INTERNATIONAL JOURNAL OF ANIMAL SCIENCE

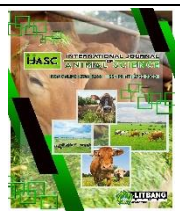
Volume 6 (1) 2024 pp. 17-21

ISSN 2684-6799 (Online)
ISSN 2086-5201 (Print)

INTERNATIONAL JOURNAL OF ANIMAL SCIENCE

Available online

Journal Page is available at http://animalsciencejournal.unisla.ac.id/index.php/asj



Acidity Level of Broiler Meat at the Chicken Slaughterhouse in North Sinjai District

Marwatiah [a], *Azmi Mangalisu* [b] *Syamsul Alam* [b]

[a] *Student of Department of Animal Science, Universitas Muhammadiyah Sinjai, City of Sinjai, State of Indonesia*
[b] *Lecturer of Department of Animal Science, Universitas Muhammadiyah Sinjai, City of Sinjai, State of Indonesia*

email: [an] *marwatiah@gmail.com,* [b] *azmimangalisu@gmail.com,* [b] *syamsulalam@gmail.com*

ARTICLE INFO

Article history:
Received 30 January 2024
Revised 30 April 2024
Accepted 5 Juni 2024
Available online 2024

Keywords:
Broiler
pH
Cutting
Total Titrated Acids

IEEE style in citing this article: [citation Heading]
F. Fulan and F. Fulana, "Article Title," International Journal of Animal Science : Jurnal Ilmiah Fakultas Peternakan Universitas Islam Lamongan, vol. 6, no. 1, pp. 17-21, 2024. [Fill citation heading]

ABSTRACT

This research aims to determine the acidity level of broiler meat at the chicken slaughterhouse in North Sinjai District. This research was carried out using the Completely Randomized Design (CRD) method with treatment P1 at Chicken Slaughterhouse A, P2 at Chicken Slaughterhouse B and P3 at Chicken Slaughterhouse C. The parameters observed in this study were the pH value and total titrated acid. The research results in this study were that the pH value at location A was 6.40, location B was 6.44 and location C was 6.39, Total Titrated Acid (TAT) at location A was 0.65, location B was 0.45 and location C is worth 0.86. The conclusion from the results of this research is that the acidity level of broiler meat in the three locations in the North Sinjai District chicken slaughterhouse means it can be concluded that the meat in the chicken slaughterhouse complies with the Indonesian National Standards, and has a broiler meat acidity level within the normal range.

1. Introduction

Meat is a food that has high nutritional content, is complete and balanced. Broiler meat is a source of animal food that is rich in amino acids needed by the body so that it is easier to digest and more practical to use [1]. Broiler meat is easily damaged due to physical impact, chemical changes and microbial activity which can reduce the quality of the meat [2]. Damage to chicken meat is caused by the growth of microbes originating from livestock and contamination by the environment during slaughter and during marketing [3].

Sinjai Regency is one of the broiler producers in South Sulawesi Province with a population of 505,500 in 2021. Sinjai Regency has several sub-districts, one of which is North Sinjai which has several chicken slaughterhouses that sell the most broiler meat with a population of 191,100 in 2021. And it can be seen that many consumers prefer to shop at slaughterhouses because they are relatively cheap compared to traditional markets in North Sinjai District [3].

The chicken slaughtering place in Sinjai Regency is a place where broiler meat is sold. Chicken slaughterhouses are synonymous with shabby and dirty conditions. It is known that meat sales equipment and services such as meat tables, knives, scales and other equipment are still far from being clean. This means that broiler meat that is sold is placed in an open environment where the meat is stored on the table without temperature control, which will affect the quality of the meat.

Meat damage is caused by poor handling so that spoilage microbes have the opportunity to grow which can reduce the quality and shelf life of the meat. Spoilage microbial contamination is a chemical reaction in cells and

https://doi.org/10.30736/asj.v6i1.122

Marwatiah et al, International Journal of Animal Science 6 (1) 2024 hal. 17 – 21
ISSN 2684-6799 (Online)
ISSN 2086-5201 (Print)

muscle tissue that can affect pH, water holding capacity, and cooking losses which are physical characteristics of broiler meat quality.

