

Meat Physical Characteristic of Sentul Kampung Kedu Crossing (Skkedu)

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Abstract

Sentul and kampung chicken are known as dual-purpose chicken, and kedu chicken is as laying hens. The crossing of sentul, kampung and kedu chicken produced SKKedu chicken. The crossing is expected to be produced local chickens that have superior meat quality from the combination of the three types of chicken. This study aimed to analyze the physical quality of SKKedu chicken meat. Tests were carried out on the flesh of the chest, upper thighs and lower thighs of 12 SKKedu chickens aged 12 weeks. Analysis of the meat physical characteristics included 4 variables pH value, cooking shrinkage, tenderness, and percentage of water binding power. The pH value of SKKedu meat in the upper thighs and lower thighs were the same ($P > 0.05$), while the breast meat was significantly different ($P < 0.05$). The tenderness is only done on breast meat and obtained a value of 2.86 ± 0.50 kg cm⁻². The different parts of meat did not have a significant effect ($P > 0.05$) on cooking losses of SKKedu chicken meat. Power binding to water (DMA) of breast and lower thigh meat was different ($P < 0.05$) with the best DMA in the lower thighs. SKKedu chicken meat was still quite tender.

Keyword: Crossing, meat physical characteristics, SKKedu chicken.

INTRODUCTION

Meat is a product of livestock that has high nutrition. One of the livestock commodity of meat-producing that Indonesians demands is chicken. Chicken meat includes food that is relatively easy to reach by the community. Chicken meat needs are generally obtained from broiler chickens. However, fulfillment the need for chicken meat is also supplied from local chicken. Based on Livestock and Animal Health Statistics (2017), consumption of broiler meat in 2016 amounted to 0.098 kg capita⁻¹ week⁻¹, while the consumption of local chicken meat is 0.012 kg capita⁻¹ week⁻¹.

Sentul chicken is one of the local chickens known as dual-purpose chicken. Likewise with kampung chickens. In addition, kedu chicken is an egg-producing local chicken. Improvement of local chicken productivity can be done through genetic quality improvement with breeding programs, namely crossing. The crossing of sentul, kampung and kedu chicken can be produced SKKedu chicken. This crossing is expected to be produced local chickens has the advantage in production of egg and quality of meat from the combination of the three types of chicken.

In addition to good nutritional value, the physical quality of meat is also a determining factor for people in consuming meat. In addition, the physical quality of meat also affects the quality of meat processing. Meat with good physical quality will produce good processed products too. Physical quality of meat includes tenderness, pH value, cooking loss, and water holding capacity. This research was to analyze the physical characteristics of chicken meat from a cross between sentul, kampung and kedu chicken (SKKedu).

This study aimed to analyze the physical quality of SKKedu chicken meat. These test was done on the breast meat, upper thighs and lower thighs of SKKedu chickens aged 12 weeks.

METHOD

The materials used were chicken meat in the breast, upper thighs and lower thighs of 12 SKKedu chickens aged 12 weeks. The tools used in the study were bimetallic thermometer, pH meter, Warner Bratzler Device, correr, planimeters, penetrometer, carper press, digital scale, small plate, stove, and pan.

Analysis of Physical Characteristics

pH value (Richana 2011).

pH value is measured using pH meter. pH meter is turned on and left to be stable for 15-30 minutes. Electrodes are rinsed with distilled water and dried with a tissue, then the electrodes are dipped in the meat sample until a stable scale reading is obtained.

Cooking loss (Bouton *et al.* 1971). Cookingloss value of the meat is measured with a weighed meat sample (initial weight) then the meat is boiled until the internal temperature of the meat reaches 80 °C. Furthermore, the meat sample is stored at room temperature for 24 hours, then weighed (final weight). The percentage of cooking losses is calculated by the following formula:

$$\text{Cooking loss (\%)} = \frac{\text{initial weight} - \text{final weight}}{\text{initial weight}} \times 100\%$$

Tenderness (Soeparno 2005). Meat tenderness value is measured using a penetrometer. The meat is boiled until the internal temperature of the meat reaches 80 °C. Meat samples are cooled and taken with correr as much as 2 cm x 2 cm x 2 cm. Sampling is carried out by following the carcass fiber path. The sample is placed above the warner bratzler and emphasis is made until the sample breaks or the maximum limit is obtained, so that the meat tenderness value is obtained.

Water holding capacity (Soeparno 2005). Water holding capacity value is measured using a carper press and a planimeter. The meat to be tested is cut as much as 0.3 g and placed on filter paper and then covered with filter paper on top of it. The meat is placed on top of the carper press (kg m^{-2}) and the maximum pressure is applied to form a fluid circle (outer circle) and outer circle of meat (inner circle), then calculate the wet area using a planimeter with the formula:

$$\text{Wet area} = \frac{\text{Area of the outer circle} - \text{Area of inner circle}}{100} \text{cm}^2$$

Furthermore, the calculation of the total H₂O content that comes out of the sample using the formula:

$$\text{H}_2\text{O (mg)} = \frac{\text{Wet area}}{0.0948} \times 6.45 - 8.0$$

Percentage of free water is calculated using the formula:

$$\text{H}_2\text{O (\%)} = \frac{\text{H}_2\text{O (mg)}}{300 \text{ mg}} \times 100\%$$

Data Analysis. Traits in this study was pH value, cooking loss, tenderness, and percentage of water holding capacity in different parts of the meat (breasts, upper thighs and lower thighs). Data were analyzed using t-test (Mattjik and Sumertajaya 2013).

RESULT

Result Physical Characteristics. Meat physical characteristic of SKKedu chicken meat was tested on this study included pH of meat, cooking loss, tenderness, and water holding capacity. The physical characteristics of SKKedu chicken meat was presented in Table 1.

