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The Influence Of Giving Fermented Coffee Waste Flour In Rations N Super Kampung Chicken Carcass Production 10 Weeks Of Age

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Abstract

Livestock is currently experiencing development. The development of meat as a source of protein, one of which is native chicken. Requires quality feed to get optimal results. However, in reality, the price of commercial feed on the market is very expensive. Feed ingredients that need to be utilized as alternative feed ingredients include agricultural industry waste, one of which is coffee skin. This study aims to determine the effect of giving fermented coffee skin using EM-4 on the production of super-native chicken carcasses up to 10 weeks of age. Using a Completely Randomized Design (CRD) with 5 treatments and 3 replications. The treatments given were K_0 (ration without the addition of fermented coffee skin), K_1 (3% fermented coffee skin), K_2 (6% fermented coffee skin), K_3 (9% fermented coffee skin), and K_4 (12% fermented coffee skin). The results showed that the addition of fermented coffee skin flour in the ration did not have a significant effect ($P > 0.05$) on all variables (slaughter weight, carcass weight, carcass percentage, and non-carcass percentage). Giving fermented coffee skin flour as much as K_3 (9%) gave low slaughter weight and carcass results. The carcass percentage variable showed the highest K_3 results (9%), and the non-carcass variable showed the lowest results in the K_3 treatment (9%). Coffee skin is a substitute for corn but does not provide significant results on chicken carcasses, therefore further research is expected.

Keywords: *Super Kampung Chicken, Carcass Percentage, Coffee Skin, Fermentation*

1. Introduction

Indonesia is currently experiencing very rapid economic growth. An increase in demand for food from livestock such as meat, milk, and eggs accompanied this development. There are as many as 79,090.68 tons of chickens in Bali Province, which will increase to 86,016.48 tons in 2022. Super free-range chicken is a local Indonesian from the jungle fowl Gallus varius [1]. To overcome this deficiency, cross-breeding was carried out between domestic chicken males and laying layer chicken females which produced a new type of chicken known as super kampung chicken [2]. The results of this cross have faster growth, where the maintenance period until harvest takes 55-60 days. [3]. Super native chickens also have resistance to disease as well as relatively more efficient maintenance and feed costs. Free-range chicken is currently a very profitable business opportunity, but only a few are pursuing it.

Increasing the number of populations and the level of production of poultry meat needs to be balanced with an increase in the availability of feed. Super native chickens require quality feed to fulfill their nutrition, to get optimal results. One of the feed ingredients used as an alternative feed, many of which come from agricultural industrial waste, one of which is coffee skin waste. Coffee is one of the leading commodities in Bali. [3] stated that coffee processing produces 45% coffee husk, 5% epidermis, and 40% coffee beans. [4] state that plantation and livestock waste from the results of coffee cultivation activities integrated with livestock has so far not been optimally processed and utilized.

Coffee bean skin contains 14.4% sugar, 8.6% tannins, 6.50% pectin, 2.6% chlorogenic acid, 1.6% caffeic acid and 1.3% caffeine by dry weight [5]. The content of mixed coffee skins is PK 9.94%, SK 18.17%, Fat 1.97%, Ash 11.28%, Ca 0.68%, P 0.20%, GE 3306 Kcal, and TDN 50.6% [6].

Coffee bean skin contains 14.4% sugar, 8.6% tannins, 6.50% pectin, 2.6% chlorogenic acid, 1.6% caffeic acid and 1.3% caffeine by dry weight [7]. The content of mixed coffee skins is PK 9.94%, SK 18.17%, Fat 1.97%, Ash 11.28%, Ca 0.68%, P 0.20%, GE 3306 Kcal, and TDN 50.6% [6]. The use of fermented products in rations can significantly increase the quantity and quality of carcasses, as well as reduce the amount of chicken abdominal fat. Fermentation can improve the nutritional quality of feed ingredients, because in the fermentation process chemical changes occur in organic compounds (carbohydrates, fats, proteins, crude fiber) and other organic matter in both aerobic and anaerobic conditions, through the action of enzymes produced by microbes. According to [8].

