

The Effect of Giving Moringa Leaf Flour (*Moringa oleifera*) in Feed as Feed Additive on Carcass Quality of Super Kampung Chicken (*Gallusgallus domesticus L. Joper variation*)

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ABSTRACT

Super kampung chicken is a descendant of kampung chicken, bangkok chicken, or other types of local chicken that are crossed with broiler chickens. In addition to genetic factors and feed management, the use of natural ingredients as feed additives can affect the quality of super kampung chicken meat. Feed additives are materials that are not included in food substances that are added to feed in small amounts and aim to stimulate growth and increase feed efficiency. With various studies in the selection of quality feed raw materials that are used as feed additives, easy to obtain, and cheap to meet the needs of super kampung chicken, namely moringa leaves. The design used in this study was a Completely Randomized Design (CRD) with 4 treatments and 5 replications. The treatments consisted of PO (Ration does not contain moringa leaf flour), P1 (Ration contains 6% moringa leaf flour), P2 (Ration contains 9% moringa leaf flour), P3 (Ration contains 12% moringa leaf flour). The parameters observed were final body weight, carcass weight and carcass percentage.

The results showed that moringa leaf flour was significantly different on the final body weight, carcass weight and carcass percentage. The best results were obtained in the P1 treatment, namely the ration containing 6% moringa leaf flour which was able to increase the final body weight by 1178.27 g, carcass weight by 759.40 g and carcass percentage by 64.50.

Keywords: Carcass weight and carcass percentage, Feed additive, Final body weight, Moringa leaf flour, Super kampung chicken.



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1. Introduction

The need for poultry meat, especially free-range chicken meat, is increasing every year. Free-range chicken meat production in Indonesia in 2021 was 269,799.30 tons and free-range chicken meat production in 2022 was 275,415.61 tons [1]. The high contribution of free-range chicken meat has caused the supply of chicken meat to have a very large influence on the stability of the provision of animal protein needs. One of the livestock commodities that is valued by the Indonesian people for its meat production is super free-range chicken [2].

Super village chickens are descendants of native chickens, Bangkok chickens, or other types of local chickens that are crossed with purebred chickens. Process This is known as *grading up*, used to improve the genetics of native chickens. It should be noted that the quality of super native chicken feed is an important factor in determining the selling value and consumption of chicken meat. In addition to genetic factors and feed management, the use of natural ingredients as *feed additives* can affect the quality of super native chicken carcasses.

Feed is the most costly factor in a free-range chicken farming business from all production costs. The high demand for feed, it is not surprising that many studies have been conducted to improve feed efficiency by providing good feed. With various studies in the selection of feed raw materials to be used as quality, easily available, and inexpensive *feed additives* so that they can meet the needs of super free-range chicken rations. This effort can reduce feed costs and can reduce the use of commercial feed. One example of a *feed additive* that can be used as a substitute for commercial feed is Moringa leaves (*Moringa oleifera*).

Moringa plants (*Moringa oleifera*) are shrubs that can grow anywhere, besides that, moringa is a plant that has many benefits. In addition to being beneficial for humans, moringa leaves are also useful as animal feed, especially for super kampung chickens. The content of protein, vitamins, minerals, and other components in moringa leaves is beneficial for the development of kampung chickens. The use of moringa in super kampung chickens has not been widely used, even though super kampung chickens have a very large role in people's lives, especially in rural areas to meet the need for meat, eggs and as additional income and contribute around 17% of meat production from the national meat supply [3].

2. Method

This research was conducted in the Animal Biology Laboratory cage of the University of North Sumatra. Maintenance for 84 days from February to April 2024.

2.1. Tools

This study used a battery cage made of wire mesh with dimensions of 50 cm long, 100 cm wide, and 100 cm high. A total of 20 cages were provided, each filled with 5 birds. Each cage has a feeder, a drinking water container, and 1 light. Oven for drying moringa leaves, blender, analytical scale, cage cleaner, scale, calculator, and camera.

2.2. Material

The materials to be used in this study are 100 vaccinated 1-day-old Joper chickens (DOC). The basal feed ration ingredients consist of moringa flour, rice bran, corn, soybean meal, fish meal, coconut oil, and premix. For drinking water, use additional vitamins and supplements such as Vitachick.

