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PEMETAAN KUALITAS pH, ASAM LAKTAT, JUMLAH TOTAL BAKTERI, DAN RESIDU ANTIBIOTIK TETRASIKLIN PADA RUMAH POTONG AYAM DAN DAGING AYAM DI KABUPATEN JEMBER, JAWA TIMUR

MAPPING THE QUALITY OF pH, LACTIC ACID, TOTAL PLATE COUNT, AND THE RESIDU OF TETRACYCLINE ANTIBIOTIC IN CHICKEN SLAUGHTERHOUSES, CHICKEN MEAT IN JEMBER DISTRICT, EAST JAVA, INDONESIA

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Abstract. *The purpose of this study was to determine the quality mapping of pH, lactic acid, total plate count and tetracycline. Antibiotics in broiler meat found in the Patrang districts' a CRD, or completely random design and a descriptive analytic case study methodology, were both used in this investigation with 9 experimental units and 3 replications. Sampling of broiler meat was taken from at 01.00 WIB. The locations used were 3 out of 6 traditional slaughterhouses. Each sample was taken from each 3 times, so that the sample size used in the 3 was 9 experimental units. Parameters observed were TPC, antibiotic residues, pH value and lactic acid levels Variance Analysis (ANOVA) was used to statistically evaluate the data. Then the SPSS program was used to perform the stands for Smallest Real Difference (BNT) test. The results demonstrated a substantial effect on the parameters of lactic acid, pH and microbiology. The conclusion of this study shows that the quality mapping of pH, lactic acid, TPC and tetracycline antibiotics in in the Patrang area, Jember City still meets the findings demonstrated a substantial. RPA 1 has a pH value of 6.27 -0.06, while RPA 2 has a pH value of 6.5 - 0.05. RPA 3 had the lowest lactic acid content (0.1% 0.01), while RPA 1 had the highest (0.14% 0.02p), both of which met SNI. The SNI is met with TPC values for RPA 1 and 2 which range from 3.17 x 10^4 cfu/g for RPA1 to 3.91 x 10^5 cfu/g for RPA2. Tetracycline antibiotic residues were not detected in any of the three RPA results for antibiotic residue analysis.*

Keywords : *Broiler Meat, Chicken Slaughterhouses, Managemen Control, Tetracycline.*

Sitasi :
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INTRODUCTION

Popular among consumers is a source of animal protein known as broiler meat. Compared to other poultry, broiler meat offers a number of advantages, including yellowish white, thick, tender and flavorful meat, as well as a lower price. According to Nadia, et al.

(2023) Broiler meat plays an important role in fulfilling nutrition because it contains important nutrients such as protein and other nutrients. This is very important for efficient body metabolism. Chickens that have been genetically modified and have good productivity and fast growth are called broiler chickens. By balancing seed, feed and management parameters, broiler productivity will be maximized because with increasing broiler meat production, it is important to ensure food safety, especially with regard to the quality of pH, lactic acid, microbiological contaminants and tetracycline antibiotics.

As quickly as possible, the safety and suitability process for broiler meat must be carried out, starting from the farm and chicken slaughterhouse until the broiler meat is consumed. One of the most important problems in this long process is the process of cutting broiler meat. The chicken slaughtering business is an important aspect of the poultry industry that must be taken into account. The Slaughter chicken of chicken meat varies from 6.8 to 7.2 as long as the meat is still alive. There are two methods of Slaughter chicken, namely direct cutting and indirect cutting (Ikasari, 2017). The amount of glycogen and meat storage temperature have an impact on changes in the pH of meat after slaughter. These changes are due to the accumulation of lactic acid from anaerobic glycolysis in muscle tissue. The process of changing the pH due to the cutting process, the animal will lose its oxygen supply when the animal ejects blood, so that the process of cell metabolism changes from aerobic to anaerobic (Mutmainna, et al. 2023).

The process of decreasing the pH of meat can also be caused by several supporting factors, namely poor handling, packaging, distribution, storage and followed by an increase in microbiological growth. According to Solehah, et al. 2022) because lactic acid bacteria have strong antibacterial properties, they able to maintain meat quality by lowering the animal's pH level. Because it can acidify meat, lactic acid is a very effective bacteria inhibitor. There is microbial contamination in broiler meat which manifests as changes in texture, unpleasant odor, sticky meat, and symptoms of discoloration. The high total number of microorganisms in chicken carcasses is inseparable from the sanitary and personal hygiene conditions in the chicken carcass production process.

