

Production of Broiler Chicken Carcass Fed on Rice Bran Biomass on Different Marketed Ages

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Abstract. The objective of the study was to evaluate the production of broiler chicken carcass fed on rice bran biomass on different marketed ages. A total of 96 samples were used and conducted in complete randomized design with four treatments and three replications. Fermented rice bran were added in commercial rations broiler 5% in aged 3 weeks, 10% in aged 4 weeks and 15% in aged 5 weeks. The observed variables were the percentage of carcass, leg, wing, breast and back. Data were analyzed using analysis of variance. Least significant difference test was conducted if there were significant differences among the treatments. Results showed that different market ages significantly affected the percentage of carcass, leg, wing, breast, and back. In conclusion, different market ages significantly affected the percentage of carcass, drumstick, wing, breast and back of broiler chicken. Therefore, in order to obtain profitable carcass, it is better to market at the age of four weeks.

Keywords: age, carcass, biomass, broiler, and rice bran,

1. Introduction

The consumers demand on livestock continues to increase due to annual growing population. Moreover, people awareness on the significance of nutritional value leads to an increase in the consumption of food from animals [1]. Broiler is one of favorite livestock products in Indonesia. The quantity of broiler production in wholesales collecteros reached 1.628.307 tons in 2015 and increased to 1.689.584 ton in 2016 [2].

Broilers are any chicken that is raised specifically for meat production and harvested at the age of 5-8 weeks. The growth of the chickens is fast as they are obtained from intensive selection, produce homogen race and contain high carcass and meat [3]. Good husbandary management and high food quality may produce fast growth rates [4]; [5].

Determining the age of chicken to be slaughtered is one factor affecting the success of broiler bussiness. Production, meat quality and profit will be achieved optimally if the farmers can predict the appropriate age to slaughter the chicken, growing market demand and efficient food conversion. The ideal slaughtering age is 4-6 weeks because the carcass percentage is the same (69-70%) with ideal weight [6].

Carcass is part of the body after slaughtered without blood, fur, head, leg, neck and internal organ. Carcass is commonly divided into several parts and those parts are known as commercial carcass, consisting of leg, breast, back and wing [3]; [7]; [8]. Commercial carcass can increase selling power so that the consumers can choose which part they prefer and required for further process. [3] found that factors affecting the production of carcass and meat of poultry are slaughtering age, sex, genetic, nutrient supply, and environment. [9] stated that facors affecting the quality of carcass are genetic, species, orde, types of livestock, sex, age, diet, aditive materials and stress. Livestock production was greatly influenced by the feed as one of the main factors. The cost of feed is the largest proportion of the total production cost that is 70-80% [16]. Therefore the use of biomass from agricultural waste is one of the solution to overcome the high cost of feed.



The present research is important for strengthening rice bran biomass as agricultural waste to be used as feed material in broiler, which is classified based on their different marketed ages. The purpose of the study was to evaluate if slaughtering age affects the parts of carcass in broiler fed on rice bran biomass. Data and information on that was relatively limited and varied.

2. Methods

A total of 96 broilers were analysed with different ages (2,3,4, and 5 weeks). Litter cage was used with a size of 1 x 1 m with a density of 8 chickens per cage. Complete commercial diet were fed to the chicken throughout the research. Fermented rice bran were added in commercial rations broiler 5% in aged 3 weeks, 10% in aged 4 weeks and 15% in aged 5 weeks. Rice bran fermentation using rumen liquid containing crude protein 13.11%, crude fat 10.87% and crude fiber 18.14% [14].

Table 1. Substances found in the feed during the study

Food substances	Analysis
	Ration
Water content (%)	12
Protein (%)	20
Fat (%)	3 – 7
Crude fiber (%)	5
Ash (%)	7
Calsium (%)	0.9 – 1.2
Phosphor (%)	0.6 – 0.9

The reserach used complete randomized block design with 4 treatments and 3 replications. The observed variabels were final weight, carcass weight, and carcass persentation. The collected data was tabulated and analysed using analysis of variance. If the treatments were significantly different, the analysis would be continued using Least Significant Difference.

3. Results And Discussion

Rice bran biomass as feed raw material can improve the growth and production of carcass in broiler at different marketed ages in order to enhance the profit of livestock farmers. The present study evaluate the production of broiler chicken carcass fed on rice bran biomass on different marketed ages.

