MELYSA
Medical Laboratory Analysis and Sciences Journal
Vol. 2, No. 2, November 2020, page 40-45
ISSN: 2657-1471 (Online)
ISSN: 2656-937X (Print)
DOI: 1035584/melysa.v2i2.51

Bacterial contamination in chili sauces of meatballs traders on Daya Nasional street

Maulidiyah Salim [1a*], Jajar Pramata Syari [1b], Laila Kamilla[1c], Anisa Fitri Midani[1d]
[1] Analis Kesehatan Poltekkes Kemenkes Pontianak, Kota Pontianak, Kalimantan Barat, Indonesia
[a*] maulidiyahsalim@gmail.com
[b] pramata.syari@gmail.com
[c] lailakamila79@gmail.com
[d] anisafitrimidani@gmail.com
* corresponding author

ARTICLE INFO
Article history:
Received date:
2020 September 10th
Revised date:
2020 October 7th
Accepted:
2020 October 23rd
Published:
2020 November 7th
Keywords:
Number of bacteria
Colonies
Chili sauce

ABSTRACT
Chili sauce is a food additive made from chili which is processed from the processing of chili that is cooked and of good quality with the addition of other ingredients. There is a chili sauce in the form of packaging and processed home industry, the use of chili sauce in the community is often presented as a supplement to a variety of foods. However, the cleanliness of chili sauce still needs to be questioned considering the factors that can affect the contamination of chili sauce can be obtained from processing, serving and contamination from the surrounding environment. This study aims to determine the number of bacteria in the chili sauce in meatball traders on daya nasional street. The research design used is descriptive. The sampling technique in this study was by total sampling. The research method used is the Total Plate Count (TPC) method. The number of samples taken in this study amounted to 8 samples. Based on the results of the study, the highest number of germs is $2x10^6$ colonies / gr and the lowest is $3.4x10^4$ colonies/gr, it can be concluded that the entire sample in this study did not meet the conditions set out in Standar Nasional Indonesia (SNI) about chili sauce No. 7388 in 2009 which is a maximum of $1x10^4$ colonies/gr.

INTRODUCTION

Food is rarely found in a sterile state, but there are some foods that can limit the growth of certain types of microorganisms. Almost all foodstuffs are contaminated by various microorganisms, especially from the surrounding environment such as air, water, soil, dust, dirt, or rotten organic matter[2]. The main factors affecting include temperature, water, pH, and the availability of oxygen[2]. Microorganism contamination is a foreign object/unwanted material that is contained in a processed food and beverage. The presence of microbes in food that is considered as contamination is if the microbes cause a decrease in the quality of food / drinks, damage to food ingredients, as well as the emergence of disturbances in human health[3].

The food with the highest percentage of microbial contamination was ice drinks at 59.8%, followed by syrup and jelly / agar drinks. Then samples of fried snacks such as bakwan, fried banana, cilok, batagor, pempek and the like as well as market snacks showed the results were 27.4% contaminated by microbiologists[16]. The storage time for meat and animal materials has a big influence on bacterial growth.[15]

Chili are one food ingredient that has long been known as a spice that gives a spicy flavor to various dishes. Some people also use chili as a medicine. Chili plants actually consist of almost 20 species[4]. Chili sauce is a food additive made from chili which is

obtained from the processing of chili which is ripe and of good quality with the addition of other ingredients used as auxiliary materials. The taste and quality of chili sauce is very dependent on the quality and variety of chili that is used in its main raw material[5].

Food ingredients derived from chili sauce are widely circulated in the community, ranging from truly hygienic plastic containers to sauces that have a variety of mixtures of synthetic preservatives. The number of household industries that have sprung up and do not use the correct rules to make chili sauce have caused many sauces containing hazardous substances to circulate in the community[6]. According to Mansauda (2014), to test the presence of bacterial contamination calculated based on Total Plate Count (TPC), to test for Coliform bacteria contamination and to identify the presence of *Escherichia coli* bacteria. The maximum limit of microbial contamination in chili sauce for Total Plate Count (TPC) that is maximum $1x10^4$ colonies/gr for the coliform test that is < 3 APM/g and for mold contamination, which is a maximum of 50 colonies/g[7].

Chili sauce is often served as a supplement to a variety of foods, for example in snacks meatballs. Meatballs is the most popular snacks enjoyed by school children to adults because it has a savory taste and with a relatively cheap price. However, the cleanliness of these foods needs to be questioned, especially in chili sauce and other accompanying spices, considering how the making and selling of these foods are susceptible to bacterial contamination, which can be dangerous.