2.3. Data Analysis Methods

The research method used was a completely randomized design (CRD) consisting of 4 treatments and 5 replications, where each replication consisted of 5 joper chickens. The following treatments were applied to the ration:

P0: Control ration (does not contain moringa leaf flour)

P1: Ration containing 6% moringa leaf flour

P2: Ration containing 9% moringa leaf flour

P3: Ration containing 12% moringa leaf flour

3. Result and discussion

3.1. Final Body Weight

The average final body weight results of super kampung chickens at 12 weeks of age after various feed treatments with the addition of moringa leaf flour can be seen in table 1.

Table 1. Average Final Body Weight of Super Kampung Chicken (g/head).

Treatment	Replicate					Average ± SD
	1	2	3	4	5	
P0	1003,00	984,00	986,67	1005,00	955,67	986,87 ^A ± 19,82
P1	1080,00	1153,33	1269,33	1230,67	1158,00	1178,30 ^B ± 73,70
P2	1115,67	1077,67	1107,33	1125,67	1105,00	1106,30 ^B ± 17,93
P3	1005,00	965,33	994,33	949,33	981,67	979,13 ^A ± 22,28

Note : Different superscripts in the same column indicate a significant difference (P < 0,01).

The results of the ANOVA analysis of diversity presented in the table show that the addition of moringa leaf flour to the feed of super kampung chickens is very significantly different (P < 0.01) on the final body weight of super kampung chickens. The average final body weight of super kampung chickens with the provision of moringa leaf flour in the feed is 979.13 - 1178.30 g / head. The highest percentage was obtained in P1 (giving 6% moringa leaf flour) which is 1178.30 g / head and the lowest in P3 (giving 12% moringa leaf flour) which is 979.13 g / head. The low P3 results are due to the high crude fiber content in moringa leaves which causes the digestive organs to work harder, the anatomical structure of the livestock's digestive tract changes, feed consumption decreases, the level of crude fiber digestibility is low, and the speed of passage of digesta in the digestive tract increases [4]. In addition, the tannin content in moringa leaves can also inhibit growth and reduce the appetite of chickens [5].

Duncan's further test results showed that the P1 and P2 treatments did not provide any significant differences, while the P0 and P3 treatments provided very significant differences. These data are comparable to SNI 7389 (2015) where the body weight of super kampung chickens at the age of 3 months reached a weight of 1 - 1.4 kg. The average final body weight results obtained were higher than the study by [6] which produced a final body weight of 792.80 - 957.80 g/head.

The average final body weight results of super kampung chickens in this study varied in each treatment. This is in line with research by [7] where the significant difference in final body weight was due to the nutrient content in the rations consumed having different protein and energy content. Different final body weights were also caused by different feed consumption between treatments. According to [8] that moringa leaf flour has many active substances, high energy concentrations and nutrients that can help in the metabolism of absorption of food substances consumed so as to accelerate the process of forming muscle into meat. Moringa leaves have a nutritional content that is rich in nutrients including protein, calcium, potassium, magnesium, phosphorus, in addition to mineral content such as iron and zinc is higher than other vegetables besides also containing several bioactive molecular compounds that can reduce the activity of pathogenic bacteria.

3.2. Carcass Weight

The average carcass weight results of super kampung chickens at the age of 12 weeks after various feed treatments with the addition of moringa leaf flour can be seen in table 2.

Table 2. Average Carcass Weight of Super Kampung Chicken (g/head).

Treatment	Replicate					Average ± SD
	1	2	3	4	5	
P0	577,00	517,67	555,67	506,33	526,67	536,67 ^A ± 29,02
P1	740,67	721,67	825,67	782,67	726,33	759,40 ^C ± 44,16
P2	682,00	649,00	651,67	672,00	665,00	663,93 ^B ± 13,84
P3	564,00	549,33	572,33	505,00	547,00	547,53 ^A ± 25,97

Note : Different superscripts in the same column indicate a significant difference (P < 0,01).

The results of the ANOVA analysis of variance presented in Table 2 show that the addition of moringa leaf flour to the feed of super kampung chickens is very significantly different (P < 0.01) on the carcass weight of super kampung chickens. The average carcass weight of super kampung chickens with the provision of moringa leaf flour in the feed is 536.67 - 759.40 g / head. The highest percentage was obtained in P1 (providing 6% moringa leaf flour in the feed) which is 759.40 g / head and the lowest in P0 (without the addition of moringa leaf flour) which is 536.67 g / head. The low P0 result was due to the absence of the addition of moringa leaf flour. The use of moringa leaf flour in feed can increase crude protein levels (10-12% higher),

increase unsaturated fat levels (3-5% higher), increase vitamin A and E levels, and increase mineral levels (calcium, phosphorus, iron) [9].

