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Effect of Synbiotics Administering Probiotics_FM and MOS In the Ration on Broiler Carcass Weight

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ABSTRACT

The use of AGP in broiler farming is for disease treatment and anti-stress, and AGP is also used to stimulate broiler growth. However, continuous use of AGP has been prohibited because it causes resistance to pathogenic bacteria and causes residue for consumers. Therefore, it is important to find a safe replacement for AGP, which can be done using synbiotics. This study aims to determine the effect of providing synbiotics from probiotic Probio_FM and prebiotic Mannan Oligosaccharide (MOS) in the diet on broiler carcass weight. The design used in this research was a Completely Randomized Design (CRD) with 5 treatments and 4 replications. The treatment in this study consisted of P0: Commercial ration + 0% Synbiotic from Probio_FM and MOS, P1: Commercial ration + 0.25 % Synbiotic from Probio_FM and MOS, P2: Cormersil ration + 0.50% Synbiotic from Probio_FM and MOS, P3: Cormersil ration + 0.75% Synbiotic from Probio_FM and MOS, P4: Commercial ration+1% Synbiotic from Probio_FM and MOS. The variables observed in this research were feed consumption, slaughter weight, absolute carcass weight and relative carcass weight. Data were analyzed using variance analysis (ANOVA) with Duncan's advanced test. The results showed that the addition of synbiotics from Probio_FM and MOS had a significant effect ($P<0.05$) on feed consumption, slaughter weight and absolute carcass weight but had no significant impact ($P>0.05$) on relative carcass weight. It was concluded that administering synbiotics from Probio_FM and MOS at 0.25%, 0.50%, 0.75%, and 1% in the ration could increase broiler chicken carcass weight. The research conclusion of the study was that giving synbiotics from Probio_FM and MOS was more effective at a level of 0.25% -0,5%, which was able to increase broiler carcass weight.

Keywords: Probio_FM, mannan oligosaccharide, slaughter weight, carcass weight

INTRODUCTION

Livestock productivity will increase if given quality feed, and one of the efforts is to provide feed additives. This feed additive is added to chicken feed to stimulate and increase the population of beneficial microbes in the chicken's digestive tract. Apart from that, feed additives also help maintain the immune system and avoid food waste. Antibiotic Growth Promoter (AGP) is a commercial feed additive often mixed into poultry food to improve livestock performance by improving animal health. However, continuous use of AGP has been prohibited because it causes resistance to pathogenic bacteria and causes residues in livestock products, harming consumer health (Chang et al., (2015). Therefore, efforts need to be made to use natural feed additives that are safer for livestock, such as providing synbiotics.

Synbiotics are a synergistic combination of prebiotics and probiotics (Dunislawska et al., 2017). Probiotics are a collection of beneficial microorganisms that survive in the intestine and provide mutual benefits both directly and indirectly through the substances produced (Kompiang, 2009), while prebiotics are a source of nutrition or energy for microbes to improve the balance in the tract (Haryati, 2011). One synbiotic that can be used is Synbiotic, which combines Probiotic_FM and MOS.

Synbiotics from Probio_FM and MOS are synbiotics produced from a combination of lactic acid bacteria (LAB) contained in Probio_FM with Mannan Oligosaccharides (MOS) resulting from the hydrolysis of palm kernel cake (BIS) using the enzyme manananse (Mairizal and Manin, 2023). Probio_FM contains four LAB species, including *Lactobacillus plantarum*, *Lactobacillus fermentum*, *Lactobacillus brevis*, and *Pediococcus pentosaceus* (Hendalia et al., 2017).

