



## Determination the prevalence of *Escherichia coli* and *Salmonella* sp. in chicken breast sold in traditional markets of East Barito Regency, Indonesia

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### ABSTRACT

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*Escherichia coli* and *Salmonella* sp. are two primary pathogens because they are indicators of hygiene for food safety and may be at high risk of foodborne illness. This study aims to determine the prevalence of *Escherichia coli* and *Salmonella* sp. in traditional markets sold in East Barito Regency as food safety monitors. Chicken breast samples were taken from chicken traders in traditional markets in East Barito Regency. Test for the presence of *Escherichia coli* and *Salmonella* sp. using MC MediaPad was conducted. The presence of *Escherichia coli* and *Salmonella* sp. was detected 20% and 6.67% in chicken sold in traditional markets in East Barito Regency, respectively. With the presence of *Escherichia coli* and *Salmonella* sp., it is necessary to increase traders' awareness regarding hygiene and sanitation.

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### 1. Introduction

Basic human needs are food that is useful in meeting the needs of the body and maintaining health and is useful in growth and development and increasing human intelligence. One food ingredient that has a high protein content and is nutritionally complete is chicken meat, which is preferred by the general public at a relatively low price.

Good chicken meat is obtained from healthy and properly slaughtered chickens that can be consumed by the public (1, 2). Chicken meat is a food product of animal origin that is easily damaged because its nutritional content can accelerate the growth of microorganisms that can make it unfit for consumption. There are many sources related to contamination from chicken meat and its processed products (3-5).

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Contamination in products of animal origin such as chicken meat is a problem that can disrupt public health, so it is necessary to pay attention, there are 2 types of pathogenic bacteria that are dangerous in chicken meat, namely *Escherichia coli* and *Salmonella* sp. Because this bacterium is zoonotic and the main cause in cases of food poisoning. Common symptoms of food poisoning caused by bacterial poisoning with common symptoms are abdominal pain, fever, vomiting, diarrhea, dizziness and convulsions (6, 7).

Public awareness related to food is getting higher so that food security and security so that there is a need for guarantees to the community. Because in animals as carriers that do not show clinical symptoms, it is almost impossible to detect, so there is a need for supervision from the government. The existence of this bacteria is widespread, starting from where chickens are bred to chicken meat being sold in the market and improper processing methods (8).

The application of the principles of hazard analysis and critical control points (HACCP) can significantly reduce the impact of the presence of microorganisms in products during the production, harvest, distribution and storage and sales processes, so that the identification and detection of the presence of microorganisms in chicken meat is very important to know in order to maintain public health.

## 2. Materials and Methods

Between July and August of 2021, from a traditional markets East Barito regency is located 12 north latitude and 25 south latitude 114 and 115 east longitude.

A total of 15 chicken samples were collected from the chicken vendor at traditional Market East Barito regency. The collected sample was placed in a sterilized sample were packed containers, labeled and date of collection and transported to the laboratory Bacteriological examination.

The sample required for this laboratory analysis is 50 g of chicken thighs, added with 450 mL of phosphate buffered saline (FBS) diluent, then homogenized using a stomacher. Preparation of the MC Media Pad *E. coli* test kit, by opening the aluminum cover, opening the transparent pad cover, and pre-dropping 1 mL of chicken meat FBS mixture and homogenizing. Gently tap diagonally, then close again. Mac Media Pad *E. coli* was placed in a Petri dish, coded and then incubated for  $24 \pm 2$  h at  $35 \pm 1^\circ\text{C}$ . The positive control used was AOAC OMA966.24 (Cer 070901). Colony color if positive for *E. coli* was purple (9).

The thigh part of the chicken that was sampled was 10 g added with 90 mL of phosphate buffered saline (FBS) and homogenized with a pusher. Prepare the MC Media Pad *Salmonella* test kit, the aluminum test kit cover book and clear pads then drop 1 mL and mix it with the chicken meat along with the FBS solution simultaneously. Close again by sliding slowly diagonally. The test kit was stored in a petri dish bearing the MC Media Pad for the *Salmonella* strain and incubated at  $35 \pm 1^\circ\text{C}$  for  $24 \pm 2$  h. Positive results related to the presence of *Salmonella* with light blue colonies (10).

### 3. Results

Based on laboratory bacteriological analysis for the detection of *Escherichia coli* and *Salmonella* sp. 15 samples from traders in traditional markets in East Barito Regency were surveyed as follows in Table 1. As shown in Table 1, the prevalence of *E. coli* 3 (20%) in chicken meat was higher than that of *Salmonella* sp. 1 (6.67%).

**Table 1.** The Prevalence of *Escherichia coli* and *Salmonella* sp. in chicken meat

Bacteria	Prevalence (%) (n=15)	
	Positive	Negative
<i>Escherichia coli</i>	3(20)	12(80)
<i>Salmonella</i> sp	1(6.67)	14(93.3)

### 4. Discussion

The existence of *Escherichia coli* indicates a condition of poor sanitation as many cases occur in the process of slaughtering chicken meat to selling points (11). Cross contamination can occur during processing and storage and can persist over time. *Escherichia coli* and *Salmonella* sp. is an indicator bacteria of sanitation and food safety because its presence includes in the process of providing chicken meat and is also present in the environment (4). The highest cases of foodborne illness are from *Escherichia coli* and *Salmonella* sp. (12, 13). *Escherichia coli* and *Salmonella* sp. are an indicator of food safety and food hygiene indicators of animal origin. Foods of animal origin, especially those containing high protein such as meat, have a high potential to be contaminated by microorganisms such as *Escherichia coli* and *Salmonell* sp. Therefore, it is important to control

food products of animal origin due to the presence of these pathogens (14, 15).

Based on previous research, the presence of *Salmonella* and *Escherichia coli* in chicken meat at the Tamiang Layang traditional market was 66.6% and 83.3%, respectively (2). In addition, research conducted at the Surabaya traditional market with samples of chicken meat, intestinal contents and rinse water at slaughtering found the presence of *E. coli* 77.50%, 65.00%, 75.00% and *Salmonella* sp. 85.00%, 57.50%. Apart from the presence of *Escherichia coli* and 52.50% *Salmonella* sp. have been pointed out to be contaminated chicken does not only contain intestinal contents and rinse water. However, it can also be caused by many factors (16, 17).

The traditional market condition was in houses that were open in the counter until the carcasses could be sold without refrigeration, resulting in mutual contamination due to the presence of *E. coli* and the genus *Salmonella* sp. is contaminated is higher than the turnover in a closed refrigerator (18, 19). In addition, the existence of the *E. coli* and genus *Salmonella* sp. is also found in some processed chickens, including grilled chicken, chicken sausages, and porridge-like shredded chicken (3, 20, 21). The above market conditions have affected the contamination of chicken carcasses sold. In traditional markets, trading activities were direct. Traditional markets usually mean dirty and messy places, and chicken was sold without mats on the table to cause bacterial contamination (22, 23). Outbreaks of *E. coli* and *Salmonella* sp. in chicken meat sold at traditional markets in East Barito Regency stated that it was necessary to improve the application of

hygiene and personal hygiene at all stages of the chicken production process so as to prevent contamination and improve the quality of chicken meat sold and public health.

## 5. Conclusion

The presence of *Escherichia coli* and *Salmonella* sp. contained in chicken was in poor health not only at the time of slaughter but also at poultry. The need to introduce stricter hygiene and hygiene standards in slaughterhouses to reduce the incidence of *Escherichia coli* and *Salmonella* sp.

## Conflict of interest

There is no conflict of interest in this review to declare.

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