Analysis of Hygiene and Sanitation in Catering Kudus Regency

David Laksamana Caesar[1*], Novianti Pravitasari[2], Ervi Rachma Dewi[3], Eko Prasetyo[4], Nur Salsabila Binti Azhar[5]

[1-4]Department of Public Health, Institut Teknologi Kesehatan Cendekia Utama Kudus, Indonesia
[5]Department of Environmental and Occuppational Health, University of Putra Malaysia, Malaysia

*Corresponding Author: caesar.david77@gmail.com

Abstract. Consuming unhealthy foods and drinks increases the risk of various diseases, including foodborne disease. Catering is declared healthy if it meets the requirements in the Republic of Indonesia Minister of Health Regulation Number 1096/Menkes/Per/VI/2011, including requirements for location, cooking equipment, sanitation facilities, and the behavior of food handlers. This research aims to describe the sanitation and hygiene conditions of catering services and the presence of Escherichia coli bacteria in food. This research method uses a cross-sectional analytical approach. Determining the number of samples in this study using the formula Slovin resulted in a sample size of 38. The number of respondents who met the inclusion criteria requirements was 20. The research instruments used were environmental sanitation hygiene test observation sheets and microbiology laboratory tests for the presence of Escherichia coli bacteria. The research results indicated that 15 (75%) catering services met the food service environmental sanitation hygiene were eligible, while 5 (25%) samples failed to meet these standards. Meanwhile, the variable for the presence of Escherichia coli bacteria in catering food met the eligible, namely 19 (95%), and only 1 (5%) sample contained Escherichia coli bacteria.

Keywords: Hygiene, Sanitation, Catering

INTRODUCTION

The number of companies operating in the food and beverage industry demonstrates the growth of the industry. One type of business is catering. This development is also supported by technological advances, which allow consumers to order food from home using smartphones and do not require consumers to come to the restaurant when they want to consume certain foods. Catering is a commercial business whose scope of activity is providing food and drinks to the public at its place of business (Ministry of Health of the Republic of Indonesia, 2011).

According to a report by the Central Statistics Agency (BPS), there were 4.85 million food and beverage businesses in Indonesia in 2023. This represents a 21.13% increase compared to the previous year. Of these, 167,500 were catering businesses (BPS, 2023)

Food processing places (TPM) are food processing businesses that include catering, restaurants, drinking water depots, canteens, and snack foods. TPM is declared healthy if it meets the requirements set by the government. These requirements include building location, sanitation facilities, kitchen conditions, food warehouse conditions, quality of food ingredients and prepared food, and food processing methods (Indonesian Ministry of Health, 2011).

One of TPM that is widely used by the community is catering. Catering usually provides various kinds of food and drink menus that consumers can order. Food and drinks provided by catering services are usually produced on a large scale, so the risk of pollution and contamination becomes higher. Therefore, hygiene and sanitation are important factors in providing food and drink so that the level of public health is guaranteed.

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 1096 of 2011, catering services are divided into 3 groups, namely catering class A, catering class B, and catering class C. Catering services in class A are those that still use home kitchens for cooking and only have a few employees. Class B catering is a catering service that has a separate kitchen from the house and serves the special needs of the community, such as Hajj dormitories, offshore drilling, domestic public transport, and companies. Meanwhile, catering class C is a catering service that has a special kitchen and only serves international transport needs.

Food hygiene and sanitation measures are an effort to maintain food quality and to free food from contamination during the processing process. This process starts from selecting raw materials to serving them to consumers. There are six important principles in food sanitation hygiene, including selecting

food ingredients, storing food ingredients, food processing, storing finished or cooked food, transporting food, and serving food. Food will easily be contaminated by biological, physical, or chemical materials if these six principles are not met. This will lead to extraordinary events (KLB) and various types of food-borne diseases (Bilqis, 2016).

According to the Central Java Health profile in 2017, there were 3 outbreaks of diarrhea in Indonesia, while in the same year there were 52 outbreaks caused by food contamination. Diarrhea cases in Central Java also continue to increase from year to year. This year, diarrheal diseases in Central Java ranked third highest. This outbreak of food poisoning occurred in 52 villages and sub-districts in Central Java (Provincial Health Office, 2017).