MATERIALS AND METHODS

This research was designed descriptively. The sampling technique in this study was by total sampling. The research method used is the Total Plate Count (TPC) method. The population of this research is the chili sauce used by eightmeatballs traders on Daya Nasional street. The sample used for the study of chili sauce used by meatballs traders on Daya Nasional street. This research was conducted in July 2019, and data analysis were carried out at the Bacteriology Laboratory of the Jurusan Analis Kesehatan Poltekkes Kemenkes Pontianak

RESULTS AND DISCUSSION

Based on the results of research conducted on 8 samples of different traders chili sauce obtained results;

Macroscopic

The results of macroscopic examination on growing colony, namely, vary in size from small, medium to large, the colony of grayish white colony shape is convex and some are flat, the surface of the colony's face shiny and the thickness of the soft colony.

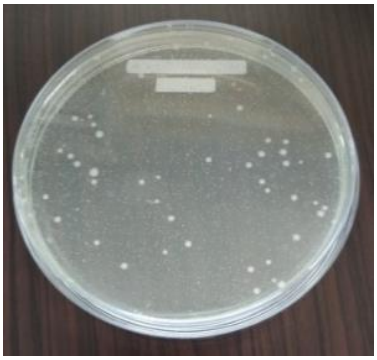

Figure 1 Macroscopic Colonies on PCA Media

Based on Figure 1, the macroscopic results of the colonies that grow on the media are varied in size, grayish white, the colony forms are convex, flat and the colony surface is shiny.

**Corresponding author: maulidiyahsalim@gmail.com*

Table 1 The Number of Bacterial Colonies in Each Sample

No	Sample Code	Number of Bacteria							TPC (Colonies/g)	Ket
		Control	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}		
1	SCPK 1	0	130	55	25	7	1	0	$3,4 \times 10^4$	TMS
2	SCPK 2	0	352	154	45	13	9	3	$3,0 \times 10^5$	TMS
3	SCPK 3	0	440	235	105	54	27	13	2×10^6	TMS
4	SCPK 4	0	189	93	40	21	17	9	$1,7 \times 10^5$	TMS
5	SCPK 5	0	175	100	43	19	7	1	$1,8 \times 10^5$	TMS
6	SCPK 6	0	111	61	27	14	6	0	$3,6 \times 10^4$	TMS
7	SCPK 7	0	120	69	30	17	11	5	$1,2 \times 10^5$	TMS
8	SCPK 8	0	390	184	73	35	15	10	1×10^6	TMS

Information : TMS : Not eligible
Threshold Value : 1×10^4 Colonies/g
Dilution : 1:100

MICROSCOPIC

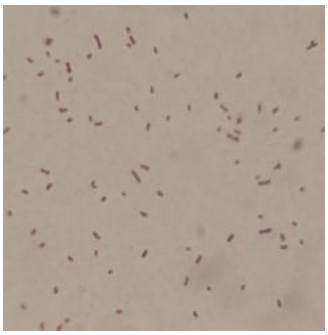

Figure 2 Gram Staining Result

Based on Figure 2, the microscopic results show the form of bacteria in the form of bacilli, red in color, gram-negative, and the bacterial structure spreads.

Data obtained from the results of the study are then processed with descriptive analysis, to simply describe the results of the research that has been done.

Table 2 Descriptive Statistical Analysis for bacterial number in chili sauce used by meatball traders on daya nasional street

	N	Minimum	Maximum	Mean
Dilution 1	8	111	440	238,37
Dilution 2	8	55	235	118,88
Dilution 3	8	25	105	48,50
Dilution 4	8	7	54	22,50
Dilution 5	8	1	27	11,63
Dilution 6	8	0	13	5,13
Valid N (*listwise*)	8			

Based on Table 2, it can be seen that bacteria from 8 traders of meatball obtained the highest number of bacteria counts found in SCPK sample 3 with a total number 2×10^6 colonies/g and the lowest number of bacteria figures found in SCPK 1 samel with the total number $3,4 \times 10^4$ colonies/g.

In accordance with the established reference though Standar Nasional Indonesia (SNI) about chili sauce No. 7388 in 2009 that various kinds of food products on the market must be guaranteed quality and safety. Likewise in consuming chili sauce, it must meet established standards.

**Corresponding author: maulidiyahsalim@gmail.com*

Calculation of the number of bacteria in a sample is done by the Total Plate Count method, where the sample is diluted using a specific diluent solution, in this study 0.9% NaCl diluent solution is used, this solution is used because it is neutral. The TPC method has the benefit of knowing the level of hygiene and sanitation or the quality of the chili sauce with an indicator that pollution has occurred in the chili sauce.

