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## Original Research

# Overview of Environmental Conditions and Personal Hygiene for the Presence of Pathogenic Germs in Food at Tanggo Rajo Culinary Tourism

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## Abstract

Foodborne disease refers to a condition when the body is affected by microbial toxins or substances that enter through the consumption of food. The World Health Organization (WHO) has reported that around 1 in 10 individuals worldwide fall ill and experience 420,000 fatalities annually due to foodborne illnesses or food poisoning. Additionally, these incidents result in a loss of 33 million years of healthy life each year. The objective of the study is to assess the ambient and personal hygiene conditions and their impact on the presence of harmful microorganisms in food during culinary excursions in Kanggano Rajo. This study was employed a quantitative research approach with a descriptive design and a cross-sectional research design. The study population consists of 101 individuals engaged in the street vendors culinary items during the Culinary Tour of Tanggo Rajo. The findings indicated that 68.5% of the respondents needed to fulfill their hygiene preferences. Additionally, study was reported unsuitable environmental sanitation conditions, 57.4% reported inadequate water condition, 77.8% reported improper waste handling, 81.5% reported inadequate waste disposal, and 100% reported insufficient vector control. The microbiological test results revealed the presence of *Enterobacter Hafniae* in 2 samples, *enterobacter aerogenes* in 16 samples, and *Klebsiella Azaenae* in 36 samples. Empowering and enhancing education in all critical sectors is advisable while ensuring effective monitoring and evaluation.

**Keywords:** Environmental Sanitation, Personal Hygiene, Pathogenic Germ, Food Safety

## INTRODUCTION

Food is included in the primary needs of each individual, which must be fulfilled every day because food contains the nutrients humans need. The number of populations that continue to increase will affect the increase in the amount of food consumed by humans. Hence, the food we consume is mandatory to fulfill nutrition and must also be guaranteed to human health (Sandika & Asti Mulasari, 2019).

Insufficient food hygiene can cause disease or health problems and death. Food hygiene is needed to determine food safety and ensure that the food is not contaminated from manufacture to eating. Food can be contaminated during staple preparation, processing, storage, distribution, removal, and serving. Contamination can result in food as a medium for

a disease. Illnesses caused by contaminated food are called foodborne diseases (*disease*) (Suryani & Astuti, 2019).

Foodborne diseases are infectious diseases or poisoning caused by microbes or agents that enter the body through food consumed. WHO states that 1 in 10 people worldwide fall ill due to foodborne illness or food poisoning, resulting in 420,000 deaths and 33 million years of healthy life lost each year. Even in the United States, there are an estimated 48 million cases of foodborne illness yearly (World Health Organization, 2022).

Bacteria belonging to the family Enterobacteriaceae are bacteria commonly found contaminating food and beverages, both cooked, frozen, and uncooked and not<sup>21</sup> Bacteria belonging to the family Enterobacteriaceae are bacteria widely found contaminating food and beverages which are bacteria that cause diarrhea (Bintara Birawida et al., 2020). Enterobacter Hafniae is a gram-negative rod bacterium found in feces, soil, and water. These bacteria can cause nosocomial infections associated with gastrointestinal diseases, wound-related diseases, pneumonia, and bacteremia of the urogenital tract (Tombokan et al., 2016).

The primary sources of food contamination come from workers, equipment, garbage, insects, rodents, and environmental factors such as air and water. The source of food contamination that has the most significant influence on contamination is food handlers. Food processors' health and hygiene considerably influence the quality of the products they produce, so they need serious attention (Satyaningsih et al., 2017).

Food safety efforts in Indonesia to prevent foodborne diseases are of particular concern to the government. Food safety is the most critical factor in improving the degree of health. This is evidenced by the existence of regulation No. 86 of 2019 concerning food safety, which prevents the possibility of contaminated or contaminated food that can be detrimental to health so that it is safe for consumption by consumers (Hadi et al., 2021).

