



Available online

S4-Accredited – SK No. 85/M/KPT/2020
Journal Page is available at <http://www.jurnalpeternakan.unisla.ac.id/index.php/ternak/index>

Response of Broilers with The Addition of Herbs (Miana Leaf Flour and African Leaf Flour) in the Broiler Ration

Nelzi Fati^a, Toni Malvin^a, Debby Syukriani^a, Irzal Irda^a, Dihan Kurnia^a

^a Livestock Cultivation Study Program, Payakumbuh State Agricultural Polytechnic, Tanjung Pati Kabupaten Limapuluh Kota Sumbar.

Corresponding author : dihankurnia5@gmail.com

ARTICLE INFO

Article history:

Received 25 January 2022

Revised 10 February 2022

Accepted 04 July 2022

Available online 30 July 2022

Keywords:

Miana leaf flour,
African leaf flour,
Performance indicators,
Broilers.

IEEE style in citing this article:

N. Fati, T. Malvin, D. Syukriani I. Irda, and D.Kurnia " Response of broilers with the addition of herbs (Miana leaf flour and African leaf flour) in the broiler ration" Jurnal Ternak : Jurnal Ilmiah Fakultas Peternakan Universitas Islam Lamongan, vol. 13, no. 1, pp. 1 - 9, 2022.

ABSTRACT

The purpose of this study is to determine the response of broilers to the addition of African leaf flour and Miana leaves. This study used a completely randomized design. Day old broilers (DOC) 90 tails were randomly divided into 6 treatments and 3 replicates, with each replicate consisting of 5 tails. The six treatments were: A (excluding African Leaf Powder (TDA) and Miana Leaf Powder (TDM)), B (Added 4% TDA), C (Added 4% TDM), D (Added 2% TDA + 2% TDM), E (addition of 1% TDA + 3% TDM) and F (addition of 3% TDA + 1% TDM) were added to the self-stirring ration. The measured parameters were PBB, ration consumption, ration conversion, and carcass percentage. The results obtained from the addition of African leaf meal and Miana leaf meal had no significant effect ($P > 0.05$) on body weight, ration consumption, ration conversion and carcass percentage. The addition of African leaf meal and Miana leaf can be tolerated up to 4% in the broiler ration.

Key words: Miana leaf flour, African leaf flour, performance indicators, broilers.

Jurnal Ternak (Animal Science Journal)
Faculty of Animal science - Lamongan Islamic University) with CC BY NC SA license.

1. Introduction

The continuation of population growth has increased the need for animal protein, especially poultry, because it is cheaper than other animals. As a result, poultry production has grown significantly worldwide. Poultry with a short keeping period is broilers. Broilers are not only easy to maintain and very popular with consumers of all ages, but also very easy to care for. The increase in broiler productivity, which is often achieved by farmers, is because of the use of synthetic antibiotics to reduce mortality and increase the growth rate of broilers.

Synthetic antibiotics are widely used in modern poultry farms for disease prevention and treatment. Antibiotics are used to prevent disease as they reduce the mortality rate, and some breeders give antibiotics to stimulate the growth of broilers. In 1960 farmers used antibiotics in broiler feed as a growth promoter. However, considering the high risk of using antibiotics that cause antibiotic resistance, such as the ability of bacteria to survive after exposure to antibiotics, the European Commission on January 1st, 2006 decided to ban the use of synthetic antibiotics that function as

growth promoters in animal feed. The prohibition of synthetic antibiotics forced researchers to find solutions to replace these antibiotics with traditional medicines, and the traditional medicines are Miana leaves and African leaves. This traditional medicine is an herbal plant that has bioactive substances such as phenols, anthocyanins, flavonoids, essential oils, organic acids that act as antibacterial, antioxidant, antifungal and natural dyes.[1]

Miana (*Coleus Scutellarioides*) is a medicinal plant that is often used as a medicine. People use this plant as a cough medicine, heart disease therapy, appetite increase, neutralizing toxins, worm medicine, blood clot removal, antimicrobial, antioxidant, antiseptic, bronchitis, tuberculosis and other activities[2]. Previous research related to phytochemicals in Miana leaves[3],[4] can increase weight gain in broilers with the addition of Miana flour[5] and aqueous extract of Miana leaves [6]. Meanwhile, African leaves contain flavonoids, tannins, saponins and terpenoids that are able to kill parasites that cause *schistosomiasis*, malarial *leishmaniasis*, as well as anti-amoebic, anti-tumor and antimicrobial agents. African leaves are good for diabetes, malaria, stabilize blood pressure, help cure insomnia, help prevent stroke, prevent cancer, and prevent heart disease[7]. Research result [8], the concentration of 100 g/ml African leaf extract was found to have the best antibacterial activity against *S. Aureus* and *E. Colli* bacteria. In addition, according to the results of the study [9], the addition of 5 cc / liter of drinking water extract from African leaves can increase the body weight gain of broilers. The active substances found in Miana and African leaves can act as feed additives. So far, there have been no studies on the simultaneous use of combinations of Miana and African leaves to increase the growth performance of broilers.