One way to suppress microbial contamination in meat is to use antibiotics. However, antibiotics are no longer allowed to be used in livestock as growth promoters starting in 2018. In accordance with regulations issued by the Minister of Agriculture in 2017, Indonesia began to impose a ban on the use of growth the abbreviations and extension in animals. feed from 1 January 2018. Findings from these investigations were mixed, suggesting that meat may contain no antibiotic residues, may do so in amounts below the maximum residue limit, or may do so in amounts beyond. According to

SNI 01-6366 (2009), the BMR for the sulfonamide group is 0.01 ppm/kg, while for the penicillin, tetracycline, macrolide, aminoglycoside, and fluoroquinolone (enrofloxacin) group is 0.1 ppm/kg. Therefore, there is a need for case study research to determine the mapping of broiler meat quality in traditional Patrang District: pH, lactic acid, microbial contamination, and antibiotic residues.

MATERIALS AND METHODS

1. Location and Time Of Research

The time of the research starts on June 14 - August 6, 2022 and the locations where the research is carried out are in several places. The sample was adopted based on a certain increase, namely the daily slaughter of more than 30 broiler chickens. Determination of where to collect broiler meat is based on the different origins of broiler livestock, so that it is expected to be representtative of circulating chickens in RPA Patrang and Patrang District, there are 3 traditional. The factor is that the Patrang District area is known as the Patrang Sub-District, there are three types of Traditional RPA places and is located in the center of Patrang District, namely the UD. Anugerah, UD. Maulanan and Mr. Yunus. Then the samples were taken to the Jember State Polytechnic Bioscience Laboratory to evaluate pH, lactic acid, and other variables using a digital pH meter and the Total Plate Count (TPC) and bacteria method. The business scale and travel time needed to bring samples to the laboratory are shown in Table 1.

2. Tools and Equipment

Patrang districts' the equipment is Burette, Intech (Digital Colony Counter), Centrifuge, digital pH meter, analytical balance, waterbath, digital pH meter, Autoclave, Biological Safety Cabinet Coloni Counter, Petri dish, Incubator, Waterbath, Erlenmeyer, stirrer, dropping pipette, autoclave, tray, flask, insulation, scissors, knife, weighing spoon, digital scale, falcon tube, vortex, centrifuge, bunsen, baker glass, petri dish, tweezers, micro pipette, tip, incubator and caliper,

Table 1. RPA Business Scale and Travel Time to the Laboratory

No	List of Standard RPA	Standart RPA business scales or RPA	RPA Day Types to Lab
1	UD. Anugerah 200 head/day Broler 10 minutes	200 head/day	10 minutes
2	UD. Maulana 100-200 birds/day Broiler 15 minutes	100-200birds/day	15 minutes
3	Mr Yunus	100-200birds/day.	20 minutes

micro pipette, plastic polyethylene, paper filter watman 41, 100 ml and 500 ml measuring cups, funnels and glass stirrers are all needed., Tissue paper, Scissors, Tweezers, Label paper, Knife, Basin, Strainer, Stationery, Passive cooling box, and OHS Equipment (Tools personal protective equipment) including lab coats, gloves, and masks.

Broiler chicken breast was used and liver obtained from traditional RPA, buffer solution, 0.1% buffered peptone water (BPW), distilled water, water, ice cubes, and alcohol 70% media, and plate count agar (PCA), physiological salt, ice, distilled water, crystal violet, iodine (Lugol), safranin, and immersion oil obtained from the Microbiology Laboratory. Other materials such as plastic, label paper, cotton, aluminum foil and plastic wrap.

3. Research methods

The research used a descriptive analytic case study model using a completely randomized design (CRD) with 9 experimental units and 3 replications. Sampling of broiler meat was taken from at 01.00 WIB. The locations used were 3 out of 6 Traditional Each sample from each RPA was obtained three times, so a total of 9 experimental units from the samples used in the 3 RPA. The bioassay screening test method was used to check for residues of just tetracycline. Digital pH meter is used to calculate the pH level. Microbiological testing of the Total Plate Count (TPC) and measurement of lactic acid by the titration method have both been completed. The research data were analyzed and if it had a significant effect it was continued with the BNT test.

4. Sampling

As much as 100 grams of liver and breast taken from broiler meat. According to Ramadhani, et al. (2020) that is to facilitate sampling of 100 g of broiler breast and liver slices taken to the laboratory and put in a sterile plastic bag in a thermos of ice for analysis. The sample is placed in a plastic container with a sample code before being placed in a cooler filled with ice. After that, the samples were taken to the Jember State Polytechnic Bioscience Laboratory to be examined for lactic acid, pH, bacteria.

