number of colonies in the control petridish (Depkes RI, 1991).

3. Result and Discussion

Sample Overview

The criteria for the fresh vegetable (*Lalapan*) sample used in the study were cabbage vegetables (*Lalapan Kol*) which was taken from the *Pecel Lele* vendor. Samples were taken directly on each *pecel* catfish vegetable salad from street vendors and put in plastic. The researcher took a sample of 10 traders in one of the sub-districts in the city of Pekanbaru.

The Pecel Lele Traders Hygiene and sanitation

A review of the hygiene and sanitation of *Pecel Lele* traders in one of the sub-districts in the city of Pekanbaru is shown in Table 1 below:

1. Water Source for washing vegetables		
	n	%
well/drill	10	100%
Galon Water	0	0%
2. Frekuensi penggantian air cuci sayuran		
1 x	3	30%
2 x or More	1	10%

Never	6	60%
Never	6	60%

Based on observations, there are 10 traders using well water or drilled water. In the frequency of changing the water used for washing, 6 traders never change the vegetable washing water because the location of the traders selling is far from the water source, while the other 4 traders change the vegetable washing water once or more, it caused the location where the traders sell is close to the water source to wash vegetables.

Directly or indirectly, water quality will greatly affect the quality of food sold (Dewi, 2003). The results of the observations can be seen in Table 2 below:

Table 2. Observation Results

No	Description	Result	
		Yes	No
1	Wearing an apron and headgear	0	10
2	Washing hands before and after handling the food	0	10
3	Coughing / sneezing in front of food	2	8
4	Scratching limbs (Ears, Nose, Mouth, or other parts)	3	7
5	All activities of touching food using tool or equipment and not directly contact with the body	0	10
6	The tool used are clean, odorless and free from defects	10	0
7	Washing fresh vegetables using water flow	0	10
8	Frees vegetables (<i>Lalapan</i>) washed with all types of fresh vegetables in one container	6	4
9	<i>Lalapan</i> that had been washed put back into the same container	6	4
10	Vegetables washed using different water for tools	10	0
11	There is a closed vegetable storage area	0	10

The results of the observation of statements regarding personal protective equipment (PPE). It was found that all traders did not use aprons while handling food. The head coverings of all Muslim women traders use the hijab where the head can be protected and free from bacterial contamination of food, while the male handlers do not use head coverings. The clean work clothes will ensure the sanitation and hygiene of food processors because there is no dust or dirt attached to the clothes which can indirectly cause food contamination (Depkes RI, 2001).

Based on observations regarding hand hygiene, all traders do not wash their hands before and after processing food, whether in frying chicken or taking fresh vegetables. Hand washing is the process of removing dirt and dust, mechanically from both sides of the hands. Hand washing with soap and water which aims to prevent cross-contamination (person to person or contaminated object to person) a disease or transfer of germs or bacteria.

Based on observations regarding coughing or sneezing in front of food, eight traders did not cough or sneeze in front of food, while two traders coughed or sneezed in front of food. Traders usually touch food that scratch their limbs, there are three traders, while seven traders do not scratch their limbs.

According to Atmiati W.D (2012), states that traders with poor personal hygiene will facilitate the spread of bacteria. There is a significant relationship between the hygienic conditions of the handlers and the presence of *E.coli bacteria* in cabbage (*Lalapan Kol*), there are still many traders who do not carry out proper hygiene of the handlers.

Based on the observation that all traders do not use tools when taking fresh vegetables (*Lalapan*) and placing the fresh vegetables in the container. The container where the fresh vegetables are placed is still in a clean condition, odorless and free from defects. All traders do not use water flow when washing the fresh vegetables, traders wash fresh vegetables in one bucket.

Based on observation, 6 traders combined the cabbage with other fresh vegetables after washing and put the cabbage and fresh vegetables in one container, but 4 traders put the cabbage separately with other vegetables after washing thoroughly.

The results showed that the 6 traders put the washed cabbage into the container before the fresh vegetables were washed. All traders when washing the cabbage do not use water used for washing tools and all traders none provided a closed container when storing the cabbage.

Based on Sembiring's research (2013), he states that ready-to-eat food storage is placing cooked food by paying attention to the principle of temporary storage in the storage room and paying attention to the cleanliness of the place and storage container. Storage of ready-to-eat food is not in accordance with health requirements, it caused storage container does not have a special storage area. As a result, the foods can be contaminated from the outside, it caused the storage area just closed only from the front, top and sides, so the dust can enter through the open part and can cause contamination of the foods. This happened because the respondents did not know the function of a closed cooking food place.