The aim of the study was to determine the effect of adding Miana leaf meal and African leaf meal to the diet as a feed additive on the performance and carcass percentage of broilers.

2. Method

This study was conducted over 3 months in the animal nutrition and feed laboratory and in a broiler cage in the animal production laboratory of the Payakumbuh State Agricultural Polytechnic Institute.

The research began with the production of Miana leaf flour and African leaf flour. Good Miana and African leaves are fresh, not deformed or too old leaves, which are then harvested and dried in the sun.

The tools used in this study were blender, Ohaus scales, oven, thermometer, cage and equipment. This study used 90 DOCs, Afrika leaf meal, Miana leaf meal, corn, soybean meal, coconut flour, fish meal, minerals, and palm oil.

This research was conducted on 90 broilers. The first week is given a commercial ration, the second week starts mixed feed with the following rules: Day 1-2 is 25% mix + 75% commercial, day 3-4 is 50% mix + 50% commercial, day 5-6 is 75% mix + 25% commercial, day 7 is 100% mix. From week 3 to week 5 was mixed feed. The provision of African leaf flour and Miana leaves was given from the 2nd week.

The feed used was commercial feed with 22% protein content, less than 5% crude fiber and 3000 kcal metabolic energy until 1 week of age. Furthermore, feed with its own formulation consisting of corn, soybean meal, coconut meal, fish meal, palm oil, minerals and the resulting ration has a protein content of 22-23% with a metabolic energy of 3000 kcal, as shown in Table 1.

This study used a completely randomized design with 6 treatments and 3 replications. As treatments, Miana leaf flour (TDM) and African leaf meal (TDA) were used.

Treatment of Miana leaf flour and African leaves are:

- A = Addition of 0% TDA and TDM in ration
- B = Addition of 4% TDA in ration
- C = Addition of 4% TDM in ration
- D = Addition of 2% TDA + 2% TDM in ration
- E = Addition of 1% TDA + 3% TDM in ration
- F = Addition of 3% TDA + 1% TDM in ration

To determine the treatment effect, the data obtained were analyzed by variance and continued with a DMRT test if there was a difference between the treatments [10].

The variables measured during the study were:

1. Consumption of ration

The ration consumption was measured weekly by calculating the difference between the given ration and the rest of the ration.

2. Weight gain

Body weight gain was the difference between the weight of the chickens' body weight in a given week and the previous week's weight of the chickens or the final body weight minus the initial body weight.

3. Conversion ratio

The ration conversion value was obtained from the amount of ration consumed in comparison with the body weight gain.

4. Carcass percentage

Carcass percentage was derived from carcass weight compared to live weight.

5. Liver weight percentage

Percentage of liver was derived from liver weight compared to live weight.

Table 1. Composition and nutritional content of treatment rations based on calculations

Feed ingredients	A	B	C	D	E	F
Corn	51	51	51	51	51	51
Oil palm	1	1	1	1	1	1
Soybean meal	40	40	40	40	40	40
Fish flour	4,5	4,5	4,5	4,5	4,5	4,5
Vegetable oil	3	3	3	3	3	3
Top mix	0,5	0,5	0,5	0,5	0,5	0,5
African leaf flour	0	4	0	2	1	3
Miana leaf flour	0	0	4	2	3	1
Crude protein	22,00	22,23	21,73	21,98	21,85	22,10
Crude fiber	3,33	3,60	4,54	4,06	4,30	3,82
Crude fat	4,18	4,18	4,08	4,13	4,11	4,15
Calcium	0,82	0,84	0,92	0,88	0,89	0,86
P	0,63	0,66	0,73	0,69	0,71	0,68
Energi metabolism	3031,20	3031,20	3031,20	3031,20	3031,20	3031,20

Based on analysis of information: Polytechnic labor from agricultural land Payakumbuh (2021) rations and the meeting under framework agreement

Tabel 2. Nutrient composition of Miana leaf meal and afrika leaf meal

Nutritional composition	Miana leaf meal	African leaf meal
Water content (%)	7,73	5,99
Crude protein(%)	14,96	27,93
Crude fat (%)	1,70	4,15
Crude fiber (%)	35,66	10,41
Ash (%)	12,54	12,05
Ca (%)	3,29	1,43
P (%)	2,88	0,426
Total phenol	9,08mg/100 mg	40,59 mg/g*
IC ₅₀	282,06 ppm	675,06ppm*

