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Article

Performance, Carcas and Broiler Lives with Giving Miana (*Coleus atropurpureus*, L) Leaves Fermentation Drink

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Abstract. The purpose of this study was to determine the effect of adding miana *(Coleus atropurpureus, L)* leaf fermented drink on performance, carcass and chicken liver. Broiler DOC without sexual segregation totaled 196 tails. The design used was a completely randomized design consisting of 4 treatments and three replications. Each test consisted of 16 tails. The treatments were: A0 = without fermented miana leaves, A1 = 4 ml fermented miana leaves /1 drinking water, A2 = 8 ml fermented miana leaves/ 1 drinking water, A4 = 12 ml fermented miana leaves /1 drinking water. The parameters observed were performance, percentage of carcass and chicken liver. The result showed that was no effect (P>0,05) of the addition of miana leaf fermentation on the performance, percentage of carcass and chicken liver. Offering 8 ml fermented miana leaves/liter provides better performance.

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1. Introduction

The condition of all people in the world is currently shrouded in fear due to the corona virus known as Coronavirus 2019 (COVID-19) which can affect people of all ages. This virus is lethal to people with congenital diseases and it is easy to infect people with weak immune systems. For this reason, people are asked to understand the importance of maintaining immunity to fight viruses. You can increase your immunity by eating a healthy and nutritious diet.

Broiler meat is a healthy and nutritious supplier of animal protein. Besides being nutritious, broilers are also easy to care for. Technological advances have allowed these broilers to grow rapidly, currently broilers can be harvested at the age of 25 days with a production yield of 1 to 1.2 kg/head in the production process with commercially available feed. Consumers are starting to be selective in choosing healthy foods in line with the many consequences of consuming foods that contain chemicals, so that consumers are increasingly careful in choosing food ingredients, both animal and vegetable. Increased intake of healthy animal protein contributes to an increase in protein requirements from animal protein suppliers such as broilers.

Broiler management is inseparable from nutritional and health management, which is of great concern to breeders and always prevents a decline in production, which affects the benefits that will be obtained later. In the past, breeders have always supplied synthetic antibiotics to stimulate growth, improve broiler feed efficiency and reduce mortality. The use of commercial feed additives as feed additives for broilers is permitted by law, but since the results seem to be good, this causes more chemicals to be used, and their use is higher, this affects these livestock products. As a result of this uncontrolled nature, the government prohibits not giving to animals. If the use of chemicals is increased, not all chemicals will dissolve, so that animal products contain antibiotic residues; if these products are consumed by consumers, it can have adverse effects on people consuming livestock products. The bad effects are chemical residues left over on livestock, resulting in resistance to antibiotics that can cause various diseases.

This prompted the Indonesia government to ban the use of antibiotics starting January 1 2018, primarily as a growth factor. This prohibition is contained in MOA 14/2017 in Article 16 which contains the use of prohibited animal products as feed additives for feed additives, also based on Law No. 41/2014 Jo. UU no. 18/2009. This government ban is forcing researchers to seek natural antibiotic alternatives to synthetic antibiotics. Researchers have never stopped discovering natural antibiotics. Natural antibiotics can act as synthetic antibiotics in the prevention and treatment of diseases, especially those caused by bacteria that leave no marks on livestock. The provision of synthetic antibiotics as feed additives in both feed and drinking water has a negative impact, among others, on bacterial residues and resistance, and their use is often uncontrolled because of the urge to accelerate growth and maximize profits. Meanwhile, processed products derived from natural plants will not harm consumers by consuming livestock meat.

The discovery of natural plants as antibiotics has been widely used by researchers to produce bioactive substances that act as natural antibacterial agents. Medicinal plants given to livestock are almost the same as those given to humans, but the choice of these plants is less competitive with humans, cheap and easy to apply to livestock. Based on this, it is necessary to conduct research on the pharmacological potential of various medicinal plants so that they can be used as an alternative prevention and treatment in the field of animal husbandry. Miana is a medicinal plant that has been used in natural medicine.

Previous research focused on the phytochemicals in miana leaves [1]; [2], anticestodes and antelmentics against worms in mice and chickens[3], inhibited the growth of the Mycobacterium tuberculosis strain H37RV isolate[4], increase body weight by adding miana leaf flour to broilers[5], increase body weight gain by adding water extract of miana leaves to broilers[6]. Research is continuing to find other forms of miana processing that are more effective at improving broiler performance.