The purpose of this study was to determine the effect of using fermented coffee husk waste flour in rations on carcass percentages and to find out what percentage level of use of fermented coffee skin flour in rations was able to provide maximum results on the carcass percentage of super village chickens aged 10 weeks

2. Material and Methods

Time and Place of Research

This research was conducted for 10 weeks from September 13 2022 to November 5, 2022, which is located at Jalan Sedap Malam, Gang Melati No. 15, Kesiman Village, Denpasar City, Bali Province

Experimental design

The design used was RAL with 5 treatments and 3 replications, the treatment used was K0 as a control, K_1 containing 3% coffee husk, K_2 containing 6% coffee husk, K_3 containing 9% coffee husk, K_4 containing 12% coffee husk. Each repetition uses 5 chickens so the total number of super free-range chickens used is 75.

Materials and Research Tools

The livestock used were 3-week-old super free-range chickens totaling 75 heads which had a homogeneous body weight (215.13 – 237.78 g) without separation of male and female sexes.This study used battery cages in the form of 15 plots of cages located in one cage building, with the size of each cage plot being length 1 m, width 50 cm, height 60 cm which was equipped with a feeding and drinking area.The tools used in this study were plastic bags to store the mixed rations, markers used to label the rations, jars for fermentation, colored strings to mark the chickens, and electronic scales to measure rations and weigh the chickens every week. The rations used in this study consisted of concentrate, corn, fermented coffee husk waste, rice bran, fish meal, coconut oil, and minerals. and drinking water provided adlibitum.

Table 1.
Composition of Treatment Ration

Material Type	Treatment

(%)	K_0	K_1	K_2	K_3	K_4
Commercial Feed 511	43	43	43	43	43
Corn	25	22	19	16	13
Fermented Coffee Skin Flour	0	3	6	9	12
Rice Bran	17,8	18,2	18,2	18,9	19
Fish flour	12,2	11,8	11,8	11,1	11
Coconut oil	1	1	1	1	1
Mineral	1	1	1	1	1
Total	100	100	100	100	100

Information :

K_0 = ration without the addition of fermented coffee husk flour.
K_1 = ration containing 3% fermented coffee husk flour.
K_2 = ration containing 6% fermented coffee husk flour.
K_3 = ration containing 9% fermented coffee husk flour.
K_4 = ration containing 12% fermented coffee husk flour

Table 2
Composition of Ingredients in Research Rations

Nutrients	Treatment					Standard
	K_0	K_1	K_2	K_3	K_4	
Crude protein (%)	18,28	18,27	18,17	18,25	18,39	16 -18
Metabolic Energy (Kcal/kg)	2.885,74	2.854,6	2.835,7	2.827,1	2.798,6	3.000
Crude Fiber (%)	4,84	5,48	6,12	6,69	7,28	8,00
Crude Fat (%)	52,92	0	0	0	0	3,00
Calcium (%)	52,92	0	0	0	0	2 - 2,70
Phosphorus (%)	52,92	0	0	0	0	0,40

Description: Based on the calculations of Scott et al. (1982)

Implementation of Activities

The cages were randomly assigned by making numbers according to the treatment code placed in one container. Then, taking the treatment code randomly, the treatment code was pasted horizontally from the top left corner of the cage to the bottom right corner of the cage.

Table 3
Treatment Randomization Scheme

Pen	Treatment Code				
1	K_{32}	K_{03}	K_{13}	K_{22}	K_{41}
2	K_{11}	K_{02}	K_{42}	K_{31}	K_{21}
3	K_{01}	K_{23}	K_{33}	K_{43}	K_{12}

Information:

1. First row box enclosure
2. Second row box enclosure
3. Third row box enclosure

K_0 = ration without the addition of fermented coffee husk flour.
K_1 = ration containing 3% fermented coffee husk flour.
K_2 = ration containing 6% fermented coffee husk flour.
K_3 = ration containing 9% fermented coffee husk flour.
K_4 = ration containing 12% fermented coffee husk flour

Coffee Skin Flour-Making Process

Preparation of coffee flour can be done as follows. Choose coffee skins of good quality with a good texture so that the results from coffee skins made from flour are feasible to process. After selecting the coffee skin, it is dried in the sun to dry and then milled in a modern way using a machine**.**