Description: The results of the proximate analysis of the chemical labor of the Payakumbuh State Agricultural Polytechnic (2021)

* Quality labor analysis results (2021)

3. Result and Discussion

Weight Gain

Table 3 presents the results of the average live weight gain from the addition of African leaf meal and Miana meal to the diets of broilers over 33 days of rearing, ranging from 1.467.73 + 115.4 to 1,742.16 + 115.14 kg/head (Figure 1). Variance results showed that the addition of African leaf meal (*Vernonia Amygdalina*, Del.) and Miana leaf meal (*Coleus Atropurpureus*, L) as feed additives at 4% in

the mixed ration had no significant effect ($P > 0.05$) on weight gain. body weight, which corresponds to the amount of diet consumed and does not have a significant effect ($P > 0.05$). There was no significant difference ($P > 0.05$) in body weight gain from the addition of African leaf flour and Miana leaf flour, as the nutrients in the diet were in the form of protein content in the range of 21.73 - 22.22% (Table 1) and fiber. Raw food amounts ranging from 3.3 to 4.54% (Table 1) are still within the range of nutritional requirements required by broilers.

Table 3. Average body weight gain, diet intake and diet conversion up to 33 days of age in chicks

Perlakuan	Body weight gain (g/head)	Ration Consumption (g/head)	Ration conversion	Carcass Percentage
A (control)	1.742,16 ± 115,14	2.960,00 ± 191,9	1,66 ± 0,055	66,55 ± 1,89
B (4% TDA)	1.521,00 ± 33,86	2.837,27 ± 84,09	1,82 ± 0,090	64,01 ± 1,75
C (4% TDM)	1.588,80 ± 139,72	3.085,07 ± 60,98	1,92 ± 0,160	64,21 ± 1,69
D (2% TDA + 2% TDM)	1.602,13 ± 61,34	2.870,60 ± 89,89	1,74 ± 0,015	64,43 ± 1,78
E (1% TDA + 3% TDM)	1.467,73 ± 115,14	2.653,73 ± 196,91	1,75 ± 0,048	67,06 ± 0,61
F (3% TDA + 1% TDM)	1.551,07 ± 78,25	2.857,73 ± 69,71	1,79 ± 0,049	69,26 ± 2,13

Based on Table 3, it can be seen that the administration of African leaf flour and Miana leaves showed a decrease in body weight compared to the control (without leaf flour), although statistically this did not show a significant effect ($P > 0.05$). This indicates that the addition of African leaf meal and Miana leaf meal did not adversely affect broiler production. Table 3 shows that among treatments supplemented with 2% African leaf flour and 2% Miana leaf flour (2% TDA + 2% TDM), body weight gain was slightly higher than with other treatments. The addition of African leaf flour and Miana leaf flour serves as a natural feed additive. Medicinal plants are natural feed additives that are multifunctional, because they are effective in improving digestive tract conditions, ration conversion, increasing nutrient digestibility, body weight, immunity, reproductive function, reducing morbidity and mortality, as well as having a preventive effect and treating livestock diseases[11]. The results of Labor and Feed Quality analysis (2021) showed that the total phenol and IC₅₀ of Miana leaf flour was 9.08 mg/100 g and 282.06 ppm, and the total phenol and IC₅₀ of African flour was 40.59 mg /g and 675.06 ppm, which means African leaf flour and Miana flour have antibacterial and antioxidant potential, so that they are assumed to increase body weight of the broilers. In accordance with the statement of [12] that African leaves have the potential of natural antioxidant agents that are used as neutralcetical/functional food.