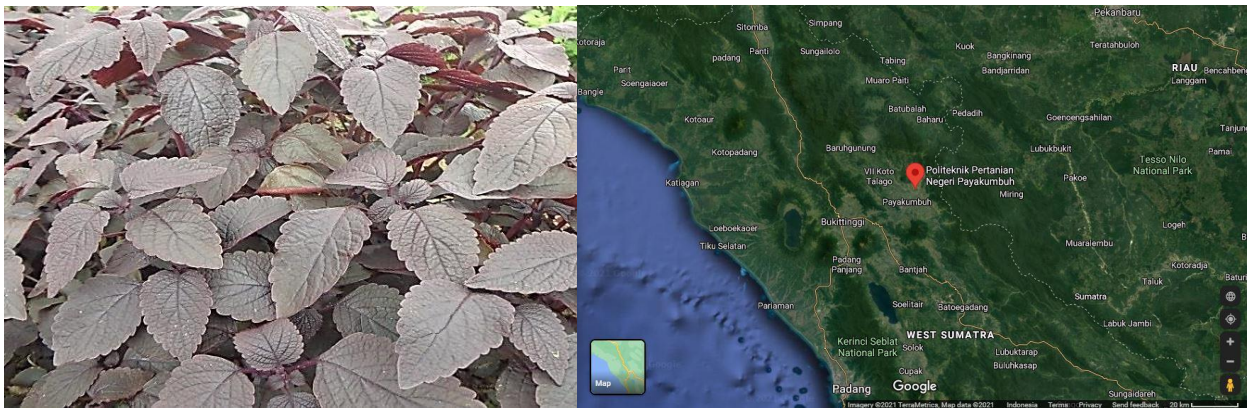

Figure 1. Miana plants and research locations in Payakumbuh Agricultural Polytechnic

Based on the foregoing, a research has been conducted with the title of research: Performance, Carcass and Broiler Liver Given by Fermented Miana Leaves (*Coleus atropurpureus*, L) in drinking water this study aims to determine the effect of theaddition of miana leaf fermentation dose to drinking water on performance (PBB, feed consumption and FCR), the percentage of broiler carcass and liver, and the addition of optimal miana leaf fermentation in drinking water.

2. Experimental Method

Broilers of 192 one-day-old Cobb strains were used as the object of the study, without gender division. The dosage of using fermentation of miana leaves (FDM) in drinking water depends on the treatment. Add miana leaf fermentation every day for 4 days, then alternate with water for 3 days. Add fermentation of miana leaves starting from the 2nd week of service.

The result of fermented miana leaves given is the result of making fermented miana leaves with the addition of water, saka and EM4. The leaves used were purple miana (*Coleus atropurpureus, L*), which was grown independently in the Padang Panjang area. The leaves used are healthy and not perforated leaves. The rations provided were commercial rations with the CP 311 and CP 511 codes (Table 1). The ration is given until the age of 1 week in the form of flour and the next week in the form of crumble until the age of 27 days.

Table 1. Nutrient content of commercial diets

Nutrients	%	
	Starter	*Grower*
Water content	Max 14	Max 14
Crude protein	19,0 -20,0	21 -23
Crude fat	5-8	5-8
Crude fiber	4-5	3-5
Ash	≤ 7,0	4-7
Calcium	≥ 0,9	0,90-1,20
Phospor	≥ 0,70	0,70 – 1,00

Note : CP 2020 data

The experimental design used in this study was a completely randomized design (CRD), 4 treatments and 3 replications, so that there were 12 experimental units and each unit consisted of 16 individuals.