Table 1. The mean and standard deviation of physical characteristics of SKKedu chicken meat

| Meat | pH | Tenderness(kg cm ⁻²) | % Cooking loss | Water holding capacity (% H ₂ O) |
|-------------|------------|----------------------------------|----------------|---|
| Breast | 5.80±0.16a | 2.86±0.50 | 40.14±4.37 | 26.46±3.19a |
| Upper thigh | 6.02±0.19b | - | 40.91±5.05 | 28.40±4.94ab |
| Lower thigh | 5.98±0.24b | - | 39.90±4.23 | 30.47±2.84b |

The number with different small letters on the same column were significantly different (P<0.05).

Factors that determine the physical quality of meat color, water holding capacity by protein or water holding (WHC), meat juiciness, texture, tenderness, taste or flavor, and meat pH value (Soeparno 2005). Furthermore Soeparno (2011) mentions the quality factors of the meat eaten including color, tenderness and texture, flavor and aroma including smell and taste as well as the effect of meat juice. Besides that, cooking losses (weight of meat lost during cooking), fluid retention, and pH also determine the quality of meat.

DISCUSSION

pH

pH meat was correlated to water holding capacity, impression of meat juice, cooking loss and meat color. Increased pH of meat will increase meat juice and decrease cooking loss of muscle (Bouton *et al.* 1971). The pH value of SKKedu chicken meat was significantly different (P <0.05) in the breast meat with upper thigh and lower thigh. Thigh meat and lower of SKKedu chicken had a

higher pH than breast meat. The mean of pH value of SKKedu chicken meat was 5.80-6.02. The pH value was normal, referring to Van Laack *et al.* (2000) which states that the pH value of chicken broiler ranges from 5.96 to 6.07.

The breast of kampung chicken meat has a pH value ranging from 5.91-5.93 (Dewi 2013), Suhartati (2017) was 5,9. SKKedu meat has pH value was more low than kampung meat. This research showed that pH SKKedu breast meat more low than kampung, so SKKedu breast meat was less soft than kampung breast meat. But according Nasution *et al.* (2016)

Soeparno (2005) stated that meat with a high pH value usually contains more juice so that the meat is more tender. This is related to the amount of lactic acid affects the pH value of meat. The pH value of meat affects the tenderness of the meat. Increased blood glycogen levels affect the decrease in meat lactic acid levels obtained during the process of converting muscle into meat. According Pearson and Young (1989) that glycogen in the blood plays a role during postmortem muscles by releasing glucose which can be used as a filler for high energy phosphatase compounds (ATP). Glycogen overhauls massively and is responsible for the formation of lactic acid in meat. This causes the postmortem muscle glycogen levels produce high lactic acid. Futhermore Sanz *et al.* (1996) stated that glycogen levels had a negative correlation with meat pH.

Tenderness

Tenderness is one of the factors that affect consumers accept the meat. Testing of tenderness in this study was only done in the breast and obtained a value of $2.86 \pm 0.50 \text{ kg cm}^{-2}$. The results of meat tenderness test using the Warner Bratzler method are influenced by muscle type, sample preparation, cooking method, procedure implantation, and panel type (Destefanis *et al.* 2008).

SKKedu chicken meat had a very soft tendency because it had tenderness value was $< 3.3 \text{ kg cm}^{-2}$. This refers to Suryati *et al.* (2008) that meat loss is grouped based on its tenderness value, which is very tender ($< 3.3 \text{ kg cm}^{-2}$), tender ($3.3-5.0 \text{ kg cm}^{-2}$), slightly tender ($5.0-6.71 \text{ kg cm}^{-2}$), slightly tough ($6.71-8.42 \text{ kg cm}^{-2}$), tough ($8.42-10.12 \text{ kg cm}^{-2}$), and very tough ($> 10.12 \text{ kg cm}^{-2}$). According to Lubis (2017), the kampung chicken meat has a tenderness of 2.99 kg cm^{-2} , so SKKedu meat was tender than kampung meat.

Cooking Loss

SKKedu chicken meat cooking losses on the breast, upper thigh and lower thigh were not significantly different ($P > 0,05$). The mean cooking loss of SKKedu chicken was 39.90-40.91%. This value was still considered normal according to Soeparno (2005) that meat slaughter varies from 15% to 54.5%. Cooking loss is the percentage of shrinkage or weight loss during the heating process. Soeparno (2011) stated cooking loss is the percentage of shrinkage or weight loss during the heating process. The lost weight is due to the loss of water present in the meat and partly due to water eavaporation.

Cooking loss can be affected by pH, sarkomer length of muscle fibers, length of muscle fibers, myofibril contraction status and cross section of chicken meat (Wanniatie *et al.* 2014). According to Nasution *et al.* (2016) cooking loss of kampung chicken meat that is 49.48%, and cooking lost of KB (kampung meat type chicken so SKKedu meat

Water Holding Capacity

Water-holding capacity can be known through the calculation of free water content in the meat. The mean percentage of water coming out from SKKedu chicken meat was 26.46-30.47%. According to Nasution *et al.* (2016) the water holding capacity of the kampung chicken is 28.93%.

Percentage of the amount of water that comes out negatively correlates with water holding capacity values. The low percentage of the amount of free water that comes out showed that the water

holding capacity of SKKedu chicken was high so that the cooking loss was lower. Water holding capacity of breast and lower thighs were significantly different ($P < 0.05$).

CONCLUSION

Different parts of the meat have an effect on the pH value and water holding capacity but had no effect on cooking loss of SKKedu chicken meat. SKKedu chicken meat was very tender.

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