

Detection of Salmonella sp. and Escherichia coli on Chicken Meat at Tamiang Layang Market

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Detection of *Salmonella* sp. and *Escherichia coli* on

Chicken Meat at Tamiang Layang Market

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ABSTRACT

Salmonella sp. and *Escherichia coli* (*E. coli*) are the two most important pathogens because they are indicators of food safety and sanitation indicators, because they can potentially pose a high risk of foodborne disease. This study aims to look at the prevalence of *Salmonella* sp. and *E. coli* in the Tamiang Layang Market as a supervision of food safety. A total of 6 chicken breast samples were taken at all chicken traders in the Tamiang Layang market. Testing the presence of *Salmonella* sp. and *E. coli* using MC-Media Pad. The existence of *Salmonella* sp. and *E. coli* in chicken meat at the Tamiang Layang market were 66.6% and 83.3%. The need to improve hygiene and sanitation of chicken traders.

Keywords: chicken meat, *Escherichia coli*, *Salmonella* sp. market

INTRODUCTION

Food is the most important basic human need in maintaining a healthy body, growth, and improving people's intelligence. Meat is an important food ingredient in meeting nutritional needs. ⁴ Chicken meat is one of the sources of high-quality animal protein that is much in demand by the community because it is easily digested, can be accepted by the majority of people and the price is relatively cheap.

Chicken meat is muscle tissue obtained from chicken which is commonly used for food consumption purposes. The speed at which meat breaks down depends on the number of initial microbes. The greater the number of initial microbes in the meat, the faster the damage will be. Microbial contamination in foodstuffs of animal origin and its products is a problem of major concern for consumers. There are many potential critical points for the occurrence of contact and entry of microbes into food from animal origin and their processed products, therefore it is necessary to identify microbial contaminants in maintaining food safety from farm to dining table (safe from farm to table).

Contamination of pathogenic microbes in animal foods such as chicken is a health problem that needs attention. Several types of pathogenic bacteria that can ¹ contaminate chicken meat are *Salmonella* sp. and *Escherichia coli* (*E. coli*). Both types of bacteria are the main cause of Foodborne disease. Foodborne disease is a disease that occurs due to consuming food contaminated with microbes such as bacteria with common symptoms of abdominal pain, vomiting, diarrhea, dizziness, convulsions, and

fever (CDC 2018). Food safety assurance or foodstuffs have become demands along with the increasing public awareness of health.

Tamiang Layang Traditional Market is the main market that provides chicken meat every day for the people of East Barito. At the Tamiang Layang traditional market, there are eight stalls selling chicken meat. Chicken meat can be contaminated in the slaughterhouse, at the point of sale, and during processing with incomplete cooking. The possibility ¹ of *Salmonella* sp. and *E. coli* in chicken meat during the sales process at the Traditional Tamiang Layang market, it is necessary to conduct research to detect the presence or absence of *Salmonella* sp. bacterial contamination and *E. coli* in chicken sold in the Tamiang Layang traditional market. Information about the contamination of these two bacteria in chicken meat products sold at the Tamiang Layang traditional market will be able to increase the awareness of the Tamiang Layang community in particular and East Barito in general in buying and consuming chicken meat sold in traditional markets in East Barito.

MATERIALS AND METHODS

A total of 6 chicken meat samples were obtained from chicken traders at the Tamiang Layang market, East Barito. The samples taken were put into a sterile plastic antong and stored in a cooler box containing an ice pack and immediately taken to the laboratory for bacteriological testing.

Isolation and Presence of *Escherichia coli*

A total of 50 grams of chicken thigh meat was weighed then added with 450 mL of Phosphate Buffered Saline (FBS), after which it was homogenized using a stomacher. Prepare the MC-Media Pad E. coli test kit by opening the aluminum cap, then opening the transparent pad cover and then dropping 1 mL of a mixture of chicken meat with homogeneous FBS earlier. Enter it slowly diagonally, then close it again. Mc-Media Pad

E. coli was inserted into a petri dish, given a code, ⁵ then incubated at $35 \pm 1^\circ \text{C}$ for 24 ± 2 hours. AOAC OMA 966.24 (Cer 070901) was used as a positive control. Colonies and the presence of E. coli will appear as purplish-red colonies (Millipore 2017).

Isolation of the presence of Salmonella sp.

A total of 10 grams of thigh meat samples were weighed then mixed with 90 mL of Phosphate Buffered Saline (FBS) solution, after which it was homogenized with a stomacher. Prepare the MC-Media Pad Salmonella test kit by opening the aluminum cover, then opening the transparent pad cover and then dropping 1 mL of the chicken meat mixture with homogeneous FBS earlier. Insert it slowly diagonally, then close it again. Mc-Media Pad Salmonella sp. put into a petri dish, given a code, ⁵ then incubated at $35 \pm 1^\circ \text{C}$ for 24 ± 2 hours. The colony and the existence of Salmonella sp. will appear as a light blue colony (Millipore 2017).