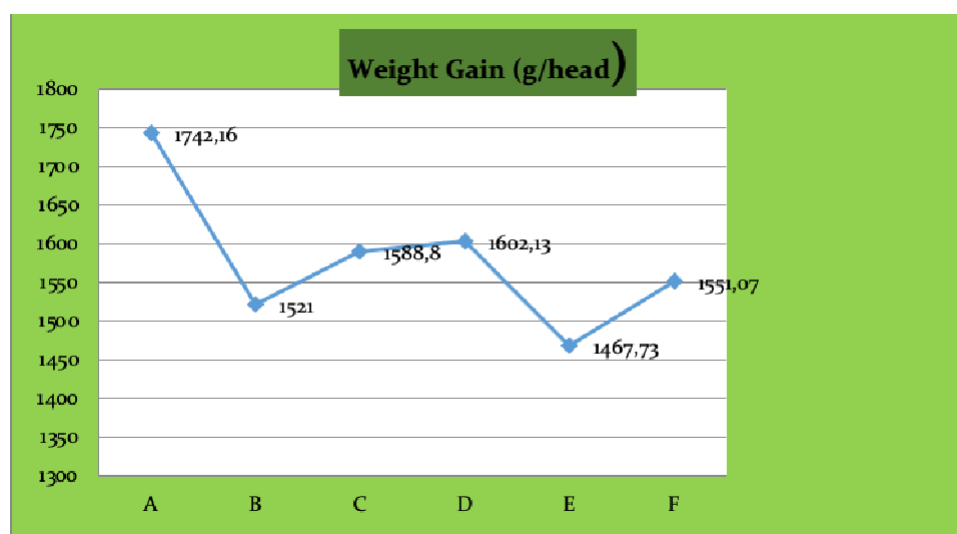


Figure 1. Graph of broiler body weight gain during 33 days of maintenance

The addition of African leaf flour and 4% Miana leaf flour in the diet resulted in an increase in the crude fiber content of the diet compared to a diet without leaf flour. The results of the proximate analysis of crude fiber from Miana leaf meal were 35.66% and African leaf flour was 10.41%, so that the addition of the ration, the crude fiber content increased even though it was still below the threshold for using crude fiber in broiler feed. This affected the weight of broilers until harvest. The lower ration consumed in the treatment was thought to be related to the higher crude fiber content of the control ration. High crude fiber is difficult to digest in the digestive tract of poultry and will come out with feces. Crude fiber protects other nutrients from the digestive system, so some of these nutrients are excreted in the feces. So that the need for nutrients for production is not satisfied, so that body weight can be reduced [5]. The levels of tannins found in African leaves and Miana leaves also affect the growth of broilers. The tannin content of African leaves is 0.05% [13] and the tannin content of Miana leaves is 1.19% [14]. According to Widodo (2005) in [14], poultry feed with a tannin content of 0.33% does not harm livestock, but if more than 0.5% can inhibit the growth of chickens, this is due to the fact that tannins suppress nitrogen retention and lead to a decrease in the absorption of amino acids that must be absorbed by the intestinal villi and be used for the growth and development of body tissues. The resulting body weight gain during 33 days of rearing was 1,467.73 - 1,742.16 g/head, while the results of this study [15] broiler body weight gain from the age of 8-35 days with the provision of Calliandra flour in the ration was 827 g - 1,124 g/head. Body weight gain of 1,394.03 - 1,506.46 g/head from fermented Miana leaves [16]. Body weight was gained of 1,541.48 - 1,734.13 g/head from addition of mixed ginseng leaf flour with Neobro as a supplement [17].

Ration Consumption

The addition of Miana leaf flour and African leaf flour which functioned as feed additives in the ration was not significantly different ($P > 0.05$) on the consumption of broiler rations. With the addition of African leaf flour and Miana leaf meal, the ration consumption was lower than the control, except for the addition of 4% Miana leaf meal, the ration consumption was higher than the control. The highest feed consumption was obtained in treatment C (addition of 4% TDM) of 3085.07 + 60.98 g/head, and the lowest was in treatment E (1% TDA and 3% TDM) of 2653.73 + 196.91 g/head, as shown in Figure 2 and in Table 3.

The addition of African leaf flour and Miana leaf flour did not reduce significantly. One of the factors causing the decline in ration consumption is taste, according to [11] sensory nerves is a factor that affects the consumption of rations. The addition of African leaf meal and Miana leaf to the feed as additional feed tends to be a little bitter, thereby reducing the consumption of rations, but with continuous feeding, broilers become accustomed to consuming these feeds. The results of research [18], bitter taste is caused by plants containing saponins which can reduce palatability and ration consumption. This is supported by the statement [19] that bitter-tasting plants contain saponins and tannins. Tannins are polyphenolic compounds with a sufficiently high molecular weight (more than 1000) and are capable of forming complexes with proteins. The bitter taste in the leaves is due to tannic compounds, the high tannin content causes a bitter and unpleasant taste [20]. The African leaf (*Vernonia Amygdalina*) is known as the bitter leaf because of its bitter taste [21]. The results showed that the addition of 4% Miana leaf flour and African leaf flour resulted in lower ration consumption than without the addition of African leaf flour and Miana leaf flour. The low consumption of this ration was due to the tannin content in the leaves, but it was still in the range of less than 0.05%.

The ration consumption of this study ranged from 2,653.73 - 3,085.07 g/head for 33 days of rearing. The results of [22] research with the addition of medicinal plants as much as 2% in the ration obtained 2,238.78 - 2,306.58 g/head which were kept for 30 days. The results of research by [5] showed that the ration consumption was 2,257 - 2,423 g/head with the addition of Miana flour in the ration for 30 days of maintenance.



Figure 2. Graph of broiler ration consumption during 33 days of rearing.