Food processing places (TPM) are one of the categories of public places that provide a lot of food for the community, and TPMs have considerable potential to cause health problems due to food. TPM is a place that sells and provides cooked food, ranging from restaurants to restaurants, including street vendors. Contrary to restaurant or restaurant entrepreneurs who sell food in permanent buildings, Street Vendors (PKL) usually trade anywhere in the crowd, such as on the roadside, in markets, including in schools, and also trade hawker food using carts, cars, or settled only using makeshift facilities. Based on these conditions, street vendors have a considerable potential to cause health problems caused by food made or a large potential for contaminated food sold (Dwi Rahmayani & Melviana Simatupang, 2019; Keputusan Menteri Kesehatan Republik Indonesia Nomor 942/MENKES/SK/VII/2003 Tentang Pedoman Persyaratan Hygiene Sanitasi Makanan Jajanan, 2003).

Based on 2020 data, the percentage of food processing sites in Jambi Province that meet health requirements has reached the target of 46.30 from the inaugurated target of 40%. However, it still needs to be satisfactory and decreased compared to 2019 by 57.10%. Food processing sites still need to meet environmental health requirements in terms of hygiene and sanitation and from the physical building. Diarrheal disease is one of the diseases carried by bacteria in food; according to data in the Profile of the Jambi Provincial Health Office in 2021, the discovery of diarrhea sufferers of all ages in Jambi Province amounted to 37,148 cases (38.%) scattered in 11 regencies/cities. According to the Jambi City Health Profile, the number of diarrhea cases for all ages in Jambi Province in 2021 in Jambi City was 3,820. In 2020, Jambi City was 5,834 (12.57%). In 2019, Jambi City, with the highest number of diarrhea cases for all ages in Jambi Province, was 13,799 (19.47%) in 2019. In 2022, there was 1 case of food poisoning in as many as six people (Dinas Kesehatan Kota Jambi, 2023).

We find many food processing sites (TPM) in tourist attractions. Food sold in public places is prone to disease transmission due to a lack of health requirements in terms of hygiene and sanitation. Tourist destinations that are quite crowded are visited and used as culinary tourism destinations in Jambi City, one of which is Tanggo Rajo culinary tourism, which coincides under the bridge on the banks of the Batang Hari River.

From the E-Monev HSP (Food Sanitation Hygiene) of the Directorate of Environmental Health of the Ministry of Health of the Republic of Indonesia in 2022, the results of the IKL (environmental health inspection) conducted by the Tanjung Pinang Health Center Sanitarian Officer that the Tanggo Rajo Ancol Jambi Hawker Food Center still does not meet the requirements with a suitability value of 65 while the suitability value for hawker food centers is 80. The preliminary study will be conducted by conducting interviews on February 9, 2023, with Tanjung Pinang Health Center sanitation officers, where Tanggo Rajo culinary tourism is the working area of the Tanjung Pinang Health Center. Based on the description above, researchers are interested in researching the Description of Environmental Conditions and Personal Hygiene on the Presence of Pathogenic Germs in Food in Tanggo Rajo Culinary Tourism.

## **METHODS**

This research was quantitative research with a descriptive and cross-sectional research design. The sampling technique used was accidental sampling using the Lameshow formula with a sample size of 54 people. The study was conducted at the Tanggo Rajo Culinary Tourism Place.

Research variables include the provision of clean water, waste handling, waste disposal, vector control, personal hygiene, and the presence of pathogenic germs. Data was collected by observing and examining food samples at the Jambi Provincial Health Laboratory. Next, the data was analyzed descriptively in the form of distribution frequency and percentage, data was presented in tabular form.

## **RESULTS**

Based on Table 1 above, on the characteristics of respondents from 54 respondents, it was known that respondents based on gender and age can be seen through the respondent distribution table. The distribution of respondents according to sex characteristics, dominated by the female sex, was 41 people (75.9%), compared to male respondents which were 13 people (24.1%).