3.1 Carcass Percentage

The percentage of carcass in different market ages is presented in Table 2.

Tabel 2. Percentage of carcass in different slaughtering ages

Parameter*	Marketed age			
	2 weeks	3 weeks	4 weeks	5 weeks
	%	%	%	%
Carcass	55,36 ^c ±3,02	59,13 ^b ±0,56	62,21 ^{bc} ±2,65	56,62 ^a ±1,38
Drumstick	31,07 ^d ±0,07	31,35 ^c ±0,06	31,89 ^b ±0,08	32,15 ^a ±0,15
Wing	12,43 ^a ±0,21	11,33 ^b ±0,04	11,08 ^c ±0,04	10,67 ^d ±0,12
Breast	34,48 ^d ±0,12	35,66 ^c ±0,17	36,08 ^b ±0,02	37,71 ^a ±0,08
Back	21,90 ^a ±0,09	21,47 ^b ±0,13	20,90 ^c ±0,17	19,43 ^d ±0,17

*Different superscripts in the same line indicate that the treatments are significantly different ($P < 0.05$)

Analysis of variance showed that the percentage of chicken carcass found in the marketed age was significantly different ($P < 0.05$). The percentage of chicken carcass increased as the age increased. [10] stated that the percentage of carcass is affected by slaughtering age. Longer slaughtering age leads to the higher percentage of carcass. Table 1 shows that the highest percentage of carcass was found in chicken with 4-weeks slaughtered age reaching 62.21% and carcass weight of 980.33. Meanwhile, the lowest carcass percentage was obtained at 2-weeks slaughtered age attaining 55.36% and carcass weight of 371.40 g. The percentage of broiler chicken in this study was tallied with previous studies. [6] found that chicken broiler marketed in two weeks contain 59.62%, four weeks is 68.84%, and 6 weeks is 70.58%, with an average increase from week 2 to week 4 reaches 15.47%, and from week 4 to week 6 attains 2.53%. The slaughtered age affects carcass percentage. Percentage of carcass is high when slaughtering age becomes longer [3]; [8].

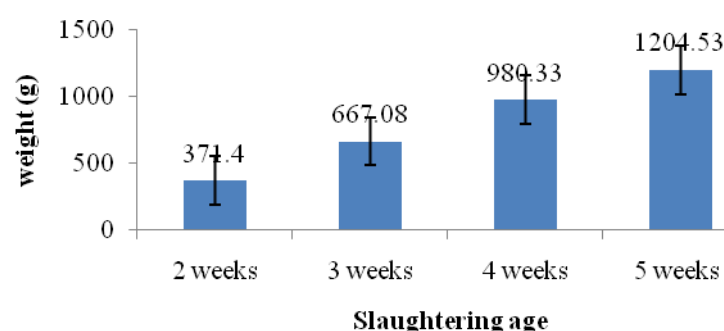


Figure 1. The comparison of carcass weight based on different slaughtering ages based on weight

Figure 1 shows that market ages had liner relation with the weight of carcass. Longer slaughtering age contributed to the carcass increament. This finding was similar to the previous study [10] that the weight of carcass increases as the body and age increases. In average, the highest percentage of carcass weight is found in Sentul chicken slaughtered at 12 weeks reacheing 694.16 g. This is due to the longer husbandry period compared to broiler chicken.

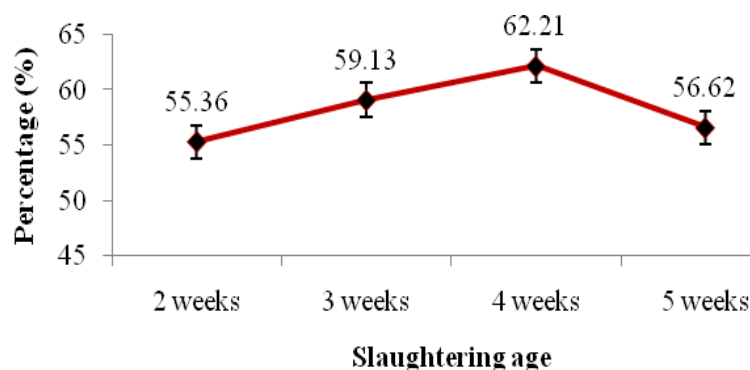


Figure 2. The comparison of carcass percentage found in broiler fed on rice bran biomass in different slaughtering ages.

