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Carcass Percentage and Organoleptic Quality of Unila-1 Superior Chicken Meat

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Abstract. Carcass and organoleptic quality of chicken meat are important factors that consumers consider when purchasing chicken. The aim of this study was to determine the percentage of carcass and organoleptic quality (color, aroma, tenderness, and taste) of Unila-1 superior chickens compared to broilers and native chickens. The research material used was Unila-1 superior chickens aged 2 months, broiler chickens aged 1 month, and native chickens aged 7 months with ten chickens each. The quality of physical properties of the meat was analyzed by the Kruskal Wallis test with twenty panelists who performed organoleptic tests on the color, aroma, texture, and taste of each chicken, while the carcass percentage was analyzed for variance using a completely randomized design with 3 treatments of chicken species and 6 replicates for each treatment. Thigh and breast meat samples from each treatment were used for the organoleptic test. Samples of thigh meat and breast meat were cut into pieces with a size of 4 x 4 cm. The thigh meat and breast meat were wrapped in aluminum foil, steamed for 35 minutes, and drained for 5 minutes. A total of 20 people aged 20-55 years served as panelists for the organoleptic test. Each panelist received a serving of meat samples for all treatments, one glass of water, and a list of questions (questionnaire). The questionnaire contains the observed variables, namely the physical properties of the meat which included the color, aroma, tenderness, and taste of the meat. The results showed that the carcass percentage and organoleptic quality (color, aroma, tenderness, and taste) of superior chicken of Unila-1 were relatively the same as broiler and native chickens. This study suggested that Unila-1 superior chicken could be an alternative to fulfill the demand of native chicken.

Keywords: carcass percentage, organoleptic quality, Unila-1 superior chicken, broiler, native chicken

INTRODUCTION

There is no doubt about the people's preference for native chicken, because it tastes delicious (savory) [1]. Compared to broiler chicken which contains a lot of fat, which is not good for health, native chicken meat is more in demand, especially by the middle and upper-class people because, in addition to having a more savory taste, it is also an organic chicken which is without antibiotics in its feed, and also has little fat content. This fact encourages the high demand for native chicken which continues to increase. On the other hand, the development of the native chicken population is very slow. This condition is actually a challenge as well as an opportunity to spur and develop the native chicken farming industry.

One strategy to increase the productivity of native chicken is to cross native chickens with laying hens with high egg productivity. The high egg productivity of laying hens can be used to produce native chickens massively. Innovation research of Dakhlan et al. [2] who searched for a combination of crosses of 2 male native chickens (Pelung and Bangkok) and 4 laying hens strains (Lohman Brown, Isa Brown, Hyline Brown, and Rose Brown) concluded that a cross between male Pelung chickens and laying hens Isa Brown strain resulted in the highest weight of 7 weeks (1.01 kg) age compared to the combination of native chickens and laying hens of other strains studied.

The chicken from a cross between the male Pelung chicken and the laying hens Isa Brown strain above was called the Unila-1 Superior Chicken. This crossbred chicken needs to be investigated further about its carcass performance and quality of the chicken meat, whether it is the same or different from pure native chicken. In addition, there was no previous research on carcass percentage and the organoleptic quality of crossbred chicken meat (Indonesia native chicken x layer chicken) or it was limited. Therefore, the specific purpose of this follow-up study was to determine the carcass percentage and organoleptic quality of Unila-1 superior chicken.

MATERIALS AND METHODS

This research was conducted at the Laboratory of Animal Production, Department of Animal Husbandry, Faculty of Agriculture, University of Lampung. The research material was 10 Unila-1 superior chickens aged 2 months, 10

broiler chickens aged 1 month, and 10 native chickens aged 7 months. This study used Kruskal Wallis test using 20 panelists who performed organoleptic tests on the color, aroma, texture, and taste of each chicken. While a completely randomized design with 3 treatments of chicken meat and 6 replicates for each treatment was applied on carcass percentage variable [3,4].

The test sample for measuring the percentage of carcass used 6 replicates on each type of livestock, while the sample for organoleptic test in the form of the thigh and breast meat used 20 replicates from each treatment. Samples of thigh meat and breast meat were cut into pieces with a size of 4 x 4 cm. The thigh meat and breast meat were wrapped in aluminum foil, steamed for 35 minutes, and drained for 5 minutes. A total of 20 people aged 20-55 years served as panelists for this organoleptic test. Each panelist received a serving of meat samples for all treatments, one glass of water, and a list of questions (questionnaire). The questionnaire contained the observed variables, namely the physical properties of the meat which include the color, aroma, tenderness, and taste of the meat. There are 7 choices of organoleptic test acceptance of the color, aroma, tenderness, and taste of meat, namely 1 = very dislike, 2 = dislike, 3 = slightly dislike, 4 = somewhat like, 5 = like, 6 = very like, 7 = very really like. The quality of the physical properties of the meat was analyzed by the Kruskal Wallis test, while the carcass percentage was analyzed for variance using a completely randomized design with 3 treatments of chicken species and 6 replicates for each treatment [3,4].