Based on the age of 54 respondents, it can be seen that the respondents who are at least aged >66 years are as many as one person (1.9%), while most respondents aged 36-45 years are as many as 16 people (29.6%). Respondents aged 26-35 years were 14 people (25.9%), respondents aged 46-55 years were ten people (18.5%), respondents aged 56-66 years were seven people (13.0%), and respondents aged 66-25 years were six people (11.1%) (Table 1).

**Table 1.** Characteristic of Respondent

Variable	Frequency	Percentage (%)
<b>Sex</b>		
Male	13	24,1
Female	41	75,1
<b>Age</b>		
16-25	6	11,1
26-35	14	25,9
36-45	16	29,6
46-55	10	18,5
56-66	7	13
>66	1	1,9

*Data source: Primer data*

Based on Table 2, out of 54 respondents, the provision of clean water mainly was unqualified, namely 31 people (57.4%), while those who met the requirements were as many as 23 people (42.6%). Waste handling with the majority of respondents who did not meet the criteria was 42 people (77.8%), while those who met the requirements were as many as 12 people (22.2%). For waste disposal, the majority of unqualified people were 44 (81.5%), and those who met the requirements were as many as ten (18.5%). In vector control, from 54 respondents, it can be known that none of the respondents meet the requirements of 54 samples (100%). Most respondents qualified less than 37 people (68.5%), while the qualified respondents were as many as 17 people (31.5%) in the personal hygiene variable. All respondent's food samples were sent to the laboratory. The result found pathogenic germs *Enterobacter Hafniae* in as many as two samples, *Enterobacter aerogenes* in as many as 16 samples, and *Klebsiella Azaenae* in as many as 36 samples.

**Table 2.** Frequency Distribution of Research Variables

Variable	Frequency	Percentage (%)
<b>Clean Water Supply</b>		
Not eligible	31	57,4
Qualify	23	42,6
<b>Waste Management</b>		
Not eligible	42	77,8
Qualify	12	22,2
<b>Sewage</b>		
Not eligible	44	81,5
Qualify	10	18,5
<b>Vector Control</b>		
Not eligible	54	100
Qualify	0	0
<b>Personal Hygiene</b>		
Not eligible	37	68,5
Qualify	17	31,5
<b>Pathogenic germs</b>		
Not eligible	54	100
Qualify	0	0

*Data source: Primer data*

## **DISCUSSIONS**

### **Environmental Conditions**

#### **Clean Water Supply**

Aware of the research results, providing clean water for food handlers in Tanggo Rajo Ancol had yet to meet all health requirements. Univariate results from the frequency of research questionnaires found that each question showed a high percentage of yes questions about clean water sources being odorless, clean water sources being colorless, and clean water sources being tasteless (100%). Then, the highest proportion of no questions was obtained by questions about having a clean water source used sufficiently (70.4%), clean water sources used not close to pollution sources (50.0%), and questions about water reservoirs having a lid (63.0%).

Notoatmodjo (2010) states that physically healthy water is clear (colorless), tasteless, and odorless. How to detect it can use the five senses; clean water must meet the requirements, namely (1) Quantity: clean water is available at least 60 liters/per person/day; (2) quality: clean water is available that meets health requirements (physical, chemical, and bacteriological), (3) continuity: clean water is available in every activity that requires water on an ongoing basis. Providing qualified clean water significantly affects daily activities in restaurants, ranging from washing materials, washing equipment, and food processing. If the water quality does not meet the health requirements, it can be a medium of disease transmission. Clean water and good sanitation are essential elements that support human health (Riana & Sumarmi, 2018).

