



Original article

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Analysis of *Salmonella sp.* Content In Broiler Meat In Banjarbaru City

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ABSTRACT

The purpose of this research is to detect the presence of *Salmonella sp.* bacteria contamination in broiler meat sold in TPA and RPA Banjarbaru. This study used a survey method with purposive sampling technique, with a total of 92 samples (2 from TPA and 2 from RPA). The research was conducted at 2 Broiler Slaughterhouses (TPA) and 2 Broiler Cutting Houses (RPA) in Banjarbaru City, followed by testing at the Laboratory of the Regional Veterinary Disease Investigator Testing Center for the Kalimantan Region. In TPA 1 Loktabat Utara, 22 samples were positive for *Salmonella sp.* out of 22 samples. Then, in TPA 2 Guntung Payung, 6 samples were positive for *Salmonella sp.* out of 22 samples, while in RPA 1 Guntung Manggis, none of the 24 samples tested positive for *Salmonella sp.*, and in RPA 2 Landasan Ulin Timur, 2 samples were positive for *Salmonella sp.* out of 24 samples tested. In conclusion, out of 92 samples, the tested broiler meat originated from 2 TPA and 2 RPA. Positive *Salmonella sp.* samples were 63.6% in TPA and 4.16% in RPA.

Keywords: Broiler, Microbial Contamination, Traditional Market, *Salmonella sp.*

1. Introduction

Meat is considered one of the nearly perfect food ingredients due to its complete nutritional content, including protein, energy, water, minerals, and vitamins. In addition, meat has a delicious taste and aroma, making it preferred by almost all segments of the general population (Ngitung *et al.*, 2020). A safe consumption of animal food products is ensured when they do not contain pathogenic microorganisms, which are microbes capable of causing health problems in humans who consume them (Indriyani *et al.*, 2019). *Salmonella sp.* bacteria are among the significant pathogenic microorganisms concerning public health and food safety (Kholifah *et al.*, 2016).

In 2017, the *World Health Organization* (WHO) reported that Salmonellosis occurred in 60,000 to 1,300,000 cases worldwide, with at least 20,000 deaths per year (Sartika *et al.*, 2016). Salmonellosis is a disease caused by the *Salmonella sp.* bacteria, which easily contaminates food that is undercooked during cooking/processing, leading to the entry of *Salmonella sp.* bacteria into the human body (Sartika *et al.*, 2016). During the summer season, the growth and infection of *Salmonella sp.* bacteria are rapid, with each cell dividing every 20 minutes at warm temperatures (Herliani *et al.*, 2022).

In the city of Banjarbaru, there are two broiler slaughterhouses: Broiler Slaughterhouse (TPA) and Broiler Cutting House (RPA). Both TPA and RPA in Banjarbaru are household industries engaged in broiler cutting services, involving activities such as slaughtering broilers, plucking feathers, cutting

heads, cutting feet (claws), removing and cleaning the intestines and chest (evisceration), with the number of broiler cuts based on consumer demand.

The safety and suitability of broiler meat quality can generally be observed from how broilers are handled at their cutting locations. Inggriati and Miwada (2018) state that the initial location of *Salmonella sp.* contamination in broiler meat occurs during cutting at cutting houses, during sales, or during production in incomplete cooking processes. Therefore, data is needed to analyze the presence of *Salmonella sp.* content in broiler meat products originating from RPA and TPA in Banjarbaru.

2. Materials and Methods

This study is a descriptive method research, and the sample size consists of 92 pieces of broiler meat from TPA 1 Loktabat Utara, with 22 samples. Furthermore, TPA 2 Guntung Payung has 22 samples, while RPA 1 Guntung Manggis has 24 samples of *Salmonella sp.*, and RPA 2 Landasan Ulin Timur has 24 samples tested on August 17, 2023. Sample collection from each RPA and TPA used the Slovin formula (Umar, 2003) simultaneously from each RPA and TPA. The selected sample part is the broiler breast part. The equipment needed for the research includes a microscope, object glass, cover glass, Petri dish, needle/round-tipped needle, 100 ml breaker glass, hot plate, stirring rod, pH meter, autoclave, pipette, test tube, cotton, newspaper, Erlenmeyer flask, knife, and measuring glass. The materials used include broiler meat, *Lactose Broth* (LB), *Rappaport Vassiliadis Broth* (RV), *Xylose Lysine Deoxycholate* (XLD) Agar, *Hektoen Enteric* (HE) Agar, *Nutrient Broth* (NB), *Blood Agar* (BA), and distilled water. Sample examination is carried out in the Regional Veterinary Bacteriology Laboratory for the Kalimantan region.