The working mechanism of synbiotics is a combination of the working mechanisms of probiotics and prebiotics, where probiotic bacteria will utilise prebiotics by probiotic bacteria for nutrition and development so that there is synergy between prebiotics and

probiotics. The Indigenous LAB group found in the digestive tract of chickens will develop and increase in number due to the presence of probiotic bacteria added from outside and prebiotic MOS, which can provide nutrition for the growth of these probiotic bacteria. LAB will produce lactic acid, which can lower the pH of the digestive tract so that pathogenic bacteria such as Escherichia coli cannot grow properly. If the population of E. coli bacteria decreases in number, the small intestine will become healthier, as indicated by the development of small intestinal villi. A good small intestine will absorb a lot of nutrients, and the more nutrients that are absorbed, the healthier the livestock will be, and the livestock productivity will be better (Celi et al., 2017), such as increasing carcass weight.

Carcass weight is the part of the chicken's body that does not have feathers, innards, head, neck and feet, and carcass weight has economic value (Zulfikar et al., 2022). Factors influencing carcass percentage include feed, age, livestock breed, and environment (Anwar et al., 2019). Carcass weight is influenced by slaughter weight, where a high slaughter weight will produce a high carcass weight, and vice versa (Subekti et al., 2012). The effect of providing synbiotics from Probiotic_FM and MOS in the ration on broiler carcass weight is unknown, so a study had been carried out to observe the impact of providing synbiotics from probiotic_FM and MOS in the ration on broiler carcass weight.

MATERIALS AND METHODS

Place and Time

This research was conducted at the Analysis Laboratory, Faculty of Animal Husbandry and Poultry Experimental Cages, Animal Cultivation and Forage Laboratory, Faculty of Animal Husbandry, Universitas Jambi, from 28 July 2023 to 16 September 2023.

Materials and Equipment

The material used was 200 Day Old Chicks (DOC) strain MB 202 Platinum produced by Japfa Confeed obtained from Poultry Shop Simpang Kawat, Jambi City. The rations used in this study's Starter and Finisher phases Starter and Finisher phases used the commercial Novo 511 non-antibiotic diet and synbiotics from probiotics_FM and MOS, which were given in solid form (flour).

This research used 20 cage units measuring 1m x 1m x 1m filled with 10 DOC. Each cage has a feeder, drinker, and a 5-watt lamp. The equipment used in this research was a 2 Kg capacity scale and a 5 Kg scale to weigh initial body weight and carcass weight.

Method

The design carried out in this research used a Completely Randomized Design (CRD). The variables observed were feed consumption, drinking water consumption, slaughter weight, and relative carcass weight. The treatment in this study was with the commercial ration Novo 511 Non-Antibiotic with a concentration of synbiotics from Probio_FM and MOS in the form of flour. Based on the research design, the combination of treatments was obtained as follows: P0: commercial ration + 0% Synbiotic, P1: commercial ration + 0.25 % Synbiotic, P2: commercial ration + 0.50% Synbiotic, P3: commercial ration + 0.75% Synbiotic P4: Commercial ration + 1% Synbiotic.

Observed Variables

The variables observed in this study were drinking water consumption, feed consumption, slaughter weight, absolute carcass weight and relative carcass weight. After the data on the observed changes were collected, the variance was analyzed according to the design used, namely CRD (Completely Randomized Design). If there is a significant effect between treatments, proceed with Duncan's multiple range test (Steal and Torrie, 1991)

RESULTS AND DISCUSSION

Ration Consumption

The analysis of variance it shows that the administration of synbiotics from Probio_FM and MOS has a significant effect ($P<0.05$) on feed consumption. Duncan's test showed that ration consumption in treatment P0 was significantly different ($P<0.05$) from P1, P2, P3, and P4, while treatments P1, P2, P3, and P4 were not significantly different ($P>0.05$) from ration consumption. The results of this study indicate that giving synbiotics can increase feed consumption.

The effect of providing synbiotics from Probio_FM and MOS in the diet on broiler slaughter weight can be seen in Table 1.

The increase in feed consumption in treatments P1, P2, P3 and P4 was caused by adding synbiotics from Probio_FM and MOS.

Probiotics are microorganisms that contain non-pathogenic bacteria that are beneficial in the digestive tract and maintain the health of the digestive tract. Meanwhile, prebiotics regulate the balance of microorganisms in the digestive tract and are non-pathogenic so they are safe for chickens to consume.