#### **Waste Management**

Based on the results of research that has been conducted on the waste handlers of food handlers in Tanggo Rajo Ancol with the majority of unqualified respondents. In general, garbage is collected in plastic containers that leak and do not have a cover, so garbage or food remnants were quickly scattered out and cause unpleasant odors. It can invite insects or rats that may be at risk of contaminating food. Even though a trash can that is suitable for use should be made of waterproof material, not easily rusted and closed, the number and volume of trash cans must be adjusted to the production of waste produced every day. They must be disposed of within 24 hours in accordance with the Indonesian Ministry of Health 1098/Menkes/SK/VII/2003 concerning Sanitary Hygiene Requirements for Restaurants (Yunus et al., 2015).

Garbage is a breeding ground for flies. Flies that are increasingly breeding will contaminate food more often. Garbage is not appropriately handled, disposed of in unsealed plastic bags, and disposed of carelessly/not transported by officers, even though street vendors pay a garbage levy (Sunaryo, 2021). This can lead to the development of disease vectors such as flies, cockroaches, rats, and so on. An open pile of garbage will attract pests or other insects and carry bacteria to the food/drink. An insect can spread disease in several ways, including through the vomit of flies. Vomit from flies on food is full of germs, and pathogens in the fly's body live longer than those on its feet. This means there is a greater chance of bacteria and viruses staying alive. The germ will mix with vomit and remain in the mouth until it lands on food and dies of illness (Sinaga & Weni Base, 2022).

According to Notoatmodjo (2011), waste is closely related to public health because, from the waste, various disease-causing microorganisms (pathogenic bacteria) and insect animals live as a transfer or spreader of disease (vectors). Therefore, waste handling must be done correctly, not only for the sake of health but for the beauty of the environment.

### **Sewage**

Based on the research that has been conducted, the waste disposal of food handlers in Tanggo Rajo Ancol still needs to meet health requirements. Univariate results from the frequency of research questionnaires found that each question showed a high percentage of yes questions on questions about sewage dumps not adjacent to clean water sources (59.3%), leftover dishwashing, and other equipment accommodated in one place. Then they were discharged into sewers (63.0%), and there were questions about non-pooled wastewater channels (66.7%). Then, the highest proportion of no questions was obtained by questions about smooth wastewater flow (68.5%), sewerage in good condition (not leaking) (77.8%), and questions about where wastewater lines are routinely cleaned (77.8%).

According to Notoatmodjo (2011), Wastewater is the remaining discharged water from households, industries, and other public places and generally contains substances that can harm human health and disturb the environment. If wastewater disposal facilities are unavailable, they can contaminate water, soil, and vegetation and become breeding grounds for flies and insects that can spread various diseases.

### **Vector Control**

Based on the research results, the vector control of food handlers in Tanggo Rajo Ancol still needs to meet the health requirements of 54 respondents. Univariate results from the frequency of research questionnaires found that each question showed a high percentage of yes questions obtained on questions about no cockroaches at all around the point of sale (38.9%), no rats at all around the end of sale (100%), and about questions no pets roaming around (48.1%). Then, the highest proportion of no questions was obtained by questions about traders never saw vectors roaming around the place of sale (92.6%), there were traps for rats (92.6%), and questions about routine spraying of flies, cockroaches, and rats periodically at least two times a year (100%). A disease vector is an organism that transmits pathogens or parasites from animals or humans to other humans. One of the efforts that can be made in controlling infectious diseases is by controlling vectors (disease-transmitting insects) to break the chain of disease transmission.

### **Personal Hygiene**

The research results on the personal hygiene of food handlers in Tanggo Rajo Ancol was from 54 respondents, and most respondents still need to meet the requirements. Univariate results from the frequency of research questionnaires found that each question showed a high percentage of yes questions obtained on questions at the time of processing (100%), namely not sneezing or coughing on direct food, not spitting carelessly, not chewing food/candy, not scratching limbs without washing hands or using hand sanitizer before handling food again, And on the question, if injured then the wound is closed with a bandage / similar and closed with a waterproof cover and clean condition (100%). Then the highest proportion of non-questions was obtained by questions using PPE such as aprons (79.6%), masks (83.3%), hairnets/coverings (57.4%), conducting health checks at least 1 (one) time a year (74.1%), and questions that have received ready-to-eat food safety counseling (94.4%).