Duncan's further test results showed that the P0 treatment was significantly different from P1 and P2, but not significantly different from P3. The P1 treatment was significantly different from P0, P2 and P3. The P2 treatment was significantly different from P0, P1 and P3. The P3 treatment was significantly different from P1 and P2, but not significantly different from P0. Based on these data, it is comparable to SNI 7389 (2015) in which the carcass weight of super kampung chicken at the age of 3 months reaches a weight of 0.6 - 1.0 kg. The carcass weight results from the data obtained are higher than the study by [6] which produced a carcass weight of 352.30 - 524.86 g / head.

Factors that affect carcass weight are the level of consumption in the poultry itself, the higher the level of consumption, the better the carcass weight produced if the nutritional value in the ration is met by research of [10]. According to [11] that carcass weight is influenced by the type of chicken, ration, live weight, gender, and age. Carcass weight is influenced by live weight, so that a large live weight will also be followed by a large carcass weight, and vice versa. This is in accordance with the opinion of [12] that high carcass weight is supported by the final live weight as a result of the increase in the live weight of the livestock concerned. According to [13] stated that the carcass weight produced is influenced by several factors, namely age, gender, slaughter weight, size and body conformation, fat, and quality.

3.3. Carcass Percentage

The average results of the percentage of super village chicken carcasses at the age of 12 weeks after various feed treatments with the addition of moringa leaf flour can be seen in Table 3.

Table 3. Average Percentage of Super Kampung Chicken Carcasses.

Treatment	Replicate					Average ± SD
	1	2	3	4	5	
P0	57,53	52,61	56,32	50,40	55,11	54,39 ^A ± 2,88
P1	68,58	62,57	65,05	63,60	62,72	64,50 ^C ± 2,48
P2	61,13	60,22	58,85	59,70	60,18	60,02 ^B ± 0,83
P3	56,12	56,91	57,56	53,20	55,72	55,90 ^A ± 1,67

Note : Different superscripts in the same column indicate a significant difference (P < 0,01).

The results of the ANOVA analysis of variance presented in Table 3 show that the addition of moringa leaf flour to the feed of super kampung chickens is very significantly different (P < 0.01) on the percentage of carcasses of super kampung chickens. The average percentage of carcasses of super kampung chickens with the provision of moringa leaf flour in the feed is 54.39 - 64.50%. The highest percentage was obtained in P1 (providing 6% moringa leaf flour in the feed) which is 64.50% and the lowest in P0 (without the addition of moringa leaf flour) which is 54.39%. The low P0 results are due to the absence of the addition of moringa leaf flour. The use of moringa leaf flour in feed can increase carcass weight (5-10% higher), increase the percentage of breast meat (10-15% higher), increase the percentage of thigh meat (5-10% higher), and improve the texture of the meat to be more tender [9].

Duncan's further test results showed that the P0 treatment was significantly different from P1 and P2, but not significantly different from P3. The P1 treatment was significantly different from P0, P2 and P3. The P2 treatment was significantly different from P0, P1 and P3. The P3 treatment was significantly different from P1 and P2, but not significantly different from P0. The carcass percentage results obtained were higher than the study by [6], which produced a carcass percentage of 44.55 - 56.72%.

The average results of the percentage of super kampung chicken carcasses in this study are in line with the results of the final body weight which shows a very significant effect. This is because the final body weight is in line with the percentage of carcass and carcass weight, the higher the carcass weight obtained, the higher the percentage of carcass obtained [10]. Protein content in feed is needed for tissue growth. The amount of protein in feed greatly influences the achievement of the weight of super kampung chickens in

line with the study by [14] where one of the nutrients that greatly affects the growth of carcass-forming tissue is protein.

4. Conclusion

4.1 Conclusion

The addition of moringa leaves as a feed additive can increase the final body weight and carcass weight and can increase the carcass percentage when given 6% moringa leaf flour with an average final body weight of 1178.30 g, carcass weight of 759.40 g, and carcass percentage of 64.50%.

4.2 Suggestions

Further research into the use of moringa leaf flour is first fermented with microbes that are able to degrade antinutrients (crude fiber, tannins, oxalates, phytates and so on) in moringa leaves so that it can increase the absorption of nutrients in moringa leaves, especially in poultry.

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