Table 1. Average Ration Consumption

Treatment	Ration Consumption (grams/head/Day)
P0	$79.32^{b} \pm 1.11$
P1	$84.49^{a} \pm 3.10$
P2	$84.32^{a} \pm 1.50$
P3	$82.98^{a} \pm 1.21$
P4	$83.45^{a} \pm 1.71$

Note:
P0: commercial ration + 0% Synbiotic
P1: commercial ration + 0.25 % Synbiotic
P2: commercial ration + 0.50% Synbiotic
P3: commercial ration + 0.75% Synbiotic
P4: commercial ration + 1% Synbiotic

Probiotic Probio_FM and Prebiotic MOS play a role in improving the health of the digestive tract, characterized by increasing the growth of small intestinal villi, length of small intestinal villi, and width of small intestinal villi, thereby increasing the surface area of small intestinal villi. Synbiotics can improve intestinal performance, optimize nutrient absorption, and have an impact on growing intestinal villi (Hartono et al., 2016).

The wider the small intestine's villi, the more nutrients are absorbed. The more nutrients absorbed, the faster the emptying process in the digestive tract. This emptying of the digestive tract will quickly introduce new feed, increasing ration consumption. The larger the surface of the small intestinal villi, the more nutrients are absorbed, which can influence the growth of intestinal organs and increase carcass (Nova et al., 2019). Providing synbiotics can improve the health status of the digestive tract, thereby increasing the absorption of nutrients, emptying the digestive tract and ultimately increasing food consumption. Increasing the length of the small intestinal villi can increase the absorption surface area, allowing nutrients to be absorbed more efficiently (Satimah et al., 2019).

Treatments P1, P2, P3, and P4 did not show differences in ration consumption ($P>0.05$). The presence of BAL in Probio_FM plays a role in reducing pathogenic bacteria. BAL produces lactic acid, which can reduce the acidity level in the intestine, reducing pathogenic bacteria such as *E.coli* (Verawati and Nurcahyo, 2023). Probio_FM contains four nonpathogenic bacteria, including *Lactobacillus fermentum, Lactobacillus plantarum, Lactobacillus brevis* and *Pediococcus pentosaceus* (Hendalia et al., 2017).

Feed consumption in this study ranged from 79.32 to 84.49 (grams/head/day). The results of this study were not much different from the results of research (Zulfikar et al., 2022), which ranged from 64.21 to 74.72 grams/head/day and the treatment given in the study used turmeric flour containing black garlic as a prebiotic at levels of 0%, 3%, 0.5%, 1% and 1.5%.

Broiler Slaughter Weight

The effect of providing synbiotics from Probio_FM and MOS in the diet on broiler slaughter weight can be seen in Table 2.

Table 2. Average Broiler Slaughter Weight

Treatment	Slaughter Weight (g/head)
P0	$1884.38^{b} \pm 17.37$
P1	$2075.00^{a} \pm 92.40$
P2	$2063.75^{a} \pm 85.94$
P3	$2008.13^{a} \pm 17.60$
P4	$2052.50^{a} \pm 32.34$

Note:
P0: commercial ration + 0% Synbiotic
P1: commercial ration + 0.25 % Synbiotic
P2: commercial ration + 0.50% Synbiotic
P3: commercial ration + 0.75% Synbiotic
P4: commercial ration + 1% Synbiotic

Based on analysis of variance, it showed that administration of Synbiotics from Probio_FM and MOS had a significant effect ($P<0.05$) on broiler slaughter weight. Duncan's further test showed that treatment P0 was significantly different ($P<0.05$) from P1, P2, P3, and P4 due to the addition of Synbiotics from Probiotics Probio_FM and MOS. In contrast, treatments P1, P2, P3, and P4 were not significantly different ($P>0.05$) on broiler slaughter weight.