Increasing people's purchasing power requires producers to produce broiler meat that is not only tender, economical in price, still tastes good, is easy to obtain, but still has high nutrition and is safe for those who consume it. Due to consumers becoming more intelligent, they also have to be more careful in choosing livestock products, including broiler carcasses. Broilers are susceptible to diseases triggered by bacteria, viruses, fungi and deficiencies in nutritional content during storage which affect meat quality and cause a decrease in pH [4]. Research on the acidity level of broiler meat in chicken slaughterhouses needs to be carried out to ensure that the meat taken from chicken slaughterhouses is safe and healthy.

2. Method

2.1 Research design

The experimental design used in this research was a completely randomized design (CRD) with 3 treatments and 3 replications. The meat used was thighs taken by sampling from 3 slaughtering locations with 3 chickens taken as a replication of the research. The research treatment is as follows:

P1: Chicken Slaughterhouse A
P2: Chicken Slaughterhouse B
P3: Chicken Slaughterhouse C

2.1 Sample Determination Technique

2.1.1. pH of Broiler Meat

The pH meter is turned on and neutralized for 15-30 minutes and standardized with a buffer solution of pH 4 and pH 7. The pH meter electrode is then rinsed with distilled water and then dried with tissue paper. Samples can be measured after the pH meter is calibrated. Then the pH meter is pierced into the sample and then left until the pH meter reading is stable. The value is displayed on the pH meter monitor screen. After the measurement, the pH meter is then rinsed with distilled water and dried with a tissue.

2.1.2. Total Tyrated Acid

The method for measuring total titration acid, the sample is weighed at 5 grams, then diluted first with distilled water, then put into an Erlenmeyer flask, 100 mL of distilled water is added and then homogenized. The sample was tested by taking 25 ml using a pipette and putting it into a different Erlenmeyer flask, dissolving the sample by adding 2-3 drops of phenolphtalint indicator first, then titrating with 0.1 N NaOH solution until the color turned pink.

Then the total titrated acid is calculated using the formula :

$$TAT\ (\%) = \frac{\mathrm{V} \times \mathrm{N} \times 90}{W} \times 100\%$$

Information :
W: sample volume (ml);
V: volume of NaOH solution, (ml);
N: normality of NaOH solution;

2.2 Data Analysis Technique

The data obtained in this research was processed using. Analysis of variance was based on a completely randomized design (CRD) with 3 treatments and repeated 3 times, and if there was a significant effect, it was continued with the Duncan test. The statistical model used is as follows;

$$Yij = \mu + \alpha i + \in ij$$

Yij : Observation response variable.
μ : Average value of observation results
αi : Effect of treatment i
$\in ij$: Influence of experimental error from the i-th treatment and j-th replication
Where : i: Treatment (1, 2 and 3)

https://doi.org/10.30736/asj.v6i1.122

Marwatiah et al, International Journal of Animal Science 6 (1) 2024 hal. 17 – 21 ISSN 2086-5201 (Print)

j : Deuteronomy (1, 2 and 3)

3. Results and Discussion

3.1 pH of Broiler Meat

The results of research regarding the acidity level of broiler meat at chicken slaughtering places in North Sinjai District are presented in Figure 1.

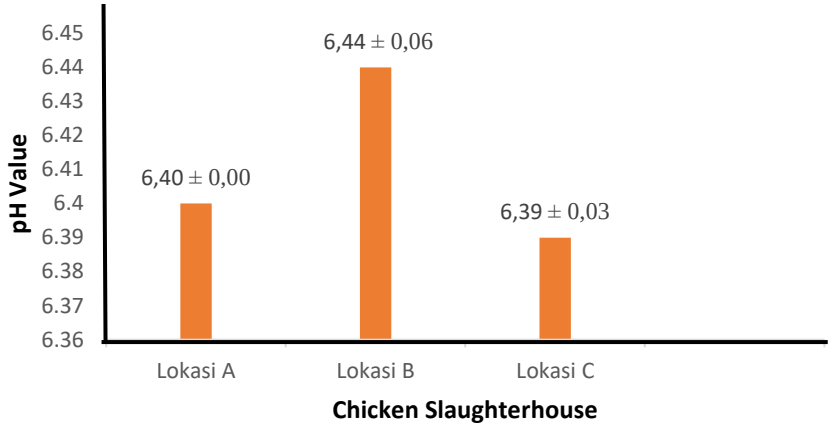


Figure 1. Average pH value of meat at the acidity level of broiler meat at the chicken slaughterhouse in North Sinjai District