After grinding the coffee skins in a sieve get really fine coffee skin flour. After that, coffee skin flour will be mixed with probiotics under the molasses brand, and EM4 according to the dosage. After mixing the coffee skin flour, put it in a jar and close it tightly, put a piece of tape so that there is no air coming in and out so that the fermentation process is successful. After that, the coffee skin flour will be left in the shade for one week. After being fermented, the coffee skin flour is air-dried first before mixing with the feed

Coffee Skin Fermentation

The tools used in the manufacture of coffee skin compost feed are scales for weighing the fermented ingredients and trays for mixing the fermented ingredients. The materials used include coffee skin flour, EM4, molasses, and water. The way of making fermented coffee skin flour is to prepare ground coffee skin waste, weigh ± 6 kg, put it in a basin or bucket, 2 liters of clean water, 300 ml of molasses then dissolve it in 2 liters of water, 24 ml of EM4, the next process is to mix the coffee skins with the ingredients that have been dissolved little by little then knead until evenly distributed and not lumpy. anaerobic fermentation for 7 days, after which the fermented product is opened and aired until dry and not exposed to direct sunlight.

Feed Mixing

Mixing of rations is done once a week. Before mixing the rations, 3%, 6%, 9%, and 12% fermented coffee husk flour was first weighed, followed by weighing concentrate, corn, rice bran, fish meal, minerals, and oil according to the amount calculated in one week. Mixing of the rations was carried out on a plastic sheet spread out on a flat floor. The ration material with the highest amount was spread evenly on the plastic sheet followed by the smallest amount. Then the ration ingredients were divided into 4 parts, each part evenly and so on and repeated several times, then cross-mixed until a truly even or homogeneous mixture was obtained.

Provision of Rations and Drinking Water

Rations and drinking water were given ad libitum, given 2 times a day, in the morning and in the evening. The drinking water came from a drilled well at the research enclosure. Drinking water containers are cleaned every day to prevent disease, then filled with fresh water. The addition of drinking water was carried out every time it was almost finished, then the remaining rations were weighed once a week.

Disease Prevention

Before the chickens are put into the cage, the cage and equipment are cleaned and sprayed with a disinfectant (design) to eradicate pests, viruses, bacteria, and fungi. Every day the place where the drinking water is cleaned, the chickens are given vita chicks through drinking water at a rate of 5 grams per 7 liters of water to avoid stress, maintain endurance, and increase appetite. As well as vaccination, by administering the Gumboro A vaccine at 13 days of age, and the Newcastle disease-Lasota (ND-Lasota) vaccine given at 21 days of age and at 35 days of age given the Gumboro B vaccine. All vaccine processes are carried out through drops in the chicken's mouth.

Cutting

Super free-range chicken before being slaughtered, is fasted for approximately 12 hours while still being given drinking water. The purpose of fasting is to get the cut weight of a super-free-range chicken without any dirt in the digestive tract of the chicken. Then, the slaughter and bleeding of super-free-range chickens are carried out. Next, the immersion in water with a temperature of approximately 80˚C then the chicken is cleaned of feathers. After that, the innards were removed, and the head and legs were cut, so that super free-range chicken carcasses were obtained which were then weighed to obtain data from the carcass weight variable observed in the study.

Observed Variables

The variables observed in the study are as follows:

1. Slaughter weight is the weight obtained after the chicken has been fasted.
2. Carcass weight is the weight obtained after the chicken has been slaughtered and blood, feathers, legs, and other organs have been removed.
3. Carcass percentage is obtained by calculating the ratio of carcass weight to slaughter weight multiplied by one hundred percent.
4. The percentage of non-carcass consists of blood, feathers, legs, neck, head, and internal organs, by calculating the ratio of non-carcass weight to slaughter weight multiplied by one hundred percent.

Data analysis

The data obtained from the results of this study were analyzed using variance analysis, if there were significantly different results (P <0.05) between the treatments, a multiple-range test was performed from Duncan [9].

3. Results and Discussion

3.1 Research Results

Based on statistical analysis, the results of the study in Table 1 show that the addition of fermented coffee husk powder in the ration statistically showed no significant effect (P>0.05) on slaughter weight, carcass weight, carcass percentage, and non-carcass percentage in super-aged free-range chickens 10 weeks.