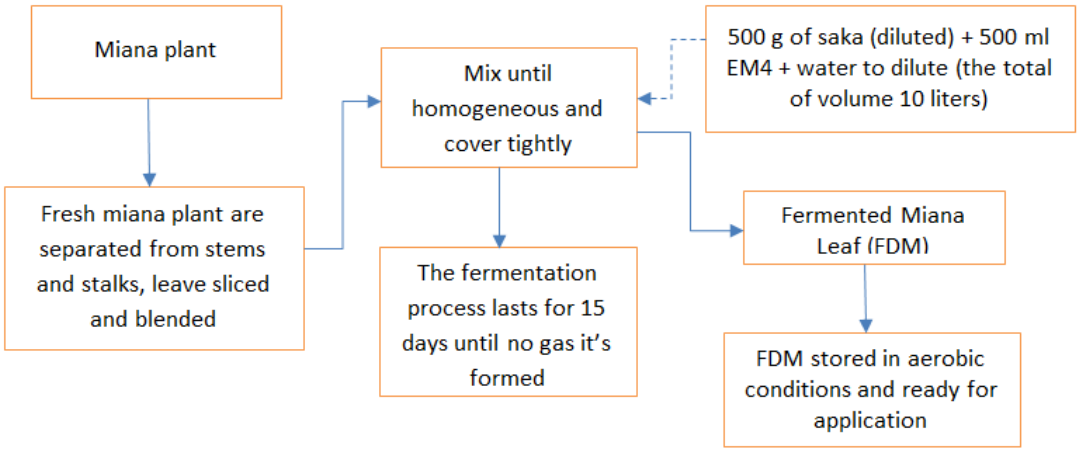

Figure 2. The flow of miana leaf of fermentation

The treatment given was the addition of miana leaf fermentation consisting of 4 doses. The treatments are given with different levels of addition of FDM:

A0 = without adding miana leaf fermentation (control)
A1 = addition of fermented miana leaves to 4 cc/liter of drinking water
A2 = addition of fermented miana leaves 8 cc/liter of drinking water
A3 = addition of fermented miana leaves to 12 cc/liter of drinking water

The experiments were carried out on stage cages, which were divided into 12 units measuring 1 mx 2 m/block. The experimental cage is equipped with a drinking and feeding area. The heating source in this study is a 75 W incandescent lamp per cell. Feed and drinking water are provided as needed every week and in unlimited quantities. Carcass and liver percentages were taken at the end of the study from two chicks per treatment.

Experiments were carried out in stilt cages which were divided into 12 units measuring 1 mx 2 m/unit. The experimental cage is equipped with a drinking and eating area. The heating source in this study was a 75 W incandescent lamp per unit. Feed and drinking water are provided as needed every week and in unlimited quantities. At the end of the experiment the chickens were cut to observe carcass and liver, two chickens per treatment.

Fermentation of Miana leaves: Miana leaves (*Coleus atropurpureus, L*) + Saka and EM4 (effective microorganism). Fermentation procedure for miana leaves: 500 g of miana leaves are washed, placed in a blender until they become puree. Then insert the canister. 500 g of Saka was diluted with water to 500 ml, then 500 ml of EM4 was added and transferred to a canister. Add water to the canisters until the volume becomes 10 liters, mix evenly and close tightly. The fermentation process lasts 15 days, without the formation of gas. When gas forms during fermentation, it is removed by opening the canister for a while and then closing it again. The result of the miana leaf fermentation process is then filtered to obtain a liquid. Fermented miana leaves are placed in a container in the form of a plastic bottle and stored in an aerobic state. The process of making miana leaf fermentation (Figure 1).

The effect of treatment can be seen by analyzing the data obtained by analyzing variance, if there is a difference between the treatments, this can be checked using the DMRT [7]**.** The parameters observed were PBB, ration consumption, FCR, carcass proportion and liver weight.

3. Results and Discussion

Weight Gain

The average weight gain obtained during the study was 1394.03 $\pm$ 23.15 g/head to 1506.46 $\pm$ 61.7 g/head (Table 2 and Figure 3). The results of variance showed that there was no effect (P> 0.05) of giving miana leaf fermentation on PBB. Table 2 shows that the addition of 8 ml/l of drinking water fermented miana leaves obtained the highest PBB, namely 1506.46 ± 61.27g/head compared to without FDM and other FDM doses, this indicates that the addition of FDM can increase broiler growth which can be measured of the resulting weight.