Ration Conversion

The conversion results of broiler rations were obtained by adding 0% control, 4% TDA, 4% TDM, 2% TDA + 2% TDM, 1% TDA + 3% TDM, 3% TDA + 1% TDM in the diet during maintenance until the age of 33 days can be seen in Table 3. The results of the variance showed that the addition of African leaf meal and Miana leaf meal to the ration had no significant effect ($P > 0.05$) on the conversion of the ration. With the addition of African leaf meal and Miana leaf meal, the ration conversion was higher than the control. The highest feed conversion was obtained in treatment C (addition of 4% TDM) which was $1.92 + 0.16$, while the lowest was in treatment A (0% control) which was $1.66 + 0.055$ as shown in Table 3 and Figure 3. This is due to the consumption of rations and the increase in broiler body weight when consuming treatment rations also had no significant effect ($P > 0.05$). The graph of the effect of adding African leaf flour and Miana leaf on the ration conversion during the study can be seen in Figure 3. The ration conversion was relatively high at each addition of African leaf flour and Miana leaf flour, presumably because the level of leaf flour used as a feed additive was 4%. In addition to the level of addition of leaf flour, the cause of the high conversion of the ration was thought to be because the crude fiber content of the ration in the addition of leaf flour was higher than that of the control crude fiber. Crude fiber in the control was 3.3% while crude fiber containing medicinal plants in the ration ranged from 3.60 to 4.54% (Table 1).

A low ration conversion value indicates that the ration is of good quality because a small amount of ration is consumed by broilers but can result in high body weight gain, while the ration conversion value is high because the large number of rations consumed by broilers is not matched by an increase in body weight gain.

The ration conversion value resulting from this study ranged from $1.66 + 0.055 - 1.92 + 0.16$ for 33 days of maintenance, while the conversion value of the ration resulting from the addition of Miana leaf flour in the ration was $1.72 - 1.89$ [5], $1,87 - 2,05$ [22] with the provision of medicinal plants that are maintained until the age of 30 days, adding Miana leaf extract to drinking water maintained until 30 days of age resulted in a ration conversion from 1.59 to 1.73[6], these differences are due to differences in terms of raising chickens, the availability of feed additives in the form and dose of administration in rations and drinking water.

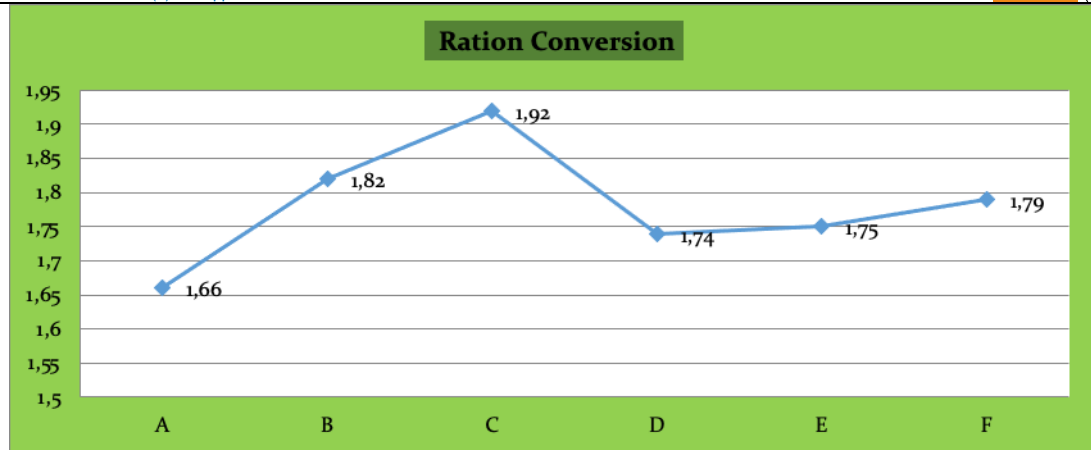


Figure 3. Graph of broiler ration conversion during 33 days of rearing.