Table 4.
Effect of Giving Fermented Coffee Skin Waste Flour in Rations on Carcass Percentage of Super Kampung Chicken Age 10 Weeks

Observational Variables	Treatment					SEM(3)
	K_0	K_1	K_2	K_3	K_4(2)	
Cutting Weight (g)	854.70 a	880.50 a	927.33 a	1021.03 a	967.03 a(1)	26.86
Carcass Weight (g)	520.33 a	550.70 a	570.53 a	650.37 a	604.00 a	22.05
Carcass Percentage (%)	60.88 a	62.27 a	61.50 a	63.61 a	62.38 a	0.69
Non Carcass Percentage (%	39.12 a	37.73 a	38.50 a	36.39 a	37.62 a	0.69

Information :

1. Values with the same letter in the same row show no significant difference (P>0.05).
2. K0: Ration without coffee content without fermented coffee skin
   K1: Rations containing 3% fermented coffee without skin
   K2: Rations containing 6% fermented coffee without skin
   K3: Rations containing 9% fermented coffee without skin
   K4: Rations containing 12% fermented coffee without skin.
3. SEM (*Standard Error of The Treatment Means*).

Cutting Weight

The results of statistical analysis on the addition of fermented coffee husks to the ration had no significant effect (P<0.05) on the slaughter weight of 10-week-old super-free-range chickens. The highest slaughter weight was obtained in treatment (K_3), which was 1021.03 g/head. On treatment (K_4) obtained a slaughter weight of 967.03 g/head less than K3 but still large compared to the treatment (K_0) 854.70 g/head, (K_1) 880.50 g/head, (K_2) 927.33 g / tail but statistically different is not significant.

Carcass Weight

The results of statistical analysis showed that the addition of fermented coffee husks to the ration had no significant effect (P<0.05) on super-free-range chicken carcasses aged 10 weeks. The highest carcass weight was obtained in treatment (K_3), which was 650.37 g/head. In treatment (K_4) the carcass weight was 604.00 g/head, which was less than (K_3) but still greater than that in treatment (K_0) 520.33 g/head, (K_1) 550.70 g/head, (K_2) 570 .53 g/head but statistically not significantly different.

Carcass Percentage

The results of statistical analysis of the addition of coffee husks in the ration showed no significant difference (P<0.05) in the percentage of super-free-range chicken carcasses aged 10 weeks. The highest percentage of carcasses was obtained in treatment (K_3), which was 63.61%. In treatment (K_4) it was 62.38% smaller than (K_3) however, it was still greater than treatment (K_0) 60.88%, (K_1) 62.67%, and (K_2) 61.50% but significantly statistically different is not real.

Percentage of Non-Carcass

The results of the research analysis showed that the addition of fermented coffee skin powder in the ration showed no significant effect (P<0.05) on the percentage of non-carcass super-free-range chicken aged 10 weeks. The lowest non-carcass percentage was obtained in treatment (K_3) = 36.39%. In the K4 treatment, it was 37.62% smaller than (K_3) but still larger than the treatment (K_0) 39.12%, (K_1) 37.73%, and (K_2) 38.50% but statistically different not real.

3.2 Discussion

Based on the research results, the provision of fermented coffee skin flour waste in the ration showed no significant results on the percentage of carcasses of 10-week-old super native chickens. This shows that fermented coffee skin flour can still be used as an additional ingredient to reduce the use of commercial feed in super-native chickens [10].

The cutting weight can be known by weighing, high cutting weight describes good carcass quality and contains a lot of meat. Based on the research results, there was no significant difference (P < 0.05) in the cutting weight, carcass weight, and carcass percentage variables. and non-carcass percentage. However, the K_3 treatment with the addition of fermented coffee skin flour at a level of 9% in the ration showed the highest results, which was 1,021.03 g/head but was not significantly different from the slaughter weight of 10-week-old super kampung chickens. This is related to the slaughter weight in the K_3 treatment which has the highest weight. A decrease in growth rate will cause the slaughter weight to be lower. Achievement of carcass weight is closely related to slaughter weight and weight gain [11]. One of the factors that affect carcass weight is the nutritional content of the ration. Decreasing energy and protein content will cause lower protein digestibility and decreased protein absorption for chicken slaughter weight [12]. Carcass weight is influenced by live weight so that large live weight will be followed by a large carcass weight. The part of the ratio that plays a major role in carcass formation is protein content.