4.1 Analysis of Lactic Acid Levels

A test sample for 100 ml of distilled water is added to 5 g of lactic acid, which is then homogenized. Erlenmeyer flask filled with filtrate as much as 20 ml. Add a few drops of penophthalein indicator after that. The end point of the test, which uses 0.1 N NaOH as the titrator, is determined by the pink color of the color of the solution in the sample being titrated. Lactic acid levels are determined using the formula in SNI (3924-2009).

4.1.1 PH testing

The pH value was determined using a digital pH meter procedure. An understanding of pH and ground level conditions is the foundation of pH testing. The electrodes were cleaned and dried, and the pH meter was calibrated using buffers pH 4 and 7 of distilled water. Carp meat weighing 5 grams is mashed and blended (homogenized) with 25 milliliters of distilled water.

The electrode is inserted into the sample, and the pH value can be read using the appropriate scale (Cappucino & Sherman, 2008).

4.1.2 Broiler Meat Microbial Test

TPC procedure according to SNI 01 -6366 (2009) is as follows: 25 g of pumpkin flesh is placed in a clean container. Homogenize for 1-2 minutes after adding 225 ml of 1% BPW solution using a stomacher. To obtain the 10-2 dilution, 1 ml of the 10-1 dilution suspension was added to 9 ml of the BPW solution.

following the same steps as in point 3. In a Petri dish, 1 ml of each suspension and dilution sample is administered twice. PCA (15-20 ml) at 45˚C was added to each beaker containing the suspension. To thoroughly combine the PCA and sample solution, swirl the beaker to form a figure 8, then let it set at 34-36˚C for 24 to 48 hours with the cup upside down. choose the right petri dish to count the colonies in each dilution series the number of colonies is 25-250. The average determination is the number of bacteria per 1 gram (CFU/gram). The following formula is used to determine the number of colonies in the cup (Kristiyanti, 2015) :

$$N = \frac{\Sigma C}{(n1 \times 1) + (n2 \times 0.1)} \times d$$

Information:

N = Number of colonies / gram
ΣC = Countable total colonies
n_1 = Number of petri dishes in the first calculated dilution
n_2 = Number of petri dishes in the calculated second dilution
d = First dilution counted

4.1.3 Examination of Antibiotic Residues

The examination begins with mashing the meat and weighing 5 grams of meat per sample, then homogenizing it with 10 ml of buffer solution, centrifuging it for 10 minutes at 3000 rpm, and taking the supernatant. The media culture was homogenized with the spores of the Bacillus Cereus bacteria in a ratio of 100 ml: 1 ml, then poured 8 ml per petri dish and allowed to stand until it solidified. Disc paper is placed on top of the media and dripped with sample solution. Furthermore, the petri dish was placed in a room with room temperature for 1 hour and then incubated at 30˚C ± 1˚C for 16-18 hours (SNI 7424, 2008).

RESULTS AND DISCUSSION

1. Chicken Slaughterhouses Use Lactic Acid

The results of the lactic acid test on broiler meat samples were based on various RPA derived at varying averages. The results of the analysis showed that the lactic acid content of broiler meat at 1 had the greatest value and was much different from the lactic acid levels at 2 and lactic acid at 3. The results of various lactic acid tests on broiler meat were analyzed, and they revealed findings that increased greatly. Broiler meat from 1 has the highest average value of 0.14, while the lowest lactic acid value. found in 2, namely 0.1. Meat lactic acid levels are affected by microorganisms, where the activity of microorganisms will produce lactic acid which can lower the pH value of the meat. According to Oktaviana, (2009),

with an increase in the pH level of the meat it will decrease, lactic acid production will increase, and microbial growth will be fast. Figure average levels of lactic acid can be seen in Figure 1.