Table 2. Average PBB, ration consumption, FCR to chickens aged 27 days

Treatment	Weight gain (g/head)	Ration consumption (g/head)	FCR
A0 (0 ml)	1394,03± 23,15	1869,58± 124,64	1,408± 0,068
A1(4ml/L)	1427,27± 18,28	1996,29 ± 26,90	1,399±0,036
A2 (8 ml/L)	1506,46± 61,27	1876,86± 29,33	1,248± 0,004
A3(12 ml/L)	1495,00 ± 82,15	2076,58± 81,49	1,391 ± 0,06

Adding FDM to drinking water can increase body weight by increasing the amount of FDM in drinking water. Table 8 shows the addition of Miana leaf fermentation (*Coleus atropurpureus*, l), 8 ml/L, can give the greatest body weight in quantitative terms. The addition of FDM in drinking water has a positive effect on increasing body weight. Research result [5], adding simplicia of miana leaves to 4% in the diet does not have a significant effect on PBBs, and it is also argued that adding simplicies of miana leaves may increase PBBs compared to simplicies of miana leaves. Adding 0.125% Miana leaf extract to drinking water can increase body weight as Miana leaf extract contains active compounds that have a positive effect on increasing PBB content [6].

Miana leaf extract (*Coleus atropurpureus, L*) has an active substance that acts as an antibacterial agent [8]. Miaya leaves contain active substances including saponins, flavonoids, alkaloids, steroids and tannins that block the growth of pathogenic bacteria. The mechanism of action of the active substance will cause cell leakage as a result of a decrease in the surface tension of the cell wall. The active ingredient in the fermentation of miana leaves with EM4 can block polypeptides that are formed on the bacterial cell wall, their formation becomes imperfect, so that lysis on the bacterial cell wall is easy, which is a function of tannin compounds. According to [9] flavonoids can increase the expression of insulin-like growth factor (IGFI), which plays a mediator role in fibroblast proliferation and collagen synthesis, thereby stimulating muscle growth. In addition, flavonoids in the cell nucleus will react and come into contact with DNA, causing damage to the lipid structure of the DNA, and eventually bacteria lyse the cells so that the cells die. Bacterial cell membrane function causes disadvantages and advantages [10]; [11]. [12] reported the results of his research that the introduction of miana extract can inhibit the growth of E. coli, so indirectly the growth of broilers is better. In addition, miana is also a feed additive containing essential oils.

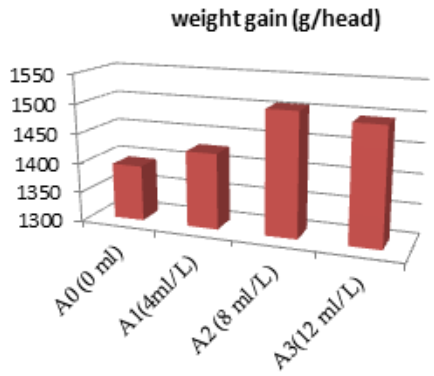

Figure 3. weight gain chart during the study

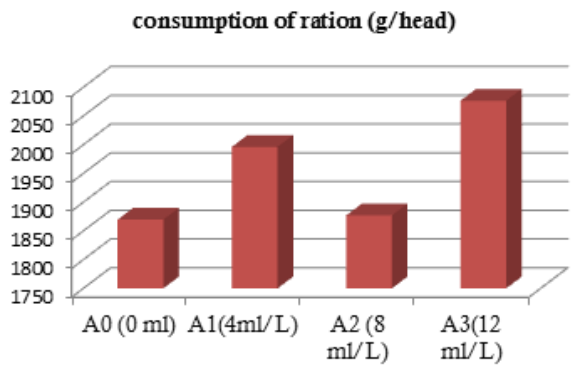

Figure 4. Diagram of ration consumption during the study

The average PBB value obtained during the fermentation of miana leaves fermented with EM4 ranged from 1394.03 ± 23.15 g/head to 1506.46 ± 61.27 g/head. Research result [13] received an increase in the live weight of broilers from 1579.25 to 1670.75 g per head/35 days due to the addition of flour from soursop leaves to the rations to a level of 3%, Meanwhile, according to the results of studies of complementary foods with the addition of mian flour to the feed, the increase in live weight was 1437.00-1467 g/head/30 days[5]. Research result[6] the addition of dry water extract of miana leaves to drinking water resulted in a weight gain of 1261.00 ± 20.97 to 1328.00 ± 20.97 g/head for 30 days of maintenance. Differences in PBB in several studies by several researchers have been associated with differences in diet, differences in feed composition, and the addition of various feed additives that affect body weight.