The high carcass weight is supported by the final live weight as a result of the increase in livestock live weight [13]. The resulting carcass weight is influenced by several factors, namely age, sex, slaughter weight, body size and conformation, fatness, quality and quantity of rations, and strain

[14]. [15] stated that for growth and production to be maximized, the amount and content of nutrients needed by livestock must be adequate. In addition, the higher average slaughter weight of chickens given K3 treatment was due to the higher consumption of rations in the K_3 treatment compared to other treatments.

Wahyu [16] stated that one factor that can affect ration consumption is palatability. Palatability is influenced by the smell, taste, texture, and color of the feed given. Palatability is the performance properties of the ingredients as a result of the physical and chemical conditions of the feed ingredients. Furthermore, it is said that differences in feed consumption are influenced by age, quality, and quantity of rations, palatability of rations, and their processing. Chickens will consume rations to meet their energy needs before their energy needs are met, and chickens will continue to eat. If chickens are fed with low energy content, they will eat more. The better the quality of the feed given, the smaller the amount of feed consumed by livestock [17].

Carcass weight is the weight obtained by weighing the chicken after being cut and removing blood, feathers, feet, and internal organs. Based on the research analysis, it shows that the provision of fermented coffee skin flour in the ration on carcass weight has no significant effect ($P < 0.05$). From these results, although the difference is not significant, the results obtained for the slaughter weight in the K3 treatment with a level of 9% fermented coffee skin flour in the ration show a higher result, namely 650.37 g/head compared to other treatments.

The energy and protein balance in the ration is expressed in kilocalories obtained from the metabolic energy per kilogram of ration divided by the percentage of protein. The energy and protein balance in the ration has a significant effect on ration consumption, growth rate, body composition, and efficiency of ration use [18]. If the protein and energy levels in the rationhigh will result in optimal growth, conversely if the energy content is low while the protein content in the ration is high, protein deficiency will occur which will result in slow growth.

Based on the results of statistical analysis, the provision of fermented coffee skin flour in the ration showed no significant effect ($P < 0.05$) on the average percentage of carcasses of 10-week-old super native chickens. In the treatment of 9% fermented coffee skin flour, (K_3) gave the highest result of 63.61% but gave no significantly different result ($P < 0.05$) with other treatments. This shows that the provision of fermented coffee skin flour does not have much effect on the percentage of carcasses of super native chickens.

[19] states that poultry carcasses are the result of slaughtering poultry (chickens) without blood, feathers, heads, feet, (metatarsus bones to toes), intestines, and giblets (liver, heart, and gizzard). The lungs are included in the carcass because they are difficult to separate. The percentage of chicken carcasses is the part of the chicken's body that is intact without blood, head, feet, and internal organs divided by the live weight multiplied by 100%. Factors that affect carcass weight are genetic and environmental. Environmental factors can be divided into two categories, namely physiology and nutrient content in the ratio [20]. Factors that affect chicken carcass weight are genetics, gender, physiology, age, body weight, and ration nutrition [21]. According to [22] the higher the carcass weight produced, the higher the weight of the physical composition of the carcass produced. Percentage Carcass is a comparison between carcass weight and live weight which is often used to estimate the amount of meat in poultry [23].

The carcass is the main result of livestock slaughter, while non-carcass is a by-product of the livestock slaughter process [24]. Blood, feathers, head, feet, and internal organs are included in the non-carcass part [25]. The percentage of non-carcass is obtained by calculating the ratio of non-carcass weight to slaughter weight multiplied by one hundred percent. Based on the results of statistical analysis, the provision of fermented coffee skin flour in the ration showed no significant effect ($P < 0.05$) on the average percentage of non-carcass. The treatment of giving 9% fermented coffee skin flour (K_3) gave the lowest result, namely 36.39%. This shows that the provision of

fermented coffee skin flour does not affect the percentage of non-carcass of super kampung chickens. The percentage of non-carcass is the ratio of carcass weight to slaughter weight multiplied by 100%. The provision of fermented coffee skin flour has been shown to provide greater carcass results. Where this provides economic benefits to farmers.

4. Conclusion

it was concluded that the addition of fermented coffee skin flour in the ration did not have a significant effect on all variables. The addition of coffee skin flour tended to provide optimal results on slaughter weight, carcass weight, and carcass percentage, namely in the K3 treatment with a level of (9%) in the ratio.

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