Based on the results of analysis of variance, it shows that the average pH value of broiler meat at different slaughter locations has no significant effect on the pH value of broiler meat (P>0.05). In this study the pH values obtained ranged from 6.39 to 6.44. This decrease in pH is caused by the cessation of oxygen supply after the animal causes the respiration process to stop. This condition causes the formation of lactic acid as a result of an aerobic breakdown of glycogen which results in a decrease in pH after cutting due to the formation of lactic acid as a result of an aerobic breakdown of glycogen. [5] states that the pH value of chicken meat after slaughter is 5.3-6.5, and will decrease until it reaches the isoelectric point (5.2-5.0) in 30 minutes to 4.5 hours at room temperature [6].

This decrease in pH is still within the normal pH range for chicken meat. This is caused by the condition of the chicken slaughtering place which is classified as clean, judging from the cleanliness of the place and the slaughtering tools used. The decrease in the pH of the meat is directly proportional to the decrease in the total titrated acid. In fresh meat, the stimulation given to bacteria with a high final pH, especially in the deeper parts of the carcass, slows to cool, causing the bone taint of the meat to become deformed and infected. Meat veins that have a high final pH due, for example, to a lack of glycogen at the time of slaughter, will also lose glucose produced by the post-mortem amylolysis process, although only in much smaller amounts than lactic acid by the glycolysis process [7].

Figure 1 shows the results of the pH value increasing at cutting location B, namely 6.44%, this is due to handling before postmortem. This is supported by the opinion of [8] who states that handling before postmortem can affect the pH quality of chicken meat because it can affect acidity or the development of rigor time. If chickens are slaughtered under stressful conditions, glycogen reserves in the muscles are low as a result, the final pH produced exceeds the optimal pH of the meat. The pH of chicken in North Sinjai District is still in the normal pH range for broiler meat.

3.2 Total Titrated Acid of Broiler Meat

The results of research regarding the acidity level of broiler meat at the chicken slaughterhouse in North Sinjai District obtained an average value of total titrated acid for meat which is presented in Figure 2.

https://doi.org/10.30736/asj.v6i1.122

Marwatiah et al, International Journal of Animal Science 6 (1) 2024 hal. 17 – 21
ISSN 2684-6799 (Online)
ISSN 2086-5201 (Print)

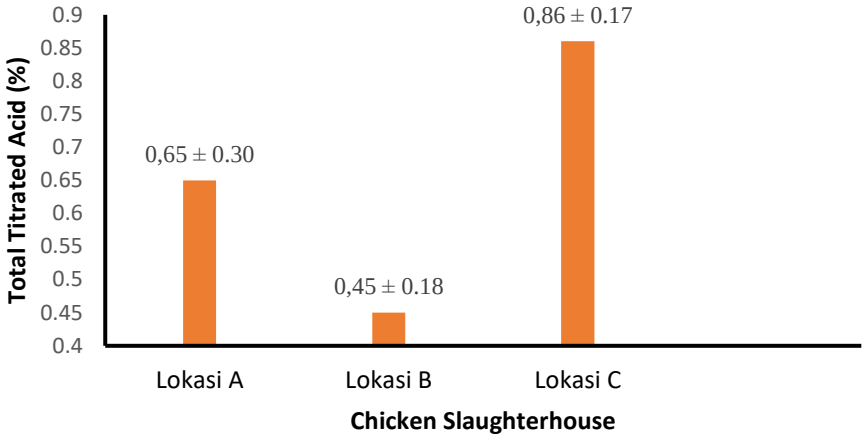


Figure 2. Average value of total meat titrated acid at the acidity level of broiler meat at the chicken slaughterhouse in North Sinjai District.