Carcass Percentage

The percentage of broiler carcasses was obtained by adding to the control diet 0%, 4% TDA, 4% TDM, 2% TDA + 2% TDM, 1% TDA + 3% TDM, 3% TDA + 1% TDM at 2 weeks of age until the age of 33 days can be seen in Table 3. The results of variance showed that the addition of African leaf meal and Miana leaf meal in the ration had no significant effect ($P > 0.05$) on the carcass percentage. The addition of African leaf meal and Miana leaf meal resulted in a higher carcass percentage than the control. In numerical terms the highest carcass percentage was obtained by treatment F (addition of 3% TDA + 1% TDM) which was 69.26% + 2.13 while the lowest was in treatment A (0% control) namely B (addition of 4% TDA) which was 66, 55% + 1.89 as shown in Table 3 and Figure 4. Table 3 shows that the administration of 3% TDA + 1% TDM resulted in the highest carcass percentage compared to the control and other treatments. These results showed that the addition of TDA 3% + TDM 1% could increase the percentage of carcass, this was due to the active substances contained in the African leaf flour, namely flavonoids, phenols, saponins, alkaloids, steroids [12];[23]; Miana leaves contain a class of chemical compounds called terpenoids, tannins, catekats and flavonoids[3]. Besides that, African leaf flour and Miana leaf flour also function as antioxidants [12]; [24], as antibacterial [25];[12];[23] which has a positive role in increasing the carcass percentage, but the addition of TDA and TDM has not given optimal results. According to the results of the laboratory quality analysis of the Payakumbuh State Agricultural Polytechnic Institute (2021), the total phenol obtained in TDA and TDM was 9.08 mg / 100 mg and 40.59 mg / g, respectively, and the IC50 of TDA and TDM was 282.06 ppm and 675.06 ppm, which means that it has antibacterial and antioxidant properties, although it does not provide optimal results.

In addition, [26] stated that phytochemicals are herbal plants containing active ingredients that can have an antibacterial effect and can improve digestive health (pH balance and microflora), feed conversion, increase nutrient digestibility and improve performance. However, the addition of 4% leaf flour did not improve performance because the increase in crude fiber was one of the inhibitors of growth, although it was still negligible so it affected carcass percentage.

The average carcass percentage obtained in this study was 64.01 % + 1.75 to 69.26% + 2.13. According to [27], the carcass percentage was 67.07% - 69.47% live weight with the addition of fermented ginger extract, 66%-67% with the addition of mian flour to the ration[5], and 69.14% - 74.43% with the addition of fermented Miana leaves in drinking water with commercial feeding[16], the difference in the percentage of carcass for each researcher, this is strongly influenced by the feed additive used, the feed ingredients given, the age of the chicken which affects the growth rate and the percentage of carcass obtained.

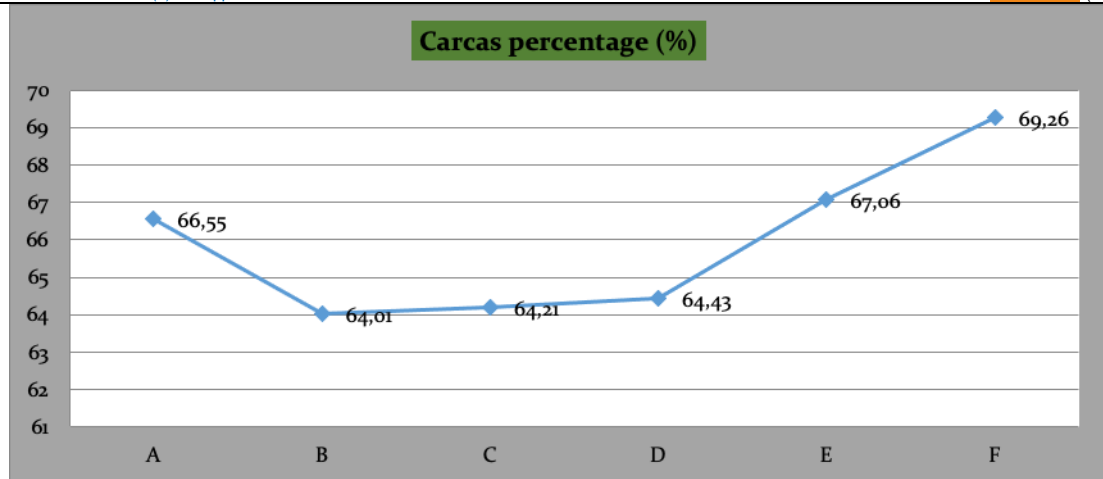


Figure 3. Carcass percentage 33 days old

Carcass Percentage

4. Conclusion

The results of this study showed that the addition of African leaf meal and Miana leaf meal to a level of 4% in the ration had no significant effect on body weight gain, ration consumption, ration conversion, carcass percentage. and the addition of 4% African leaf flour and 4% Miana leaf flour can be tolerated in the broiler ration.