Supporting good practices to form correct personal hygiene behavior, the need for facilities that support the hygiene of handlers, such as hand washing and soap stations, completeness of work clothes (aprons, hair covers, masks, and gloves), this is supported by the regulation of the Ministry of Health of the Republic of Indonesia No. 942 / MENKES / SK / VII / 2003.

### **Pathogenic germs**

The results of the study conducted on street vendors in Tanggo Rajo Culinary Tourism Jambi City showed that all respondents in food samples sent to the laboratory (100% of samples). There were pathogenic germs. Findings were obtained from laboratory results, namely *Enterobacter Hafniae*, as many as two samples, *Enterobacter aerogenes*, as many as 16 samples, and most found *Klebsiella Azaenae*, as many as 36 samples.

Bacteria members of the Enterobacteriaceae family are bacteria commonly found contaminating food and drinks, both cooked, frozen, and uncooked and uncooked. Some bacteria belonging to the family Enterobacteriaceae are pathogenic, including members of the genera *Enterobacter*, *Serratia*, *Escherichia*, *Proteus*, *Salmonella*, *Shigella*, and *Klebsiella*.1 *Klebsiella* (Darna et al., 2018).

According to Jawetz et al. (2012), Bacteria belonging to the family Enterobacteriaceae are bacteria commonly found contaminating food and drinks that are bacteria that cause diarrhea. *Enterobacter Hafniae* is a gram-negative rod bacterium found in feces, soil, and water. These bacteria can cause nosocomial infections associated with gastrointestinal diseases, wound-related diseases, pneumonia, and bacteremia of the urogenital tract (Tombokan et al., 2016). *Enterobacter aerogenes* is a pathogenic bacterium that can cause opportunistic infections of the skin 5%, gastrointestinal tract 10%, urinary and genital tract 4%, respiratory tract 6%, and post-operative infection 10%, resulting in peritonitis. *Klebsiella Azaenae* is a gram-negative bacterium with polysaccharide capsules whose natural habitat is humans and animals' gastrointestinal tract. The *Klebsiella* group causes disease pathogenesis with nonspecific factors similar to *E. coli*, such as in patients with UTIs, diarrhea, sepsis, and meningitis.

Sanitation indicator bacteria are a type of bacteria that, when found in food, serve as an indication that the water or food has been polluted by human excrement. Sanitary indicator bacteria are often abundant and reside in the human intestinal tract. Therefore, the existence of these bacteria in food suggests that at some point during food processing, they have come into contact with excrement from the human gut and could be carrying additional dangerous pathogenic germs (Asokawati et al., 2015).

### **CONCLUSIONS**

The investigation found that the majority of personal hygiene and general sanitation conditions failed to meet the necessary standards. Additionally, all food samples were found to contain harmful microorganisms. It is advisable for all pertinent sectors to strengthen, enhance education, and carry out monitoring and assessment.

### **REFERENCES**

- Asokawati, R., Chahaya, I., & Dharma, S. (2015). Gambaran Higiene Sanitasi Penyelenggaraan Makanan dan Keberadaan Bakteri *Escherichia coli* pada Peralatan Makan di Lingkungan Kantin Universitas Sumatera Utara Tahun 2015. *Lingkungan Dan Keselamatan Kerja*, 4(3), 1–9.
- Bintara Birawida, A., Selomo, M., Fajaruddin Natsir, M., Rahmawati, I., & Rachmat, M. (2020). Sanitasi Dan Keberadaan Bakteri Pada Air Minum Dengan Risiko Diare Di Pulau Barrang Lompo. *Jurnal Nasional Ilmu Kesehatan (JNIK) LP2M Unhas*, 3(1), 1–13.
- Darna, Turnip, M., & Rahmawati. (2018). Identifikasi Bakteri Anggota Enterobacteriaceae pada Makanan Tradisional Sotong Pangkong. *Jurnal Labora Medika*, 2(2), 6–12.