RESULTS AND DISCUSSION

Carcass Percentage

The carcass percentages of Unila-1 superior chicken, broiler, and native chickens at each slaughter weight, namely Unila-1 superior chicken aged 2 months, 10 broiler chickens aged 1 month, and 10 native chickens aged 7 months are shown in Table 1.

Table 1. Carcass percentage of Unila-1 superior chicken, broilers and native chickens

Replication	Unila-1 Superior chicken (%)	Broiler (%)	Native chicken (%)
1	60.94	70.50	61.08
2	61.94	69.70	58.53
3	61.55	71.47	62.81
4	63.92	70.36	62.93
5	61.88	71.80	63.84
6	63.34	71.14	61.47
Average	62.26 ± 1.13[a]	70.83 ± 0.78[a]	61.68 ± 1.84[a]

The results of the analysis of variance showed that the carcass percentage was not significantly different ($P>0.05$) between Unila-1 superior chickens, broilers, and native chickens at each slaughter weight. This means that the proportion of Unila-1 superior chicken carcasses contributes to the carcass percentage as well as broiler chickens and native chickens. The result of this study indicated that the two-month-old Unila-1 superior chickens was as good as one-month-old broilers and seven-month-old native chickens. Risnajati [5] stated that the growth of an animal is an interaction between genetic and environmental factors. This means that the carcass percentage of Unila-1 superior chicken aged two months provides the same benefits as native chickens aged seven months.

The result showed that carcass percentage of Unila-1 superior chicken was still higher than that of native chickens, but still below broiler chickens. According to Subekti et al. [6] that the percentage of broiler carcasses at 28-35 days was between 65-75% of live weight. Factors that affect the percentage of carcasses are the final weight of chickens, genetics, ration composition, and environmental temperature. This means that the carcass percentage of Unila-1 superior chicken still could be increased from environmental factors. As Soeparno [7] argues that environmental factors affect the growth rate, the composition of carcass weight and carcass percentage which usually increases with the increase in the live weight of chickens.

Organoleptic Quality

The results of organoleptic quality tests for Unila-1 superior chicken meat, broiler meat, and native chicken meat are shown in Table 2.

Table 2. Organoleptic quality of Unila-1 superior chicken meat, broiler meat and native chicken

Variables	Unila-1 superior chicken meat		Brolier chicken meat		Native chicken meat	
	Thigh	Breast	Thigh	Breast	Thigh	Breast
Colour	4.65±0.99	4.15±1.31	4.75±1.07	4.50±0.94	4.40±1.14	4.60±0.75
Aroma	4.20±1.19	4.55±1.27	4.70±0.92	4.95±1.39	4.40±1.27	4.55±1.28
Tenderness	5.30±1.08	4.90±1.33	5.20±1.36	4.85±1.42	4.80±1.44	4.35±1.46
Taste	5.10±0.97	4.50±1.28	4.75±1.25	4.70±1.66	4.60±1.23	4.15±1.65

Meat colour

The color of cooked meat is one of the main sensory properties of meat. The color of the meat is the total impression seen by the eye and is influenced by conditions when viewing. Meat color is a combination of several factors detected by the eye [8]. The results showed that the color scores of Unila-1 superior chicken thighs and breasts, broiler meat, and native chicken meat were not significantly different (P>0.05). The liking value for Unila-1 superior chicken, broiler, and native chicken thigh meat were 4.65, 4.75, and 4.4, respectively, while for Unila-1 superior chicken, broiler, and native chicken breast meat were 4.15, 4.5, and 4.6, respectively. This means that the color of Unila-1 superior chicken meat is relatively the same as that of broiler chicken and native chicken. According to Soeparno [7], the factors that affect meat color are feed, species, breed, age, gender, stress (activity level and muscle type), pH, and oxygen. Of these factors, the main determinants of meat color are the concentration of the meat pigment myoglobin, the type of myoglobin molecule, the chemical status of myoglobin, and the chemical and physical status of other components in meat [9].