Based on the results of analysis of variance, it showed that different slaughter locations had no significant effect on the TAT value of broiler meat (P>0.05). Figure 2 shows an increase at the chicken slaughterhouse C due to the high level of lactose being broken down by bacteria, the more it becomes acidic so that the pH decreases, this is in accordance with the pH in this study, namely at the chicken slaughterhouse C. Meanwhile, the lowest total titratable acid value for broiler meat was found at slaughter location B due to the pH being too high. This is because the resulting pH is too high, which is caused by the activity of lactic acid bacteria breaking down carbohydrates into pyruphic acid compounds which are then reduced by NADH2 to lactic acid. As lactic acid increases, H+ increases, resulting in a decrease in the pH value.

This is in accordance with the opinion of [9] that the pH value is closely related to total acid, if the pH value decreases, there will be an increase in total acid. Of the total values of titrated acid, it is included in the normal category, namely in the range of 0.45-0.86%. This is in accordance with the opinion of [10] which states that the minimum value of total titrated acid content is 0.40-0.90%. The low total acid value in meat at the slaughterhouse in North Sinjai District indicates a low number of bacteria. This shows that the condition of the slaughtering place in North Sinjai District is classified as clean.

3.2 Interaction of pH Value and Total Titrated Acid

The results of the interaction regarding the pH value and total titrated acid of broiler meat at the chicken slaughterhouse in North Sinjai District obtained the average value of pH and total titrated acid for meat which is presented in Figure 3.

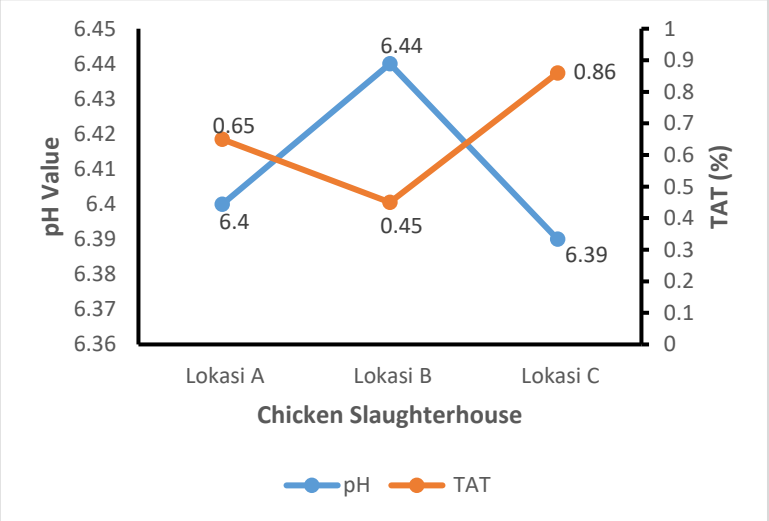


Figure 3. Average interaction value of pH and total meat titrated acids on the acidity level of broiler meat at the chicken slaughterhouse in North Sinjai District.

The interaction between pH and total titrated acid in broiler meat refers to changes in the pH value in meat that can have an impact on the total acid concentration which can be measured using the titration method. Low pH in

https://doi.org/10.30736/asj.v6i1.122

Marwatiah et al, International Journal of Animal Science 6 (1) 2024 hal. 17 – 21 ISSN 2086-5201 (Print)

meat can result in an increase in total titratable acids, because more acid is present in meat, as well as high pH, there is a decrease in total titratable acids. This occurs because an increase in pH can reduce the acidity in the meat, which can reduce the amount of acid detected by the titrated total acid method. [11] stated that the acidic atmosphere is caused by the metabolism of lactose which is broken down by lactic acid bacteria which exist naturally in meat, resulting in a sour taste. Lactic acid bacteria are able to convert carbohydrate sources into volatile acids, alcohols and esters. The total acid in meat depends on the glycolysis process and glycogen reserves in the muscles. The more glycogen in the muscles, the more lactic acid formed [4].