Figure 2 shows that the percentage of carcass increased from 2 weeks to 4 weeks and then decreased at the age of 5 weeks. One of the factors affecting the percentage was fresh weight. The percetage of carcass is the comparison of carcass weight and fresh weight. Therefore, better fresh weight will be followed by higher carcass weight [8]; [9].

3.2 Leg percentage

The percentage of leg on different ages is presented in Table 1. Analysis of variance shows that different slaughtering ages significantly affected leg percentage on broiler chicken ($P < 0.05$). Leg percentage when slaughtered at the age of 5 weeks was found higher than 2, 3, and 4 weeks. Longer slaughtering age increases leg percentage. This was tallied with the study done before that the percentage of carcass is affected by slaughtering age [10]. [11] Reported that the proportion of bone tissue, meat and fat are affected by age, orde, weight, sex, and diet.

Table 2 shows that the highest percentage of leg was obtained at 5 weeks slaughtering age reaching 32.15% with the leg weight of 387.24 g, while the lowest percentage was found in 2 weeks old attaining 31.07% with the weight of 115.40 g. This was tallied with the research done before that the percentage of leg in poultryslaughtered at 4, 8 and 12 weeks old was 47.60, 38.78 and 25.91%, respectively [8]; [12]. Analysis of variance showed that slaughtering age significantly affected leg percentage ($P < 0.05$).

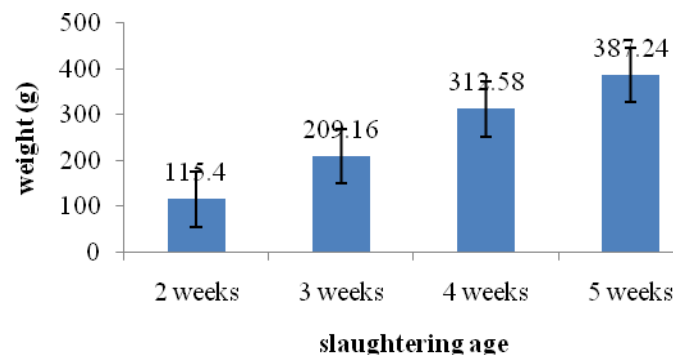


Figure 3. The comparison of leg percentage in different slaughtering ages based on weight

Figure 3 shows that slaughtering age was correlated with the increament in weight. Longer slaughtering age would result in higher leg percentage of broiler chicken.

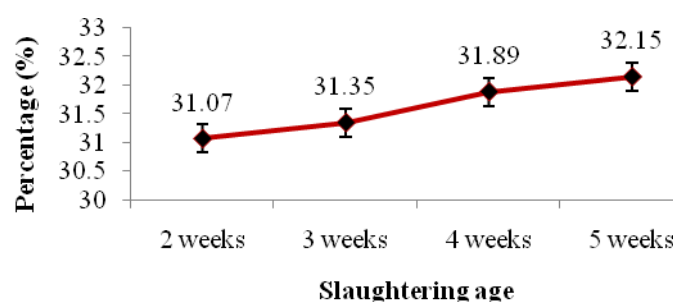


Figure 4. The percentage of leg in broiler fed on rice bran biomass in different slaughtering ages

Figure 4 shows that the slaughtering age correlated with the leg percentage. Longer slaughtering age contributed to higher leg percentage. Previous study showed that slaughtering age significantly affects leg percentage ($P < 0.05$) on free-range chicken [8]; [13]. The leg percentage in 6 weeks old is significantly different to 12, 18 and 24 months old, but there was no significant difference between 12 and 24 months old. Different age may affect leg percentage.

3.3 Wing percentage

The wing percentage is presented in Table 1 analysis of variance showed that wing percentage was not significantly affected by slaughtering age ($P>0.05$). Based on LSD test, the percentage of chicken broiler slaughtered at 2 weeks old was higher than 5, 4 and 3 weeks old ($P<0.05$). This because wing is not the main part to produce meat. Therefore, longer slaughtering age leads to lower percentage of wing. [12] Wing percentage grows normally as other body parts. Moreover, wing is mainly composed of skin and bone.