Data Analysis

Data analysis is performed descriptively on the results of sample testing. The reference in this study is SNI 7388:2009 regarding the maximum limits of microbial contamination in *Salmonella sp.* bacteria. It should be negative/25g.

3. Results and Discussion

Based on the data collected, the results obtained from 92 samples taken from 2 RPA and 2 TPA in the city of Banjarbaru show that 30 samples tested positive for *Salmonella sp.* These include 28 samples from TPA and 2 samples from RPA. The data can be seen in Figure 1 below:

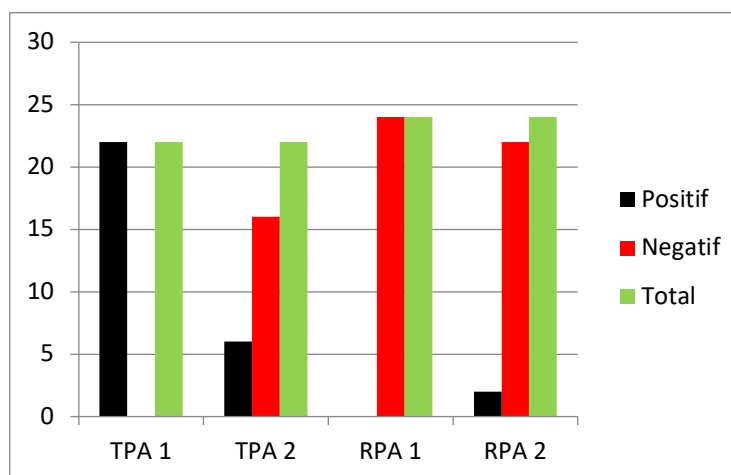


Figure 1. Test Results from 2 (RPA) and 2 (TPA)

Based on Figure 1, the test results for the 92 *Salmonella sp.* samples indicate that in the sampling from 4 locations (2 RPA and 2 TPA), in TPA 1 Loktabat Utara, 22 samples tested positive for *Salmonella sp.* out of 22 samples. Then, in TPA 2 Guntung Payung, 6 samples tested positive for *Salmonella sp.* out of 22 samples. Meanwhile, in RPA 1 Guntung Manggis, none of the 24 samples of *Salmonella sp.* tested positive, and in RPA 2 Landasan Ulin Timur, 2 samples tested positive for *Salmonella sp.* out of 24 samples tested. Based on the calculation results from the total samples tested, which were 92 samples, *Salmonella sp.* was positive in 63.6% of TPA and 4.16% of RPA.

Contamination in broiler meat in TPA Banjarbaru originates from the insufficient cleanliness of the equipment conditions in TPA used during the carcass process. According to Steven *et al.* (2006) in Indriyani *et al.* (2019), concerning *Salmonella sp.* contaminated meat, the most common sources of contamination are preparation tools (knives, blades, hooks), water (used for washing carcasses and cleaning the floor), skin, and pollution channels (accidentally released during dressing), which can cause contamination of the meat. As seen in Figure 2



Figure 2. Left: Traditional RPA 1 (A) right: Traditional TPA 2 (B)

The carcass processing process is a significant source of *Salmonella sp.* contamination because the carcasses are placed directly on the floor. A study conducted in India showed that the floor, floor plates, and walls are the most common locations for bacterial contamination. Additionally, bacterial contamination can also occur from feces, blood, and fluids that come out of the entrails and then adhere to the floor and wall surfaces, thus highly contaminating the cut meat (Indriyana *et al.*, 2019).

A different case occurs in RPA, where only a few samples are positively contaminated with *Salmonella sp.* from the research results we have observed and noted about the hygiene and sanitation of RPA being ensured even though their hygiene levels differ. According to D'Oust (2000) in Sukmawati *et al.* (2018), the differences between each sample indicate that the level of hygiene, sanitation, and refrigeration in the entire company is not the same. The results obtained show that the hygienic level, sanitation, and refrigeration of RPA samples can be classified into three categories: high, medium, and low. The difference in the number of colonies per sample can be influenced by several factors, including the condition of the broiler cutting house, where the hygiene factor of RPA is the most influential. One way to maintain RPA sanitation is to clean it regularly in a short time. Microorganisms contaminating meat are generally known to come from the digestive tract and feces of livestock.