The pH value is a value that shows the degree of acidity of a material, where the pH of meat is closely related to the acid level produced and has an inverse relationship with the TAT value. The lower the pH value, the higher the TAT value [13]. Differences in the place where the chicken is slaughtered do not have a significant effect on the pH and TAT produced. The pH value of chicken meat ranges from 5.3-6.5 after slaughtering [5]. Where location C has a lower pH value than locations A and B. The difference in pH value between broiler chicken slaughter locations in North Sinjai District is caused by glycogen levels in muscle tissue, which has an impact on the accumulation of lactic acid in the meat. The lower the lactic acid content, the lower the glycogen reserves will be. Apart from that, factors that can influence the pH value are genetics, type of livestock and feed. This is in accordance with the opinion of [8] that factors that can influence meat quality are genetics, species, breed, type of livestock, gender, age, feed, including additives (hormones, antibiotics and minerals) and stress conditions. . The pH of the meat produced from the three markets has a pH range that is still reasonable for consumption meat. The minimum value for TAT levels is 0.40-0.90% and the overall results of the analysis of TAT levels for broiler meat show values that are in accordance with established standards [10].

4. Conclusions

Based on the results of research on the acidity level of broiler meat in locations A, B, and C at the North Sinjai District chicken slaughterhouse, it can be concluded that the meat at the chicken slaughterhouse complies with Indonesian National Standards, and has a broiler meat acidity level within the normal range.

5. References

[1] Krisdianto. (2013). “Studi Kandungan Residu Oksitetrasiklin pada Ayam Ras Broiler”. Universitas Muhammadiyah Surakarta.

[2] Hajrawati, H., Fadliah, M., Wahyuni, W., Arief, I. I. (2016). “Kualitas fisik, mikrobiologis, dan organoleptik daging ayam broiler pada pasar tradisional di Bogor”. *Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan*, *4*(3), 386-389.

[3] Badan Pusat Statistik Kabupaten Sinjai. (2021). “Kabupaten Sinjai Dalam Angka Tahun 2021”. BPS, Sinjai.

[4] Tamalluddin, F. (2012). *Ayam broiler, 22 hari panen lebih untung*. Penebar Swadaya Grup. Jakarta.

[5] Soeparno. (2009). “Ilmu dan Teknologi Daging”. Gadjah Mada University Press. Yogyakarta.

[6] Forrest, J. C., Aberle, E. D., Hedrick, H. B., Judge, M. D., Merkel, R. A. (1975). “Principles of Meat Science”. WH Freeman and Co.

[7] Lawrie, (2003). “Ilmu daging. Edisi kelima”. Terjemahan: A. Parakkasi dan Y. Amwila. Universitas Indonesia Press. Jakarta.

[8] Anggraeni, Y. (2005). “Sifat fisik daging dada ayam broiler pada berbagai lama postmortem di suhu ruang”. Skripsi. *Fakultas Teknologi Pertanian. Institut Pertanian Bogor*.

[9] Prasetyo, E. G. (2013). “Rasio jumlah daging dan kulit buah pada pembuatan selai buah naga merah (*Hylocereus polyrhizus*) ditambah rosela (*Hibiscus sabdariffa* L.) dan kayu manis (*Cinnamomum* Sp)”. Universitas Jember.

[10] Codex. (2003). “Codex Standart for Fermented Milks: Codex STAN 243, FAO/WHO Food Standards (US): Codex Alimentarius Commission”.

[11] Bertoldi, F. C., Sant’Anna, E. S., Beirão, L. H. (2004). “Reducing the Bitterness of Tuna (Euthynnus pelamis) Dark Meat with Lactobacillus casei subsp. casei ATCC 393”. *Food Technology and Biotechnology*, *42*(1), 41-45.

[12] Feiner, G. (2006). “Meat products handbook: Practical science and technology”. Elsevier.

[13] Masrianto, I. I. Arief, E. Taufik. (2019). “Analisis Residu Antibiotik Serta Kualitas Daging dan Hati Ayam Broiler Di Kabupaten Pidie Jaya Provinsi Aceh”. Magister Ilmu Produksi dan Teknologi Peternakan, Fakultas Peternakan, IPB Universty.

 https://doi.org/10.30736/asj.v6i1.122