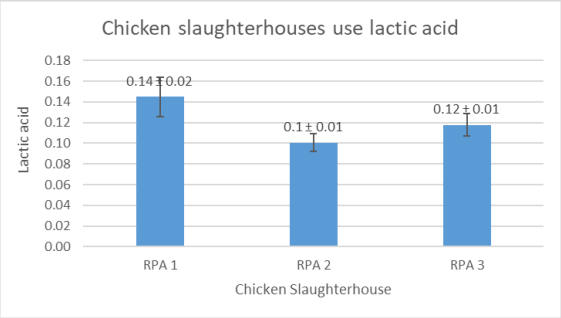

Figure 1. Mean Lactic Acid Value of Broiler Meat Based on Origin of RPA

Based on the descriptive examination of the three RPA varieties, type 1 had the highest lactic acid content while type 2 came from a chicken slaughterhouse. The pH test on chicken meat yielded very varied findings based on the analysis of variance, with chicken meat at RPA 2 having the highest average value of 6.50 and the pH value of RPA 1 having the lowest average value. RPA 2 and RPA 3. The chickens were rested in RPA 1 before being slaughtered, so that RPA 1 had the highest concentration of lactic acid. Giving rest time is an anticipatory step to reduce the negative effects of stress from the transportation process after arriving at the slaughterhouse. The ability of lactic acid bacteria such as *Lactobacillus salivarius* to survive in the digestive process increases with a lower pH content. According to Adawiyah, et al. (2015), lactic acid bacteria should have a stable potential against stomach acid and have resistance to bile salts.

2. Using the pH of a Chicken Slaughterhouse

The average pH value of broiler meat samples based on several different. Analysis of the pH value of the samples from RPA 2 showed significantly different values from the pH values of RPA 1 and RPA 3 and was the highest. The pH test on broiler meat yielded very varied findings based on the analysis of variance, with broiler meat at RPA 2 having the highest average value of 6.50 and the pH value of RPA 1 having the lowest average value. RPA 2 and RPA 3. This is because the quality of chicken meat will experience livestock fatigue and stress because these conditions cause chickens to die and undergo a glycolysis process which results in lactic acid production. which can reduce the pH value of broiler meat. Poernomo, et al. (2022) stated that before slaughter, the value of livestock muscle continued to decrease from 7.0 to 5.6-5.7 within 6-8 hours postmortem, reaching a final pH value of approximately 5.5-5, 6. The pH of broiler meat varies between 6.8 and 7.2 while still alive, then drops to 5.8 to 5.9 for 2 to 4.5 hours after killing due to lactic acid buildup in muscle tissue caused by anaerobic glycolysis. Figure the average pH level can be seen in Figure 2.

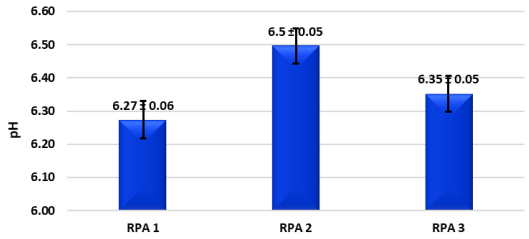

Figure 2. Average Broiler Meat pH Value Based on Origin of RPA

Terhadap The results of the pH value test on broiler meat based on are still at the SNI 3924-2009 standard level which requires a standard pH value of 6-7. Based on the descriptive analysis of the 3 the pH value of RPA 2 was the highest, while the pH value at 1 was the lowest. This can be caused by the water used for cleaning is not replaced. After being cut, the body will produce meat that has a low pH, is pale, mushy, and watery due to the mechanism that breaks down too much muscle glycogen and accumulates lactic acid (Lengkey, et al. 2013).

3. Chicken slaughterhouse, microbiology

The varying origins of RPA led to varying average TPC levels in microbiological tests of broiler meat samples (Figure 3). The above analysis informs that microbiology at RPA 2 shows that the value outperforms the TPC value at RPA 1 and RPA 3 and is the highest and differs significantly. Microbiological testing on broiler chicken meat showed varied findings based on analysis of variance, broiler meat at the lowest average RPA 1, namely 4.50 x 10^4. Broiler chicken meat obtained had a high RPA. Conditions in the RPA environment can result in bacterial contamination of broiler meat. All in Patrang sub-district are in poor condition. The equipment was seldom cleaned, the floors were pitch black, and the roof was covered with chicken feathers. When compared to RPA 1 it is cleaner, where the floors and equipment are quite clean. This is a supporting factor that makes the microbiological TPC value at RPA 1 rather low. This is consistent with of Syarifuddin, et al. (2020) that total plate count easily develops in a chicken slaughterhouse environment that does not maintain cleanliness such as knives, water, and the cutting tools used as well as the employees themselves. Bontong, et al. (2012) also argue that meat can be contaminated if equipment is not cleaned frequently after use.