Feed conversion ratio (FCR)

The resulting average ration consumption ranged from 1869.58 + 124.64 to 2076.58 + 81.49 g per head (Table 2 and Figure 4). The results of the dispersion showed no effect (P> 0.05) of the addition of miana leaf fermentation on ration consumption. The results (Table 2) show that the addition of 12 ml/liter of FDM water gives the highest feed consumption, namely 2076.58 ± 81.49 g/head. In terms of quantity, consumption of A4 is higher than treatment A1, A2 and A3, meaning that FDM supplementation can increase ration consumption. The results showed that the addition of miana leaf fermentation when viewed from the perspective of ration consumption could increase, but it also had an effect on increasing body weight. Increasing the dose of FDM can increase ration consumption along with the increase in body weight to a dose of 12 ml/liter of FDM compared to without FDM.

This result is slightly different from the results of previous studies[6] that miana leaf extract supplementation induces feed intake by increasing the addition of miana leaf extract, which is believed to be due to the bitter taste of miana leaves, when given continuously causes a decrease in ration intake with an increase in the dose of miana leaf extract. Whereas in this study, increasing the amount of FDM could increase the consumption of broiler rations up to a maximum dose of 12 ml/liter. It is suspected that broilers prefer FDM with the addition of EM4 to their drinking water. When FDM is added at a dose of 12 ml/liter in drinking water, the ration consumption increases (Table 2), which means that FDM is tasty enough to increase the broiler's appetite. The taste of the material is influenced by the smell, the taste of the material imparted to livestock. The content of FDM, the presence of antibacterial agents that play a role in inhibiting the growth of pathogenic

bacteria in the digestive tract so that food can be absorbed properly and affect the growth of broiler chickens during production.

FDM compounds that act as antibacterial agents include flavonoids. Flavonoids affect the permeability of bacterial cell walls, lysosomes and microsomes, which causes a violation of the permeability of bacterial cell walls, lysosomes and microsomes, which is the result of the interaction between flavonoids and bacterial DNA[14]. In addition[15]reported that miana leaves have the greatest antibacterial activity, besides that miana leaf extract contains flavonoids that can increase immunity, the total number of flavonoids is 98.53 mgAEAC / gram of miana flour sample [16] 8.59 mg RE / g extract [4]. The average ration consumption for 27 days of maintenance ranged from 1869.58 $\pm$ 124.64 g / head to 2,076.58 $\pm$ 81.49 g / head. The results of the study [17] show that the ration consumption with the addition of areca powder in commercial feed until the age of 5 weeks is 2.23-2.37 kg per head. The consumption of broiler rations with probiotics and herbs was 1969-2008. 8 kg / 27 days[18] and the ration provided was commercial. The difference in ration consumption compared to other researchers was in line with the addition of probiotics, with increasing probiotic doses, ration consumption also increased.

Feed Convertion Ratio (FCR)

The resulting average FCR value ranged from 1.248 $\pm$ 0.06 to 1.408 $\pm$ 0.068 (Table 2 and Figure 5). The dispersion results showed that there was no effect (P> 0.05) from the addition of FDM on FCR. FCR as a result of adding FDM under control. The lowest FCR (Table 2) is the A3 treatment (added 8 ml / L FDM per liter of drinking water. The FCR obtained from this study corresponds to the highest body weight gain with A3 treatment and the lowest A3 ration consumption, which shows the best performance is 8 ml / liters of drinking water. It also shows that the fermented miana leaf extract as an antibacterial agent is given 4 times a week. In addition, the feed additive contained in fermented miana leaf extract has antibacterial properties. One of the antibacterial properties of miana leaves is the presence of flavonoids.