5. References

- [1] D. N. Edi, "Pemanfaatan Kandungan Bioaktif Tanaman Lokal Untuk Menunjang Produktifitas Ternak Unggas (Ulasan)," *Briliant J. Ris. dan Konseptual*, vol. 5, no. November, pp. 819–838, 2020, [Online]. Available: <http://jurnal.unublitar.ac.id/index.php/briliant/article/view/543>.
- [2] A. Ahmad and M. N. Massi, "The antituberculosis drug Rifampicin is activated by 2', 5'-Dimethyl Benzopelargonolactone from the leaf of *Coleus Atropurpureus* L. BENTH," *Int. J. Pharma Bio Sci.*, vol. 5, no. 1, pp. 758–764, 2014.
- [3] V. Lisdawati, D. Mutiatikum, S. Alegantina, and Y. Astuti, "KARAKTERISASI DAUN MIANA (*Plectranthus scutellarioides* (L.) Bth.) DAN BUAH SIRIH (*Piper betle* L.) SECARA FISIKO KIMIA DARI RAMUAN LOKAL ANTIMALARIA DAERAH SULAWESI UTARA," *Media Litbang Kesehatan. Vol.*, vol. 18, pp. 213–225, 2008, doi: 10.22435/mpk.v18i4Des.1090.
- [4] A. Z. Wakhidah and M. Silalahi, "ETNOFARMAKOLOGI TUMBUHAN MIANA (*Coleus scutellarioides* (L.) Benth) PADA MASYARAKAT HALMAHERA BARAT, MALUKU UTARA," *J. Pro-Life.*, vol. 5, no. 2, pp. 567–578, 2018.
- [5] N. Fati, R. Siregar, U. . Lutfi, D. Syukriani, and T. Malvin, "Broiler Response on Increase in Flour Leaves Miana (*Coleus Atropurpureus*, L) as a Feed Aditive in Ration," *EKSAKTA Berk. Ilm. Bid. MIPA*, vol. 20, no. 2, pp. 52–61, 2019, doi: 10.24036/eksakta/vol20-iss2/203.
- [6] N. Fati, D. Syukriani, U. M. Lutfi, and R. Siregar, "Pengaruh Pemberian Ekstrak Daun Miana (*Coleus Atropurpureus*, L) dalam air minum terhadap Performa broiler," *J. Ilm. Ilmu ilmu Peternak.*, vol. 23, pp. 1–15, 2020.
- [7] I. I. Ijeh and C. E. C. C. Ejike, "Current perspectives on the medicinal potentials of *Vernonia Amygdalina* Del," *J. Med. Plants Res.*, vol. 5, no. 7, pp. 1051–1061, 2011.
- [8] R. D. Pratiwi and E. Gunawan, "Uji aktivitas antibakteri ekstrak etanol daun afrika (*Vernonia Amygdalina* delile) asal papua terhadap bakteri *staphylococcus aureus* dan *escherichia coli*," (*Pharmaceutical J. Indones.*, vol. 15, no. 02, p. 121, 2018.
- [9] P. Damayanti, Mihrani, and M. Y. Surung, "Pemanfaatan ekstrak daun afrika (*Vernonia amydalina*) terhadap performa broiler," vol. 15, no. 1, pp. 23–28, 2019.
- [10] R. G. D. and Steel and J. H. Torries., *Principles and procedures of statistic, A Biometrical Approach.*, 2nd ed. 1993.
- [11] M. Ulfah, "Potensi Tumbuhan Obat Sebagai Fitobiotik Multi Fungsi Untuk Meningkatkan