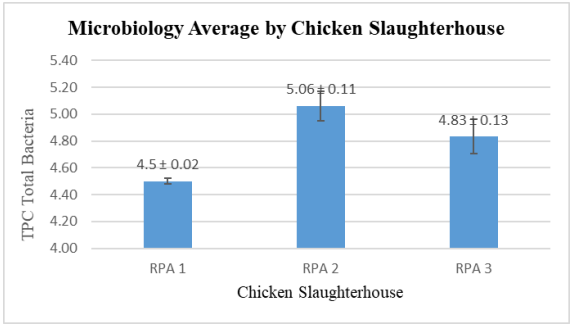

Figure 3. Average TPC Value of Broiler Meat Based on Origin of RPA

Entok The microbiological TPC value from microbiological testing is still within the permissible limits according to SNI 3924-2009 which mandates a maximum plate number of superscript 5.06+0.11 cfu/g. Microbiological analysis of the descriptive description of three different types of chicken slaughterhouses at 3 was the

highest, while microbiology at RPA 1 was the lowest. This is because equipment is rarely cleaned after use and water is used many times. Contamination of chicken meat is a very real possibility. At 1, microbiology has the lowest score (4.5 + 0.02). According to Morandi, et al. (2005), bacteria can grow faster every 30 minutes at a temperature of 25˚C and a pH of 6.0-6.5. because heat promotes higher growth of bacteria, temperature is a component that must be taken into account when trying to limit the growth of bacteria (Taha, 2012). This is also supported by the opinion of Kurniati, et al. (2016) stating that the environment affects sanitation, temperature and humidity have an important role in determining whether a piece of meat or a location will be microbiologically contaminated. Chicken Slaughterhouse. Using antibiotics with tetracycline residues. The research findings showed that 9 samples had no traces of tetracycline antibiotics. For samples of broiler meat sold in Jember, the diameter of the inhibition zone varied between 7.11 and 7.21 mm. According to SNI 01-6366 (2009), the diameter of this inhibition zone is still below of Just tetracycline (lowercase), without antibiotics.

The figure 4. shows that RPA 1 has an average tetracycline residue of 7.145 ± 0.06. Tetracycline antibiotic residues at RPA 2 averaged 7.152 ± 0.02. After that, RPA 3 had tetracycline antibiotic residues on average 7.037 ± 0.07. Tetracycline antibiotic residues at RPA 1 were the highest and at RPA 3 the lowest according to a descriptive

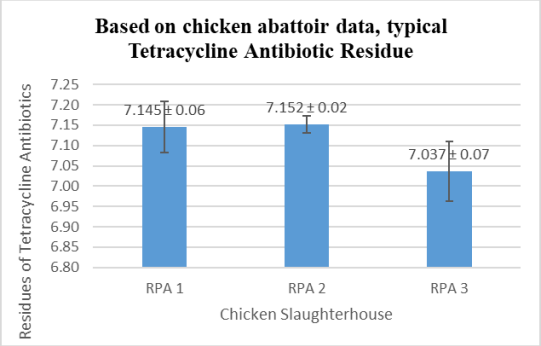

Figure 4. Average Value of Residue Test Based on Origin of Parameter

according to a descriptive analysis of the three types of RPA. Tetracycline residue in food of animal or meat origin should not exceed 0.1 mg/kg, according to SNI: 01-6366-2000.

The degree of antibiotic resistance of the bacteria according to 3 sensitive, moderate, and resistant categories is used to categorize standards based on the CLSI to determine the diameter of the antibiotic inhibition zone (Septianita, 2023). If bacteria can be suppressed effectively and a clear zone forms during the test, the bacteria can be considered responsive to antibiotics. In addition, if the bacteria can be inhibited but the inhibition is weaker in the middle class and there is no blockage in the resistant class if the bacteria can be inhibited but show resistance. Tetracycline antibiotic resistance was divided into three categories: sensitive if the bacterial inhibition zone was less than 19 mm, moderate if between 15 and 18 mm, and resistant if greater than 19 mm. And if the diameter of the bacterial inhibition zone is less than 14 mm, then the resistance category is applied. antibiotics for AGP feed,

which work to eliminate harmful bacteria such as coli, *Salmonella, Campylobacter, and enterococci* that are present in the digestion of chickens (Masrianto, et al. 2019). The presence of antibiotic residues in the sample, according to Saniwanti, et al. (2015), caused by broiler meat from administration of tetracycline antibiotics exceeding the recommended dose and killing calves before the specified time after administration of tetracycline antibiotics so that the antibiotics continue to accumulate in the meat.

CONCLUSION

RPA 1 has a pH value of 6.27 - 0.06, while RPA 2 has a pH value of 6.5 - 0.05. RPA 3 had the lowest lactic acid content (0.1% 0.01), while RPA 1 had the highest (0.14% 0.02), both of which met SNI. The SNI is met with TPC values for RPA 1 and 2 which range from superscript 3.17×10^4 cfu/g for RPA1 to 3.91×10^5 cfu/g for RPA2. Tetracycline antibiotic residues were not detected in any of the three RPA results for antibiotic residue analysis.

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