According to [9], flavonoids can increase the expression of insulin-like growth factor (IGFI), which acts as a mediator in fibroblast proliferation and collagen synthesis, thereby promoting muscle growth. In addition, miana leaves [11];[10] can inhibit the growth of E. coli, resulting in better growth of broiler chickens and lower ration consumption, so that the transformation of the diet becomes more efficient. The active substances are tannins, flavonoids and saponins, which cause cells to bubble and eventually destroy the cell walls of bacteria. Saponins play a role in lowering the surface tension of bacterial cell walls, besides saponins and tannins also disrupt the stability of bacterial cell membranes, which causes bacterial cell lysis, which leads to cell membrane damage and the release of several components such as proteins, nucleic acids. acids and nucleotides in bacterial cells. Thus, bacterial cells cannot grow and develop [19]; [20]; [21].

The results of the study by [22] show that miana leaves can be used as a natural antibiotic and have antibacterial activity equivalent to the oxytetracycline antibiotic. Inhibition of E. *coli* and other pathogenic bacteria due to the entry of DMF makes digestion of nutrients smoother, and absorption of nutrients also increases which results in increased body weight, so that feed efficiency increases. The average FCR from the addition of FDM to drinking water ranges from 1.248 + 0,004 to 1.408 + 0,068. Meanwhile, according to the results of the study [17] the conversion of the diet with the addition of the feed additive in the form of betel powder to the commercial diet was 1,72 $\pm$ 0,13 to 1,74 $\pm$ 0,11 within 5 weeks of the study. The results of a study [18] with the addition of a mixture of probiotics and herbs resulted in a diet conversion from 1,47 to 1,6. The difference in ration conversion achieved was related to differences in the shape and method of adding feed additives to broilers. A good ration conversion can be indicated by a low number.

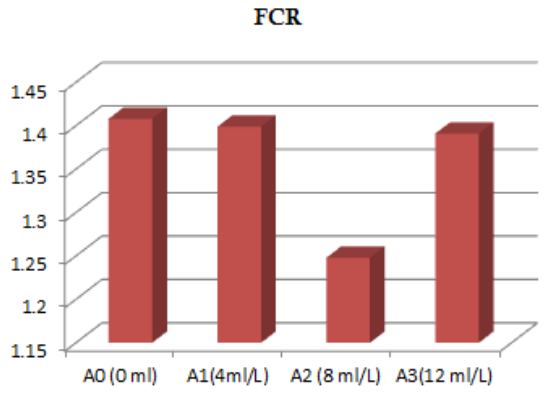

Figure 5. FCR during the study

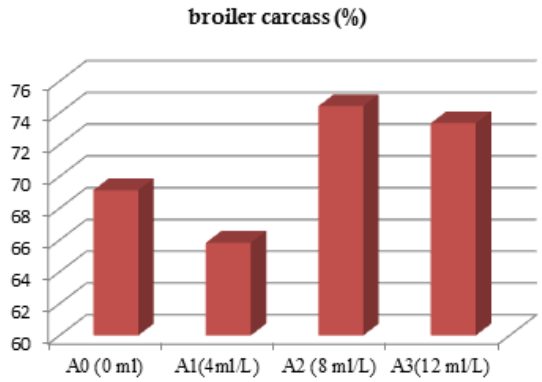

Figure 6. Percentage of broiler carcass

Broiler carcass

The percentage of carcasses obtained ranged from 65.83% ± 1.198-74.43% ± 4.995 (Table 3 and Figure 6). The dispersion results show that the addition of FDM has no effect (P> 0.05) on the percentage of carcass.

Table 3 shows that the addition of fermented miana leaves to 8 ml / L drinking water resulted in a higher percentage of carcass compared to controls and other treatments. The percentage of carcass obtained is consistent with the increase in PBB, low FCR, with the addition of FDM compared to treatments A1, A2 and A4. The active substance contained in fermented miana leaf extract can act as an antibacterial agent[23], as an antioxidant[16], serves as fungicidal [24], also has active substances in the form of steroids, saponins, flavonoids, anthocyanins and tannins[25], which has a positive effect on improving performance and carcass percentage compared to controls (without the addition of extract fermented with miana leaves). The active substances contained in fermented miana leaf extract can inhibit the growth of pathogenic E. *coli* bacteria[26], So it can suppress and kill harmful bacteria, which results in better digestion and absorption of nutrients.

The average percentage of carcasses obtained ranged from 65.83% + 1.198 to 74.43% + 4.995 live weight. Research result[27] The percentage of carcass from the addition of fermented ginger extract to water was 67,07% -69,47% of the live weight of carcass, and 66% - 67% by adding miana flour to the ration[5].