- Penampilan Dan Kesehatan Satwa Di Penangkaran,” *Media Konserv.*, vol. 11, no. 3, pp. 109–114, 2006, doi: 10.29243/medkon.11.3.%p.
- [12] A. Omede, M. Suleiman, F. Atanu, V. Sheneni, and E. Jegede, “Evaluation of antioxidant and cytotoxic properties of *Vernonia Amygdalina*,” *Int. J. Cell Sci. Mol. Biol.*, vol. 4, no. 4, pp. 1–6, 2018, doi: 10.19080/ijcsmb.2018.04.555644.
- [13] J. S. Mandey, M. Sompie, and C. J. Pontoh, “Potensi nutrisi dan bioaktif daun afrika (*Vernonia Amygdalina*) sebagai kandidat bahan pakan dan aditif natural pada ayam broiler,” *Pros Sem Nas Masy Biodiv Indon*, vol. 6, no. 1, pp. 482–486, 2020, doi: 10.13057/psnmbi/m060105.
- [14] I. I. Praptiwi and A. T. D. Indriastuti, “KUALITAS AYAMBROILER DENGAN PEMBERIAN DAUNMAYANA (*Solenostemon scutellarioides*, L.),” *Agrinimal*, vol. 4, no. 1, pp. 17–21, 2015, [Online]. Available: http://ejournal.unpatti.ac.id/ppr_paperinfo_Ink.php?id=927.
- [15] A. K. Wati, Z. Zuprizal, K. Kustantinah, E. Indarto, N. D. Dono, and W. Wihandoyo, “Performan Ayam Broiler dengan Penambahan Tepung Daun dalam Pakan,” *Sains Peternak.*, vol. 16, no. 2, p. 74, 2018, doi: 10.20961/sainspet.v16i2.23260.
- [16] T. Malvin, N. Fati, Y. S. Amir, R. Siregar, D. Syukriani, and U. M. Lutfi, “Performance, Carcass and Broiler Lives with Giving Miana (*Coleus Atropurpureus*, L) Leaves Fermentation Drink,” *J. Eksakta*, vol. 22, no. 02, pp. 162–173, 2021.
- [17] Y. S. Amir, U. Mohtar, R. Siregar, N. Fati, and D. Kurnia, “The Response of The Addition of Ginseng Leaves (*Talinum Paniculatum Gaertn*) Mix Supplements in Rations to The Performance of Broiler Production,” *J. TERNAK*, vol. 12, no. 85, pp. 54–60, 2021.
- [18] Yanuartono, H. Purnamaningsih, A. Nururrozi, and S. Indarjulianto, “Saponin : Dampak terhadap Ternak (Ulasan),” *J. Peternak. Sriwij.*, vol. 6, no. 2, pp. 79–90, 2017, doi: 10.33230/jps.6.2.2017.5083.
- [19] S. Handayani, A. Kadir, and M. Masdiana, “Profil fitokimia dan pemeriksaan farmakognostik daun anting-anting (*Acalypha indica*. L),” *J. Fitofarmaka Indones.*, vol. 5, no. 1, pp. 258–265, 2018, doi: 10.33096/jffi.v5i1.317.
- [20] T. Kusumaningsih, N. J. Asrilya, S. Wulandari, D. R. T. Wardani, and K. Fatihin, “Reduction on the Levels of Tannins From Stevia Rebaudiana Extract Using Activated Carbon,” *ALCHEMY J. Penelit. Kim.*, vol. 11, no. 1, p. 81, 2015, doi: 10.20961/alchemy.v11i1.111.
- [21] Y. A. Putri, “Potensi Daun Afrika (*Vernonia Amygdalina*) sebagai Antidiabetik Artikel info Artikel history,” *J. Ilm. Kesehat. Sandi Husada*, vol. 10, no. 2, pp. 336–339, 2019, doi: 10.35816/jiskh.v10i2.183.
- [22] Y. S. Amir, P. S. Noor, N. Fati, and T. Malvin, “Pengaruh Pemberian Tanaman Obat Sebagai Feed Additive Dalam Ransum Terhadap Performa dan Organ Pencernaan Ayam Pedaging,” *J. Livest. Anim. Heal.*, vol. 3, no. 2, pp. 61–67, 2020.
- [23] D. Meilani and M. Y. Kusumastuti, “Optimasi Formula Gel Ekstrak Etanol Daun Afrika (*Vernonia Amygdalina*) Sebagai Antibakteri Terhadap *Pseudomonas aeruginosa* Dan *Staphylococcus epidermidis*,” *Pros. Sains Tekes Semnas MIPAKes Umr.*, vol. I, pp. 1–6, 2019.
- [24] M. R. Podungge, Y. K. Salimi, and S. Duengo, “Isolasi dan Uji Aktivitas Antioksidan Senyawa Flavonoid dari Daun Miana (*Coleus Scutelleroide* Podungge, M.R., Salimi, Y.K. & Duengo, S. 2017. Isolasi dan Uji Aktivitas Antioksidan Senyawa Flavonoid dari Daun Miana (*Coleus Scutelleroide* Benth.),” *J. Entropi*, vol. 1, no. 1, pp. 67–74, 2017.
- [25] D. E. Kusumawati, F. H. Pasaribu, and M. Bintang, “Aktivitas Antibakteri Isolat Bakteri Endofit dari Tanaman Miana (*Coleus scutellariodes* [L.] Benth.) terhadap *Staphylococcus aureus* dan *Escherichia coli*,” vol. 1, no. 1, pp. 37–44, 2014, doi: 10.29244/45-50.
- [26] S. K. Ramiah, I. Zulkifli, N. A. A. Rahim, M. Ebrahimi, and G. Y. Meng, “Effects of two herbal extracts and virginiamycin supplementation on growth performance, intestinal microflora population and fatty acid composition in broiler chickens,” *Asian-Australasian J. Anim. Sci.*, vol. 27, no. 3, pp. 375–382, 2014, doi: 10.5713/ajas.2013.13030.
- [27] U. Haroen and A. Budiansyah, “Penggunaan Ekstrak Fermentasi Jahe (*Zingiber officinale*) Dalam Air Minum Terhadap Kualitas Karkas Ayam broiler,” *J. Ilm. Ilmu-Ilmu Peternak.*, vol. 21, no. 2, pp. 86–97, 2018.