Temperature and humidity are supporting factors for the growth and reproduction of microbes, especially bacteria. In addition, the bacteria in processed foods can be caused by bad hygiene practices[24]. Microbiological contamination can occur due to several aspects. The first possibility is the lack of hygiene practice by food handlers during food processing. According to the results of personal hygiene, some food handlers do not use PPE, namely masks, gloves and aprons. In addition, there are food handlers who use hand hygiene when processing food processing[12].

Contamination or pollution is the entry of foreign substances into food that is not desired or desirable. Contamination is classified into several types, namely microbial pollution, such as bacteria, fungi, fungi. Physical pollution, such as hair, soil dust, insects and other impurities[8].

Microbial pollution includes pollution originating from bacteria, mushrooms, fungi and others. Microbial contamination can occur from planting fruit to processing it into a sauce coupled with pollution from other sources such as water. The discovery of bacteria is likely due to the use of unclean water both in washing and in the processing of chili sauce and the sanitation of the processors also affect the presence of bacteria in this sauce. Considering the results of observations that have been made the process of making chili sauce is processed by traders who use almost gallon water on average. Factors that can cause bacterial contamination include making materials, tools used, the use of hands and the environment.[9]

Equipment used in chili sauce storage can also be a source of contamination if the equipment used is not clean. Observation results also show that traders use refill chilli sauce containers for sample storage. The chilli sauce container is not washed with clean water before refilling the chili sauce while according Permenkes number 1096/Menkes/Per/VI/2011 About Jasaboga Sanitary Hygiene (2011)[10] states that food equipment used for food presentation may not contain bacterial colonies, food equipment must be free from contamination of microorganisms or bacteria.

Physical pollution includes pollution from hair, insect and other soil dust. As for one of the physical contaminants that can affect bacterial growth, among others, the sale location is on the side of the road with a dirty environment, namely the environment that is close to the gutter, exposure to vehicle smoke dust which can potentially be a source of pollution.[11]

Based on observations of the location of the sales of traders are on the side of the road where it is close to the sewers and garbage piles. This can make the container and chili sauce contaminated by the surrounding air, vehicle pollution and dust that carry microorganisms attached to the container and chili sauce. Food storage is one of food hygiene and sanitation. Poor storage of food ingredients can cause damage to these foods. The use of containers that are not resealed after use can also allow contamination. Food storage is good and right, the container should have a lid to avoid contamination of the outside air and the exposure of insects (flies) and storage in a clean, cool place and avoid direct sunlight.

The factors that can cause bacterial contamination, including the materials used, the tools used, the use of hands and the surrounding environment.[19] Another source of bacterial contamination is a tool used by traders, usually after being used, it is stored in an open state, allowing for an increase in microorganism pollution.[11] The food handlers need to use gloves, a source of pathogenic bacteria contamination can be through the use of unclean hands from making food to serving.[23] Pathogenic bacterial pollution can also be caused by a dirty environment, an environment that is close to a ditch, exposure to vehicle

**Corresponding author: maulidiyahsalim@gmail.com*

fumes can be a potential source of pollution[20]. Another possibility that can cause a high Total Plate Count (TPC) is from raw materials that do contain microbiology. The chicken intestine has microbiology in it, both beneficial bacteria and harmful bacteria such as coliform bacteria[13,14].

The results showed that from the 8 samples of chili sauce, it was found that all samples did not meet the SNI requirements on the bacteria number parameter. The highest number of bacteria counts is in the SCPK 3 sample with a total plate count of 2 x 10^6 colonies/g where the bacteria count exceeds the limits set by the Standar Nasional Indonesia (SNI) about chili sauce No. 7388 in 2009, namely the maximum amount of microbial contamination in chili sauce is 1x10^4 Colonies/g. This indicates that the chili sauce was contaminated with bacteria.

CONCLUSIONS

Based on the results of the study it can be concluded as follows the highest number of bacteria counts is in the SCPK 3 sample with a total number of bacteria 2 x 10^6 colonies/g and the lowest number of bacteria counts is in SCPK sample 1 with a total number of bacteria 3.4 x 10^4 colonies/g. All samples in the chili sauce in meatball traders on daya nasional street were contaminated with gram-negative bacteria. All samples did not meet the requirements of the Standar Nasional Indonesia (SNI) about chili sauce No. 7388 in 2009 with a maximum limit of 1 x 10^4 colonies/g.

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**Corresponding author: maulidiyahsalim@gmail.com*