The condition of the place where *Pecel Lele* sell is on the side of the road is obtained by observing the condition of the place where *Pecel Lele* sell. All traders have not paid attention to the condition of the place to sell, as well as the condition of the serving container. The location of the place to sell is on the side of the road near the source of dust, smoke and other pollution.

The place where vendors (*PKL*) sell is on the side of the road, *Pecel Lele* traders usually put their tents in front of the shop. Traders provide chairs and tables made of plastic, for use by consumers. This is in accordance with Ari's (2006) research, semi-permanent stalls, consisting of several carts arranged in a row and equipped with chairs and tables. The roof and its surroundings are usually covered with a protective covering made of plastic, tarpaulin or other impermeable to water. Based on the business facilities, these vendors (*PKL*) can be categorized as permanent traders, generally for the type of food and beverage merchandise.

The trash cans owned by *pecel lele* traders are trash cans that are not covered with plastic and opened. Such trash cans invite disease vectors to come to the production site, it can also cause cross-contamination of processed food. According to Vidya (2013), a good trash can is covered with plastic to make it easier to transport when the trash is full.

Analysis of Escherichia coli Bacteria Content in Cabbage Vegetables (Lalapan Kol)

The results of the examination can be seen in Table 3 below:

Table 3. *Escherichia coli* content found in cabbage vegetables

No	Sample Code	Numbers of Colonies	<i>Escherichia coli</i>
1	1	4,46 x 10 ² CFU/g	Positive
2	2	1,5 x 10 ³ CFU/g	Positive
3	3	0 CFU/g	Negative
4	4	2,2 x 10 ² CFU/g	Positive
5	5	0 CFU/g	Negative
6	6	3,3 x 10 ³ CFU/g	Positive
7	7	5,4 x 10 ² CFU/g	Positive
8	8	1,1 x 10 ³ CFU/g	Positive
9	9	0 CFU/g	Negative
10	10	0 CFU/g	Negative

Based on the table above, it is known that there were 6 samples of cabbage that were positive for *E.coli*. Meanwhile, 4 samples of cabbage were negative for *E.coli*. In accordance with the decision of the Director General of POM Number: 03726/B/SK/VII/89, the requirement for fresh vegetables to be consumed is maximum containing *Escherichia coli* 10² CFU/g. Based on the 6 samples containing *Escherichia coli*, it has exceeded the standard of fresh vegetables that are fit for consumption. Where samples from traders 1,2,4,6,7, and 8 using the TPC (*Total Plate Count*) method found a lot of *Escherichia coli* bacteria in cabbage vegetables found in trader 1 as much as 4.46 x 10² CFU/g, traders 2 as much as 1.5 x 10³ CFU/g, trader 4 as much as 2.2 x 10² CFU/g, trader 6 as much as 3.3 x 10³ CFU/g, trader 7 as much as 5.4 x 10² CFU/g, and trader 8 as much as 1.1 x 10³ CFU/g.

In accordance with Tindry's research (2015), the results of the examination of E.coli in cabbage at a restaurant located on Jalan Piere Tendean Boulevard, Manadi City, through laboratory examinations, found 7 food stalls (87.5%) containing E.coli in cabbage while 1 food stall (12.5%) negative for E.coli. The negative sample of cabbage was precisely in food stall 2, according to the results of interviews conducted by researchers. This restaurant 2 was the only food stall that put the cabbage separately and compared to other food stalls that only put the cabbage and basil in one container.

Purba's research (2012), the results of the E.coli examination carried out on the cabbage, lettuce and eggplant in traditional markets did not comply with health standards because they were not in accordance with the Minister of Health Regulation RI1096/Menkes/Per/VI/2011, which was 0 per gram sample. This can happen because the farmers of cabbage, lettuce and eggplant increase the fertility of agricultural land as a medium for growing vegetables use organic fertilizers in the form of humus or livestock manure. Bacterial contamination of E.coli, especially vegetables that spread on the surface of the soil or whose height is close to the ground (short), such as fresh cabbage, splashing rainwater that reflects off the land often causes E.coli contamination.

Conclusion

From the results of research on 10 pecel catfish traders who sell cabbage vegetables in one of the districts in Pekanbaru City, it can be concluded:

1. The sanitation hygiene of street catfish pecel traders is in the poor category
2. The results of laboratory examinations found that 6 positive samples contained E. coli, while 4 negative samples of cabbage vegetables contained E. coli.

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