One of the most common contaminants in unhygienic food and beverages is Escherichia coli. E. coli is a gram-negative, facultative anaerobic, rod-shaped bacterium belonging to the Enterobacteriaceae family. It lives in the intestines and can multiply in the surrounding environment. This bacterium has an incubation period of 12 to 48 hours. Symptoms will appear in someone who has consumed contaminated food or beverages after 18 to 48 hours (Afriyanti, 2019).

The Food and Drug Monitoring Agency (BPOM) formed the Ready-to-Eat Food Industry (IPSS) to regulate food products from the ready-to-eat industry to remain safe, quality, and nutritious (BPOM, 2015). Not only does BPOM require the implementation of hygiene and sanitation in the food industry, but the health service also requires the implementation of hygiene and sanitation, especially in the catering sector. Apart from the owner and person in charge of the food service, employees must also know about food service hygiene and sanitation, especially food handlers or employees who work directly in contact with food.

According to BPOM data, in 2021, there were 106 cases of poisoning outbreaks reported to BPOM Semarang, with 144 victims sick and 1 person dead. The causes of poisoning were generally 100 cases of animal poisoning, 3 cases of food poisoning, and 1 case of poisoning with drugs, pesticides, and household chemicals (Febriana, 2019).

In research conducted by Caesar and Rohmah in 2021 regarding the presence of Escherichia coli bacteria in dawet ice drinks in Kudus Regency, it was found that the number of dawet ice contaminated with bacteria was 83.3% and was declared not to meet health requirements. Apart from that, in this research, it was also discovered that the personal hygiene and sanitation conditions of the dawet ice traders were also not in good condition (Caesar, 2021).

Another study conducted by Rokot et al. in 2023 at restaurants in North Minahasa Regency showed that the personal hygiene conditions of food handlers in good condition were 6 people (30%), and the food handlers whose personal hygiene conditions were in poor condition were 14 people (70%). Meanwhile, for the variable of the presence of Escherichia coli bacteria on cutlery, it was found that 13 samples (65%) of cutlery tested positive for containing bacteria, while only 7 cutlery samples (35%) of cutlery did not contain Escherichia coli bacteria (Cigarette, 2023).

Based on the profile of Kudus Regency in 2017, the number of catering service owners who already had hygiene certificates was 62. In the last 3 years, the Kudsu District Health Service recorded an increase in 18 catering services that had hygiene certificates. This is because many catering services do not extend the active period of hygiene certificates. Therefore, it is necessary to strictly monitor the hygiene and sanitation of catering services that have not yet extended the active period of their certificates, as well as the supervision of catering services that have only become active in the current period (SLH, 2017).

Therefore, this research aims to determine the description of hygiene, sanitation, and Escherichia coli bacteria that exist in catering services in Kudus Regency. The food service that is the sample in this research is a class A food service. Apart from this aim, this research also aims to provide education to food service business owners so that they can pay attention to food quality so that people can get quality food.

METHODS

This research uses a descriptive-analytical research design. This research emphasizes observing data on independent variables and dependent variables. This study employed a cross-sectional research design. According to Notoadmojo (2018), a cross-sectional study is research that emphasizes the time

of measurement or observation of independent variable data and the dependent variable calculated simultaneously at the same time. The research was conducted at class A2 catering services in Kudus Regency, with a population of 62 catering services. The research sample consisted of 20 samples, based on calculation results using the Slovin formula. The research locations are spread across all sub-districts in Kudus Regency.