In general, the test results for the 92 *Salmonella sp.* samples show that broiler meat samples from traditional TPA are more contaminated with *Salmonella sp.* bacteria compared to modern RPA. This is because broiler meat from RPA is treated well from the beginning of the process until the end, becoming a packaged product placed in the freezer during the sales stage to consumers. Therefore, the high business prospects and consumer consumption rates of broiler meat in Banjarbaru City must be balanced with good hygiene and sanitation practices in broiler production.

Animal food products are safe to consume if free from pathogenic microorganisms, which are microorganisms that can cause health problems in humans when ingested. Pathogenic bacteria that can contaminate broiler meat include *Salmonella sp.* This type of bacteria is the most common cause of food poisoning. Diseases caused by *Salmonella sp.* are called Salmonellosis (Rahayu & Darmawi 2022).

Contamination of *Salmonella sp.* in broiler meat from broiler RPA can occur when broilers are still alive or during slaughter, even during the cleaning process (boiling water immersion, feather removal, washing). *Salmonella sp.* contamination generally occurs in live broilers due to external horizontal contamination of eggs during incubation, resulting in broiler meat contaminated with *Salmonella sp.* And crowded broiler cages, with too many broilers inside, make healthy broilers easily infected with diseases (salmonellosis) from broilers that are already sick (Kholifah *et al.*, 2016). Contamination of broiler meat with *Salmonella sp.* bacteria can occur before and after broilers are slaughtered, during cutting, dirty knives, and unchanged washing water can cause *Salmonella sp.* contamination (Putri *et al.*, 2022).

According to the Indonesian National Standard (SNI) No. 6160 of 1999, feather removal should be done with a feather removal machine, so the possibility of contamination will be reduced. Other contamination occurs through the surface of meat during meat preparation, carcass division, cooling, freezing, frozen meat refreshment, carcass or meat cutting, packaging, storage, and distribution of processed meat products. Microbial contamination in meat begins when blood circulation stops during slaughter, especially if the equipment used to remove blood is not sterile. Contamination can also occur on the surface of meat during meat preparation, carcass and meat cutting, as well as during the production, packaging, storage, and distribution of processed meat products. Therefore, everything that comes into direct or indirect contact with meat has the potential to be a source of microbial contamination (Soeparno in Zairiful *et al.*, 2020).

Blood must be completely removed to produce high-quality carcasses. Efforts must be made to reduce contamination to obtain healthy and safe broiler carcass products. The criteria that guide the determination of the quality of broiler meat for consumption are tenderness, marbling content inside the muscle, color, taste and aroma, water content, and drug residues (Savitri, 2020).

Clean knives, cutting boards, and other equipment frequently used to cut broilers, and frequently change the water used during the broiler cutting process. If using water at a temperature above 60°C, processing is done at a temperature of 60°C for 12 minutes or 60°C for 30 minutes can be used to kill most *Salmonella* bacteria (Etika *et al.*, 2017).

From a food safety perspective, preventive measures are needed to encourage people to live a clean and healthy lifestyle. The presence of *Salmonella*. To prevent salmonellosis, the ingredients in food must be monitored. Effective control to prevent contamination is by implementing the HACCP approach, Hazard Analysis and Critical Control Points is a concept that is generally known in food safety programs with a management and control supervision system that must start from upstream (where products/animals are produced) to downstream become products (Lawley in Zelpina *et al.*, 2020).

Various microbial contamination issues can be easily overcome by improving environmental sanitation. The most important thing is personal hygiene, and hands should be washed as often as possible. Furthermore, Personal Cleanliness (personal hygiene), including short-cut nails, no nail polish, clean and tidy hair, clean clothes, clean shoes, polite and comfortable. Important factors to consider and fulfill in the slaughter or slaughter of livestock are that the place of slaughter of livestock must be clean and hygienic, and the equipment used to slaughter livestock must be sterile, and workers must be clean and hygienic. It needs to be equipped with special work clothes, personal protective equipment, headgear, gloves, boots, or special shoes for slaughtering animals. This is a crucial factor in the slaughter of animals because it affects the quality of meat and the initial number of microorganisms in the meat (Ramdhani *et al.*, 2022).

Conclusions

Based on the test results from 92 samples of broiler meat originating from 2 Chicken Slaughterhouses (TPA) and 2 Chicken Cutting Houses (RPA), it was found that 63.6% of the samples taken from TPA showed positive results for the presence of *Salmonella sp.* Meanwhile, only 4.16% of the samples from RPA tested positive for *Salmonella sp.*

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