The results of this study indicated that both Unila-1 superior chicken thigh and breast meat are thought to have relatively the same concentration of myoglobin meat pigment, myoglobin molecule type, and myoglobin chemical status. Cooking meat at temperatures above 800 Celsius causes the myoglobin pigment to denature and the color of the meat changes to a grayish-brown which is the typical color of cooked meat. The color of the three types of poultry produced the cooked meat that was grayish brown on the thighs meat, while the breast meat was pale white brown. This is in line with the statement of Wideman et al. [10] that the darker color of thigh meat is due to the higher amount of myoglobin compared to breast meat, also in line with Barbut [11] that thigh meat has a higher proportion of red fiber, whereas for breast meat formed by more white fibers.

Aroma

Aroma is an important quality trait to be considered in the organoleptic assessment of foodstuffs because the aroma is a very influential factor in consumer acceptance of a product. Aroma is a quality trait that gives an impression very quickly to consumers. The average value of the panelists' preference for the aroma of thigh meat of Unila-1 superior chicken, broiler, and native chicken were 4.2, 4.7, and 4.4, respectively, while for the aroma of breast meat was 4.5, 4.95, and 4.45, respectively, which ranged from somewhat like to like. The results of this study showed that the aroma of both thigh and breast meat of different chicken was not significantly different. This result indicated that the aroma of Unila-1 superior chicken meat can be accepted by consumers as well as broiler meat and native chicken meat.

The relatively higher aroma value of broiler chicken compared to Unila-1 superior chicken and native chicken is thought to be due to the relatively higher amount of fat content in the broiler meat, as Soeparno [7,12] stated that the smell and taste of meat are largely determined by fat-soluble precursors, and the release of volatile substances contained in the meat. In addition, Soeparno [12] argues that one thing that can affect the aroma of cooked meat is the cooking temperature.

Tenderness

The overall impression of tenderness includes three aspects. First, the ease of penetration of the teeth into the meat, second, the ease with which the meat is chewed into smaller pieces, and third, the amount of residue left after mastication [7]. The amount of more connective tissue causes the meat to be tougher than that of less connective tissue [7]. The results showed that the level of tenderness in Unila-1 superior chicken, broilers, and native chickens meat were relatively equally preferred (P>0.05), both on the thigh and breast meat, with a liking range of 4.35-5.30. These

results indicated that the amount of connective tissue in the thigh and breast meat in the three types of poultry was relatively the same so that the tenderness was relatively the same as felt by the panelists.

The relatively equal tenderness of meat between Unila-1 superior chicken, broiler chicken, and native chicken is thought to be due to the relatively young age for the three types of poultry. According to Ranti [13], the texture of the meat is largely determined by water content, fat content, and type of carbohydrates. Nurwantoro et al. [14] stated that texture is related to muscle fiber bundles (fasciculi) which are wrapped in rough and soft perimysium. The size of the texture is determined by the number of muscle fibers, the size, and the number of the wrapping perimysium. In this regard, it appears that the tenderness of the meat of the three types of livestock is thought to be due to the relatively equal number of muscle fibers, size, and number of wrapping perimysium. Nishimura et al. [15] also reported that the presence of intramuscular fat in the longissimus muscle associated with the connective tissue structure reduces the toughness of the meat.

Taste

Taste ranks first in consumer acceptance. The taste of food is influenced by several factors, namely chemical compounds, temperature, consistency, and interaction with other flavor components as well as the type and duration of cooking [13]. The flavor is a complex sensation, involving smell and taste, texture, temperature, and pH, of all of these factors, the smell is the most important. The evaluation of smell and taste is highly dependent on the taste panel [9].

Based on the hedonic scale obtained from the results of this study, it appears that the taste of Unila-1 superior chicken, broiler, and native chicken thigh meat were at an average value of 5.10, 4.75, and 4.60, respectively, while for breast meat were 4.5, 4.7, and 4.25, respectively. The results of this study mean that the three types of meat was moderately preferred by the panelists. Oeckerman [16] stated that fat greatly affects the flavor of meat, as Chizzolini et al. [17] also reported that intramuscular fat plays a major role in shaping the flavor of broiler chickens.

CONCLUSION

Carcass percentage of Unila-1 superior chicken, broiler, and native chicken was 62.26 ± 1.13, 70.83 ± 0.78, and 61.68 ± 1.84%, respectively. Panelists in average like the color, aroma, tenderness, and taste of the three chicken meat. The carcass percentage and organoleptic quality of Unila-1 superior chicken were not different from that of broiler and native chicken. Unila-1 superior chicken could be an alternative to fulfill the demand for native chicken that continuously increased.

ACKNOWLEDGMENTS

The authors are very grateful to the Institute for Research and Community Service, University of Lampung, which has funded this research.

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