The research instrument used an observation sheet according to Minister of Health Regulation No. 1096/Menkes/Per/VI/2011 to determine the sanitation variables of catering services. Meanwhile, to determine the Escherichia coli bacteria content, measurements were conducted in the laboratory using the following equipment and materials: 1) Test Tube, 2) Glass Beaker, 3) Erlenmayer, 4) Petri Dish, 5) Autoclave, 6) Analytical Balance, 7) Dry Sterilizer/Oven, 8) Test Tube Rack, 9) Dryglassky, 10) Round Ose, 11) Straight Ose, 12) Micropipette, 13) Bunsen, 14) Ice Box Cooler, 15) Spatula Spoon, 16) Sample Container, 17) Incubator, and 18) Colony Counter. While the materials needed for the process include 1) Food Sample (rice), 2) EMB agar media, 3) Nutrient Agar media, 4) 0.9% NaCl, 5) Aquades, 6) Aluminum Foil, and 7) 70% Alcohol. And the steps for taking rice samples are as follows:

1. Prepare tools and materials.
2. Sterilize hands and the work area using 70% alcohol.
3. Sterilize the spatula using Bunsen
4. Sterilize the container where the rice samples are stored.
5. Take and put rice samples in the prepared container, then close tightly and label each sample.
6. Take the sample to the laboratory using an ice box cooler.
7. Samples will be tested using the TPC test (total plate count).

Data were analyzed using descriptive analysis of each research variable. The analysis aims to determine the frequency and percentage distribution of catering environmental sanitation variables and the presence of Escherichia coli bacteria in food.

RESULTS AND DISCUSSION

This research was conducted on 20 A2 category catering services in Kudus Regency with details:

Tabel 1. Distribution Frequency of Catering Service Locations by Category A2

No	District	Frequence	Prosentase (%)
1	Kota	6	30
2	Bae	4	20
3	Mejobo	3	15
4	Jati	6	30
5	Gebog	1	5
	Total	20	100

Based on the above data, the largest distribution of catering services is in Kota and Jati Districts, with 6 catering services (30%). This is because the majority of catering services in Kudus Regency are located in these two districts. Furthermore, these districts are located in densely populated industrial and residential areas, allowing the catering business to grow rapidly.

Descriptive analysis was conducted on each research variable, namely environmental sanitation of catering services and the presence of E. coli bacteria in food. The results of the descriptive analysis for these variables can be seen in the table below:

Tabel 2. Descriptive Analysis of Environmental Sanitation of Catering Services and the E. Coli Bacteria

No	Variable	Frequence	Prosentase (%)
1	Sanitation of Catering		
	Not Eligible	5	25
	Eligible	15	75
2	Escherichia coli bacteria		
	Not Eligible	1	5
	Eligible	19	95
	Total	20	100

Based on Table 2, it is known that in the catering service sanitation variable, 5 samples (25%) did

not meet the catering service sanitation hygiene requirements, and 15 samples (75%) met the requirements. Meanwhile, for the variable of the presence of Escherichia coli bacteria, 19 samples (95%) did not contain Escherichia coli bacteria, and only 1 sample (5%) did not contain Escherichia coli bacteria.

1. Sanitasi Jasaboga

Environmental sanitation in catering establishments consists of two components: building condition and sanitation facilities. The study found that all catering establishments are located more than 500 meters from waste disposal sites or other sources of pollution. This aligns with Indonesian Minister of Health Regulation No. 1096/Menkes/Per/VI/2011. In addition to distance to waste disposal sites, building condition also includes ceiling height. Ceilings are clean and comply with established regulations. In general, catering establishments meet the requirements for ceiling height. Lighting and ventilation also meet regulatory requirements. Ventilation has been designed to remove steam, heat, and odors from the premises.

Furthermore, observations revealed that doors and windows are sturdy and can be easily opened outward. Catering establishment doors are also equipped with barriers to prevent insects and other insects from entering, reducing the risk of biological contamination. Based on the observations in this study, it was found that the doors and windows of catering establishments are designed to open inward but do not close automatically. This aligns with research conducted by Karina in 2016, which highlighted the importance of insect control devices in food processing areas. Flies and other insects in the kitchen are disease vectors that can contaminate and contaminate both ingredients and processed food (Karina, 2016)

Another component studied was the condition of the floors. The floors of catering establishments in Kudus Regency still do not meet standards. Some catering establishments still have slippery floors, cracked floors, or broken floors. Slippery and broken floors can increase the risk of workplace accidents. This contrasts with research conducted by Raras Ari in catering establishments in Semarang. This study found that the floors met regulatory requirements: watertight, level, non-slip, and easy to clean (Ari, 2016)

The minimum kitchen space for food processing is 2 square meters, but not all catering establishments meet this criterion. Food processing areas contain items unrelated to food processing, such as clothing and even bedding. Referring to the 2011 Minister of Health Regulation, the presence of items other than cooking utensils does not comply with regulations, and the presence of these items can increase the risk of food contamination.