- Dinas Kesehatan Kota Jambi. (2023). *Data Kesehatan Kota Jambi*. Dinas Kesehatan Kota Jambi.
- Dwi Rahmayani, R., & Melviana Simatupang, M. (2019). Analisis Pengaruh Higiene Penjamah Dan Sanitasi Makanan Terhadap Kontaminasi E. Coli Pada Jajanan Sekolah. *Jurnal Kesehatan Masyarakat*, 3(2).
- Hadi, B. R. I., Asih, A. Y. P., & Syafiuddin, A. (2021). Penerapan Hygiene Sanitasi Makanan pada Pedagang Kaki Lima. *Media Kesehatan Masyarakat Indonesia*, 20(6), 451–462.
- Jawetz, Melnick, & Adelberg. (2012). *Mikrobiologi Kedokteran* (25th ed.). EGC.
- Keputusan Menteri Kesehatan Republik Indonesia Nomor 942/MENKES/SK/VII/2003 Tentang Pedoman Persyaratan Hygiene Sanitasi Makanan Jajanan, (2003).
- Riana, A., & Sumarmi, S. (2018). Hubungan Kontaminasi Coliform Dan Skor Perilaku Higiene-Sanitasi Pada Pedagang Jajanan Di Kantin Sekolah Dan Pedagang Keliling. *Media Gizi Indonesia*, 13(1), 27.
- Sandika, Y., & Asti Mulasari, S. (2019). Hubungan antara Higiene Sanitasi Pedagang dengan Keberadaan Bakteri Escherichia Coli pada Milkshake. *Jurnal Fakultas Kesehatan Masyarakat*, 13(1), 30–36.
- Satyaningsih, A., Sabulu, Y., & Munandar, S. (2017). Gambaran Higiene Sanitasi Dan Keberadaan Escherichia Coli Dalam Jajanan Kue Basah Di Pasar Kota Kendari Tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2(5), 1–10.
- Sinaga, E. R., & Weni Base, M. O. (2022). Gambaran Sanitasi Pedagang Kaki Lima dan Kandungan Bakteri Escherichia Coli Pada Es Batu serta Olahan Kelapa Muda di Kelurahan Kelapa Lima. *Oehonis : The Journal of Environmental Health Research*, 5(1), 36–40.
- Sunaryo. (2021). Kondisi Hygiene dan Sanitasi Pedagang Sate Ayam di Kecamatan Kota Kabupaten Ngawi. *2-TRIK: Tunas-Tunas Riset Kesehatan*, 11(4), 196–202.
- Suryani, D., & Astuti, F. D. (2019). Higiene dan Sanitasi pada Pedagang Angkringan di Kawasan Malioboro Yogyakarta. *Jurnal Kedokteran Dan Kesehatan*, 15(1), 70–81.
- Tombokan, C., Waworuntu, O., & Buntuan, V. (2016). Potensi Penyebaran Infeksi Nosokomial Di Ruang Instalasi Rawat Inap Khusus Tuberkulosis (IRINA C5) BLU RSUP Prof. Dr. R. D. Kandou Manado. *Jurnal E-Biomedik (EBM)*, 4(1), 1–8.
- World Health Organization. (2022). *Food safety*. <https://www.who.int/news-room/fact-sheets/detail/food-safety>
- Yunus, S. P., Umboh, J. M. L., & Pinontoan, O. (2015). Hubungan Personal Higiene dan Fasilitas Sanitasi dengan Kontaminasi Escherichia Coli Pada Makanan di Rumah Makan Padang Kota Manado Dan Kota Bitung. *JIKMU*, 5(2), 210–220.