Table 4. Percentage of broiler carcass and liver

Treatment	Carcass (%)	Liver (%)
A0 (0 ml)	69,14 ± 1,176	2,083 ± 0,356
A1(4ml/L)	65,83 ± 1,198	2,253 ± 0,129
A2 (8 ml/L)	74,43 ± 4,995	1,706 ± 0,318
A3(12 ml/L)	73,36 ± 4,007	2,078 ± 0,287

The percentage of carcass obtained from this study was higher than the previous researchers, which means that the addition of FDM can increase the percentage of carcass. Differences in the percentage of carcass for each study based on feed ingredients, feed additives that affect the growth rate and the percentage of carcass produced.

Liver

The average percentage of broiler livers obtained was 1.706% ± 0.318 to 2.253% ± 0.129 (Table 3 and Figure 6). The results of dispersion of addition of fermentation of leaves of miana (Coleus atropurpureus, l) to drinking water did not have a significant effect (P> 0.05) on the percentage of broiler liver.

The results showed that the percentage of liver weight was still within the normal range of liver weight, namely 1.7 - 2.8% of the body weight of the chicken [28] . The results of this study showed the percentage of liver weight was 1.706% ± 0.318 to 2.253% ± 0.129. The result of the addition of FDM is that the percentage of liver weight is still within the range of normal liver weight. The function of the liver is to detoxify toxins, and one of the liver diseases is characterized by an increase or decrease which can be seen from its weight. This means that the addition of FDM to drinking water containing active compounds that have an antibacterial and antioxidant role does not affect liver function, so fermentation of miana leaves can be passed on to broilers in drinking water as it does not affect the physiological organs of the chicken. according to [29] and Blakely dan Bade (1991) *cit*.[30] The physiological function of the liver is to remove bile, accumulate vitamins and fats, remove toxins from the body, break down red blood cells, deactivate polypeptide hormones, store energy readily used by glycogen, form plasma proteins, metabolize proteins, carbohydrates and lipids.

The average percentage of liver weight obtained in this study was 1.706% + 0.318 to 2.253% + 0.129 of body weight, which was still within normal limits. The results [31] showed that the percentage of liver mass produced was 1.88-3.01% with the addition of herbs, namely aloe vera, noni and ginger, until the chicken was five weeks old. The percentage of liver weight 1. 78% - 2.01% of the live weight of broilers fed with herbal ingredients in drinking water [32]. The resulting percentage of liver weight[33] was 3.07–3.88% taking into account various herbs in the diet and lighting for broiler keeping. The difference in the percentage of liver weight produced by each researcher is still within the normal range (Sturkie, 1976) cit [31], liver weight is influenced by species, sex, age, body weight and pathogenic bacteria.

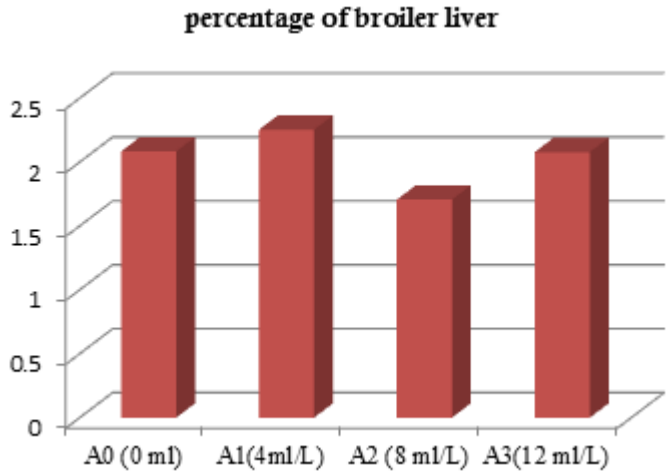

Figure 7. Percentage of broiler liver

4. Conclusion

The addition of miana leaf fermentation can be tolerated up to 12 ml/l against ration consumption, liver percentage and addition of 8 ml/l obtained PBB, ration conversion, better carcass percentage.Based on the conclusions obtained, further research is needed to determine the correct dosage in broiler maintenance

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