The second component examined in the catering service sanitation variable is sanitation facilities. Based on the research, catering services in Kudus Regency generally use clean water sources from the Regional Water Company (PDAM) and dug wells. The water used is sufficient and meets physical requirements, namely, it is odorless, tasteless, and colorless. In terms of wastewater management, catering services have wastewater disposal channels or septic tanks. The waste generated is domestic waste from the washing of food ingredients, the washing of cooking and food utensils, and the use of toilets and bathrooms.

Other sanitation facilities include latrines and handwashing facilities. The number of latrines and handwashing facilities must be commensurate with the number of employees in each catering service. The minimum standard for the number of latrines is one for 1-10 employees, two for 11-25 employees, and three for 26-50 employees. The standard for the number of handwashing facilities is one for every 10 employees. Handwashing stations should be located in easily accessible locations close to the workplace. In general, most catering establishments meet the requirements for toilets and handwashing facilities.

The final sanitation facility required for every catering establishment is the availability of trash cans. Trash cans must be separated into organic and inorganic waste. Furthermore, trash cans must be covered and in sufficient numbers. While the number of trash cans in catering establishments in Kudus Regency meets the requirements and is covered, there is no separation process for organic and anorganic waste.

Overall, this study found that 25% of catering establishments do not meet the hygiene and sanitation requirements. This is consistent with research conducted by Wulandari et al. on restaurants in Yogyakarta. Wulandari reported that 67% of catering establishments did not meet the requirements set by the Minister of Health (Wulandari, 2024).

2. Bacteria of *Escherichia coli*

Based on the research results, it was found that only 1 (5%) catering service showed E. coli bacteria in the samples taken, while 19 (95%) other catering services did not find E. coli bacteria in their food samples. Laboratory examination of Escherichia coli bacteria in food showed a positive result when indicated by the presence of shiny, metallic green colonies with a black dot in the center of the colony growing on Eosin Methylene Blue Agar (EMBA) media. Based on BPOM Decree No. 13 of 2019 concerning the Maximum Limit of Microbial Contamination in Processed Foods, the maximum limit for E. coli bacteria in rice samples is 105 CFU/gram.

This means that in general, catering services are able to maintain hygiene during food processing, resulting in only 1 sample being found to be exposed to bacteria in their food. In addition to the processing process, food storage also influences bacterial contamination in food and beverages. According to Minister of Health Regulation Number 1096/Menkes/Per/VI/2011, food storage areas must be protected from physical, chemical, and biological contamination, including E. coli bacteria. Food containers must be separate for each type of food and have securely closing lids. Furthermore, storage must adhere to the principles of first in, first out (FIFO) and first expired, first out (FEFO).

Another factor influencing the presence of E. coli in food is the behavior of food handlers. According to Arumsari (2021), there is a significant relationship between food handler knowledge and the presence of E. coli bacteria in refilled drinking water in Sragen Regency. Poor food handler practices can be a factor in bacterial contamination of food and beverages. Food handlers must maintain good personal hygiene when preparing food and beverages (Arumsari, 2021)

Furthermore, Rahmayani's (2019) research also found that poor food handler behavior is associated with the presence of Escherichia coli bacteria in food and beverages. Rahmayani stated that food handlers' poor behavior in food and beverage processing includes not washing their hands before preparing food, and not wearing masks or aprons while preparing food. These behaviors can increase bacterial contamination in food and beverages (Rahmayani, 2019)

CONCLUSION

Based on the research conducted, it was found that 15 (75%) catering service environmental hygiene and sanitation standards were eligible, and 5 (25%) were not. Meanwhile, 1 (5%) sample identified Escherichia coli in food, and 19 (95%) samples were not identified. The government is expected to provide training and assistance to catering services in Kudus Regency, so that all catering services can maintain the safety of the food and drinks they produce.