Table 3 shows the highest percentage was found in boiler chicken slaughtered at 2 weeks old reaching 12.43% and the weight of 46.17 g. Meanwhile, the lowest wing percentage was obtained at 5 weeks old attaining 10.67% and weight of 128.59 g. Previous study showed that the average percentage of poultryslaughtered at 4, 8 and 12 weeks old is 8.61, 18.25 and 19.50%, respectively [12]. The percentage of wing is significantly affected by slaughtering age ($P<0.05$). The percentage of 4 weeks old wing poultryis smaller than that of 8 and 12 weeks old. The comparison of wing percentage in boiler chicken slaughtered in different ages is presented in figure 5.

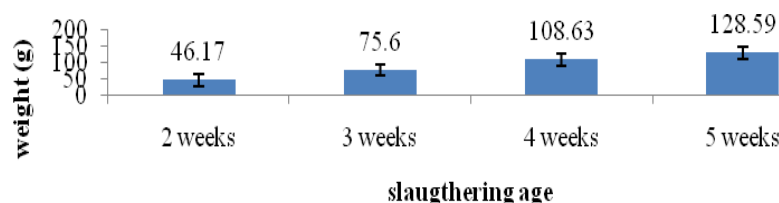


Figure 5. The comparison of wing percentage in boiler chicken slaughtered in different ages based on weight

Figure 5 shows slaughtering age correlated with weight increment in boiler chicken. Longer slaughtering age contributed to higher percentage of wing. The comparison of wing percentage in different slaughtering age is presented in Figure 6.

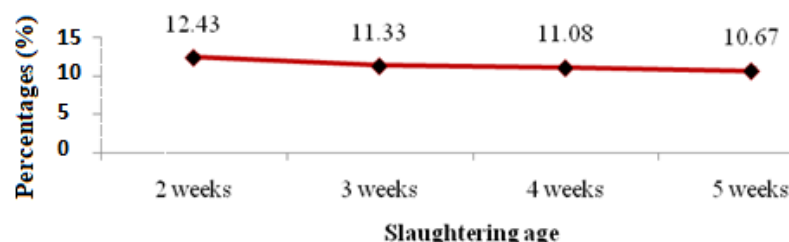


Figure 6. The comparison of wing percentage in boiler fed on rice bran biomass in different slaughtering ages

Figure 6 shows that slaughtering age was inversely correlated with the percentage of wing. Longer slaughtering age lowered the percentage of wing in boiler chicken. This was tallied with the study done that wing percentage is not significantly affected by age ($P>0.05$) [8]; [13]. This is also supported by previous study that wing is dominated by bone, and fat deposition in wing part is lower. Therefore, at this age, the results found were not significant [17].

3.4 Breast Percentage

The effect of slaughtering age on breast percentage is presented in Table 1. Based on Analysis of variance, it showed that slaughtering age significantly affected the breast percentage ($P<0.05$). A 5

week old chicken was shown to have higher breast percentage compared to 2 and 4 weeks ($P<0.05$). It means that the percentage of breast continued to increase to the age of 5 weeks old. Longer slaughtering age led to higher breast percentage because the most active part of body in responding food is breast (*musculus pectoralis*). [19] The most responsive part of the body in food is breast then followed by leg part. [19] Stated that 70% of the carcass is deposited in the breast part.

Table 4 shows that the highest breast percentage was found in 5 weeks old that reached 37.71% and weight of 454.27 g. Meanwhile, the lowest percentage was obtained at 2 weeks old that attained 34.48% and weight of 128.07 g. [12] Reported that the average percentage of breast from poultry slaughtered at 4, 8 and 12 weeks is 14.25, 20.47 and 28.52%, respectively. Analysis of variance showed that breast percentage is significantly affected by slaughtering age. The comparison of breast percentage in different slaughtering age is presented in figure 7.

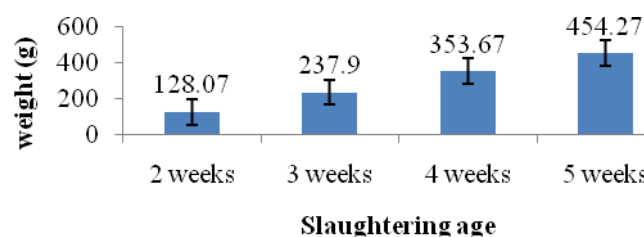


Figure 7. The comparison of breast percentage of broiler in different slaughtering ages based on weight

Figure 7 shows the slaughtering age correlated with the weight of breast. Longer slaughtering age led to the increment in body weight. The comparison of breast percentage is presented in figure 8.