RESULT AND DISCUSSION

Based on bacteriological analysis in the laboratory ² to determine the presence of Salmonella and E. coli from chicken meat obtained from the Tamiang Layang market, 6 samples were examined with the following results in Table 1.

¹ Table 1. Presence of Salmonella sp. and Escherichia coli in chicken

Sampel	Salmonella sp.	Escherichia coli
⁶ Sampel 1	+	+
Sampel 2	-	+
Sampel 3	+	+
Sampel 4	-	-
Sampel 5	+	+
Sampel 6	+	+

² Table 1 shows that the presence of Salmonella sp. and E. coli were positive in 4 samples, i.e. sample (1,3,5,6), whereas in sample 2 it was negative ³ Salmonella sp. and positive in E. coli and in sample 4 negative for ³ both. Salmonella sp. and E. coli are food pathogenic bacteria that are transmitted by fecal or oral. The presence of these bacteria in food products of animal origin is caused by many factors of livestock/animal origin, the process of slaughtering, the process of transportation of the product to the market/retail, as well as handling at the sales location (Nel et al., 2004; Regalado-Pineda et al., 2020) Based on studies conducted on the wet market environment and small-scale processing plants in Perlis and Penang, Malaysia, Salmonella sp. not only in meat but also found in utensils and equipment used in processing, washing containers, soaking containers, tables, drains and floors around wet markets and processing plants. This suggests that this source is a potential risk for transmission of Salmonella sp. on chicken meat and its environment (Nidaulah et al., 2017). Poor sanitation ¹ and hygiene conditions and high humidity in the slaughterhouse and chicken

meat processing industry are ideal for biofilm formation by Salmonella sp. Bacteria. These biofilms are long-lasting and tend to protect Salmonella sp. from cleaners, so it is very risky to cross-contaminate Salmonella sp. in chicken and chicken meat shops (Smith et al., 2007).

Table 2. Prevalence of Salmonella sp. and Escherichia coli in chicken

Sampel	Prevalensi (%) (n=6)	
	Positif	Negatif
Salmonella sp.	4 (66,6)	2 (33,4)
Escherichia coli	5 (83,3)	1 (16,7)

Based on Table 2, the prevalence of Salmonella sp. 4 (66%) and E. coli 5 (83,35). The prevalence of E. coli is higher than that of Salmonella sp. high prevalence E. coli in chicken meat shows the low application of sanitation and personal hygiene in producing chicken meat at the Tamiang Layang Market. Salmonella sp. and E. coli are indicators of food safety and sanitation indicators on the food of animal origin. Meat is one of the main sources of contamination from Salmonella sp. and E. coli, therefore the importance of controlling and surveillance of the presence of these pathogens in food of animal origin (Hedican et al., 2007; Kirk et al., 2015).

The presence of Salmonella sp. and E. coli is not only reported in developing countries as well as in developed countries. Prevalence of Salmonella sp. at retail sales of chicken in Japan 54%. Ontario 37.7%. Egypt 44% (Furukawa et al., 2017; Doaa 2013, Lee and Middleton 2003). In addition, the existence of Salmonella sp. and E. coli was also reported in the chicken home processing industry and supermarkets in Trinidad

with a prevalence of 20.5% and Supermarkets 8, 3% (Khan et al., 2018) The high prevalence between home processing and supermarkets is due to a significant relationship in hot water immersion baths for hair removal and carcass cooling tubs (Khan et al., 2018). There is also cross-contamination at various stages of chicken meat production in traditional markets (Nidaulah et al., 2017).

The market condition of Tamiyang Layang is in an open stall for the sale of chicken meat where the slaughtering process until the carcass is ready for sale is carried out on the sale site without refrigeration, resulting in cross-contamination of ¹the presence of *Salmonella* sp. and *E. coli*. Sales of chicken meat in open markets without refrigeration have a chance to be contaminated by *Salmonella* sp. or *E. coli* is higher than sales in closed and refrigerated spaces (Nida et al., 2016). In addition, the poor tourism conditions in the sales market in tropical countries also have a high potential for contamination by ²*Salmonella* sp. and *E. coli* which can cause foodborne illness as well as a zoonotic disease for the community. ²The presence of *Salmonella* sp. and *E. coli* in chicken meat, not only showed ¹poor sanitary conditions during slaughter but also showed the health status of poultry as carrier carriers against *Salmonella* sp. and *E. coli*.

¹CONCLUSION

The presence of *Salmonella* sp. and *Escherichia coli* in chicken meat sold at the Tamiang Layang Market, stated that the implementation of sanitary and personal

hygiene in every stage of the chicken meat production process has the potential to cause disease in the community because it is a foodborne disease.

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