REFERENCES

Afriyanti, L. N. (2019). Keberadaan *Escherichia Coli* Pada Makanan Di Kantin Sekolah Dasar. *Higeia Journal Of Public Health*, *3*(3), 417–429.

Ari, R.P. and Caesar, D.L., (2016). Higiene dan Sanitasi Makanan di Terminal Penumpang Pelabuhan Tanjung Emas Semarang. JKM (Jurnal Kesehatan Masyarakat) Cendekia Utama.

Arumsari, F., Joko, T. and Darundiati, Y.H., (2021). Hubungan higiene sanitasi depot air minum dengan keberadaan bakteri Escherichia coli pada air minum isi ulang di Kecamatan Mondokan Kabupaten Sragen. Media Kesehatan Masyarakat Indonesia, 20(2), pp.75-82.

Bilqis, R., Wahyuningsih, N., & Darundiati, Y. (2016). Faktor-Faktor Yang Berhubungan Dengan Jumlah Koloni Bakteri Dan Keberadaan *E. Coli* Pada Air Cucian Peralatan Makan Pedagang Makanan Di Tembalang. *Jurnal Kesehatan Masyarakat (EJournal)*, *4*(3), 888–896.

BPOM. (2019). Peraturan Badan Pengawas Obat Dan Makanan Nomor 13 Tahun 2019 Tentang Batas Maksimal Cemaran Mikroba Bpom. 2019. Peraturan Badan Pengawas Obat Dan Makanan Nomor 13 Tahun 2019 Tentang Batas Maksimal Cemaran Mikroba Dalam Pangan Olahan. Indonesian Drug An. *Indonesian Drug And Food Control*, 1–48.

Caesar, D. L., & Rohmah, U. (2021). Analisis Bakteri *E. Coli* Minuman Es Dawet Di Kabupaten Kudus. *J-Kesmas: Jurnal Kesehatan Masyarakat*, *7*(1), 59. Https://Doi.Org/10.35329/Jkesmas.V7i1.1931

Dinas Kesehatan Provinsi Jawa Tengah. (2017). *Profil Kesehatan Profinsi Jawa Tengah Tahun 2017*. *3511351*(24), 1–112.

Febiana, M. (2019). *Laporan Tahunan 2021 BPOM Semarang*. Semarang

Karina, A.I., (2016). Isolasi dan Identifikasi Bakteri Penambat Nitrogen, Pelarut Fosfat, dan Bakteri Pendegradasi Selulosa pada Tanah Bekas Tanaman Bawang Merah (Allium cepa L.) yang Diberi Biofertilizer (Doctoral dissertation, Universitas Airlangga).

Kemenkes RI. (2011). Permenkes RI No. 1096/Menkes/Per/ Vi/2011 Tentang Higiene Sanitasi Jasaboga. *Journal Of Chemical Information And Modeling*, *53*(9), 1689– 1699. Https://Peraturanpedia.Id/Peraturan-Menteri-Kesehatan-Nomor-1096- Menkes-Per-Vi-2011/

Kemenkes RI. (2021). *Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/4788/2021*. 1–60.

Notoadmodjo. (2018). *Metode Penelitian Kesehatan*. Jakarta: Rineka Cipta

Rahmayani, R.D. and Simatupang, M.M., (2019). Analisis pengaruh higiene penjamah dan sanitasi makanan terhadap kontaminasi E. coli pada jajanan sekolah. Jurnal Untuk Masyarakat Sehat (JUKMAS), 3(2), pp.164-178.

Seftyana Dwi, W., (2024). Uji Kelaikan Fisik Jasaboga Golongan A2 Di Rumah Makan Jl. Wahid Hasyim, Caturtunggal, Depok, Sleman, Yogyakarta Tahun 2024 (Doctoral dissertation, POLTEKKES KEMENKES YOGYAKARTA).