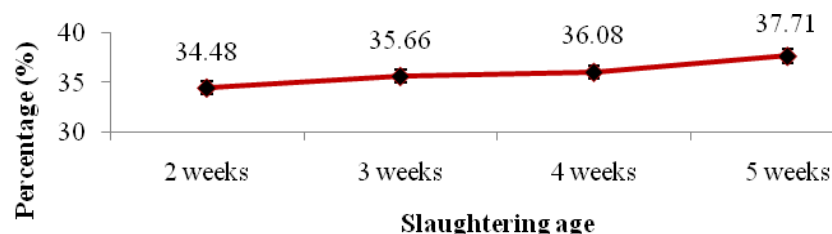


Figure 8. The comparison of breast percentage in boiler fed on rice bran biomass in different slaughtering ages

Figure 8 shows that slaughtering age correlated with breast percentage. Longer slaughtering age resulted in higher breast percentage.

3.5 Back Percentage

Back percentage in different slaughtering age is presented in Table 1 analysis of variance showed that different slaughtering ages significantly affected back percentage ($P<0.05$). LSD test showed that the back percentage in 2 weeks old was higher than 3-5 weeks old. This was because the bone component in the back was higher compared to meat component. The proportion bone in the back part was higher than other commercial cuts. The increased of meat proportion in breast will result in low growth of bone in the back part [19].

Table 5 shows that the highest back percentage was found in 2 weeks reaching 21.09% with the weight of 81.33%, while the lowest percentage was found in 5 weeks attaining 19.43% with weight of 234.03 g. The comparison of back percentage in different slaughtering age is presented in Figure 6.

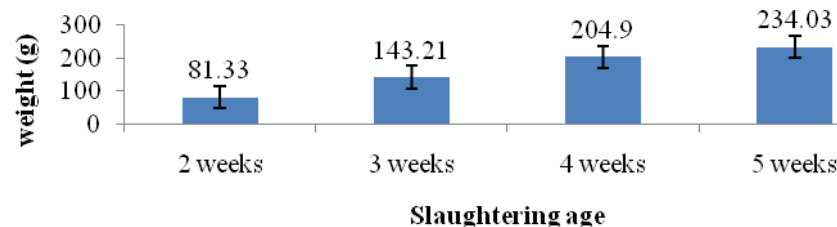


Figure 9. The comparison of back percentage in different slaughtering ages based on weight

Figure 9 shows that different slaughtering age had liner relation with back percentage. Longer slaughtering age resulted in higher back percentage. The comparison of back percentage in different slaughtering ages is presented in Figure 10.

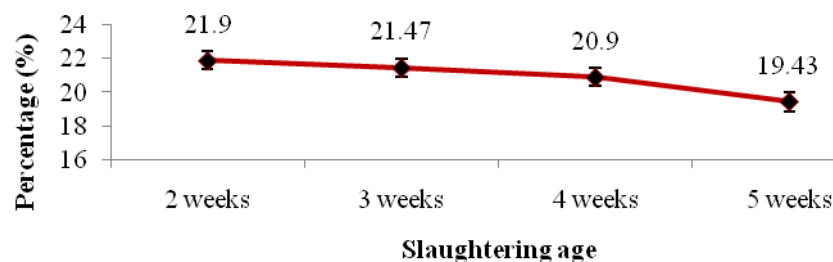


Figure 10. Back percentage of broiler fed on rice bran biomass in different slaughtering ages

Figure 10 shows that there was a nonlinear relationship of slaughtering age to the back percentage. Longer slaughtering age resulted in lower back percentage. Back is part of the body dominated by bone and contains less meat. During the growth process, bone continues to grow with relatively low rate, while muscle growth is relatively quick so that the ratio of muscle and bone increase during growth [9].

4. Conclusion

In conclusion, different slaughtering age significantly affected the percentage of carcass, leg, wing, breast and joint wing of broiler fed on rice bran biomass. Therefore, in order to obtain profitable carcass, it is better to slaughter the chicken at the age of 4 weeks.

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