The lower slaughter weight in treatment P0, when compared with treatments P1, P2, P3 and P4 has a close relationship with the level of feed consumption, where the decrease in feed consumption in P0 is also followed by a decrease in slaughter weight (Table 1). Increasing ration consumption at P1 to P4 will cause many nutrients to be absorbed so that the slaughter weight of broiler chickens will increase when

compared to P1. By increasing the absorption of food substances, livestock's nutritional needs will be increasingly met. This will result in an increase in body weight, which will impact the broiler's slaughter weight. Live weight by measuring the weight of a live chicken. A large live weight indicates good carcass quality and abundant meat (Nahak, 2019). Slaughter weight is closely related to feed consumption, the more feed consumed, the higher the amount of food substances needed to enter the body so that body weight gain is better and results in a higher slaughter weight (Zulfikar et al., 2022).

Slaughter weight is obtained by weighing the final weight of the chicken after fasting for approximately 5 hours. Slaughter weight in the study ranged from 1884.38 – 2075.00 grams/head (Table 2). The results of this study were higher than the results reported by Jumiati et al., (2017), the average slaughter weight of broilers ranged from 1707.13-1867.91 grams/head and the treatment used in this research using ginger flour (*Curcuma xanthorrhiza*, Roxb) as a prebiotic with levels of 0%, 1%, 2%, and 3%.

Broiler Absolute Carcass Weight

The effect of providing synbiotics from Probio_FM and MOS on absolute carcass weight and relative carcass weight of broilers can be seen in Table 3.

Table 3. Average of Absolute Carcass Weight and Relative Carcass Weight

Treatment	Absolute Carcass Weight (g/head)
P0	$1476.25^{b} \pm 14.22$
P1	$1611.88^{a} \pm 83.58$
P2	$1610.88^{a} \pm 80.27$
P3	$1571.88^{a} \pm 29.47$
P4	$1600.63^{a} \pm 30.71$

Note:
P0: commercial ration + 0% Synbiotic
P1: commercial ration + 0.25 % Synbiotic
P2: commercial ration + 0.50% Synbiotic
P3: commercial ration + 0.75% Synbiotic
P4: commercial ration + 1% Synbiotic

The variance analysis showed that providing synbiotics from Probiotic_FM and MOS in the ration had a significant effect ($P<0.05$) on the absolute carcass weight of broilers. Duncan's further test showed that P0 was significantly different ($P<0.05$) from P1, P2, P3, and P4, while P1, P2, P.3, and P4 were not significantly different ($P>0.05$) in absolute carcass weight. The results showed that administering synbiotics from Probio_FM and MOS could increase absolute carcass weight. The increase in absolute carcass weight in treatments P1, P2, P3, and P4 was caused by adding the symbiotic compared to P1.

In treatment P0 there was an increase in P1, P2, P3 and P4 because the administration of synbiotics from Probio_FM and MOS worked well. The aim of administering synbiotics from Probio_FM and MOS is to balance non-pathogenic and pathogenic bacteria in the intestine, thereby accelerating the absorption of nutrients in the intestine. Meanwhile, in treatments P1, P2, P3, and P4, there was no increase in absolute carcass weight because both were given synbiotics from Probio_FM and MOS in these treatments. The synbiotic action of probio_FM and MOS in the intestine can be seen from the total pathogenic bacteria in the digestive tract. Reducing e.coli bacteria in the intestine can expand the small intestinal villi. The wider the small intestinal villi are, the more nutrients they will absorb, thereby increasing the absolute carcass weight of broilers. Increasing the length of the small intestinal villi can expand the absorption surface, allowing optimal absorption of nutrients (Satimah et al., 2019).

The absolute carcass average of broilers during the study in each treatment ranged from 1476.25-1611.88 grams/head (Table 3). This research is higher than the results of research conducted by (Suryanah et al., 2016); the average value of carcass weight is closely related to the slaughter weight of broiler chickens, with the average value of carcass weight ranging from 1081.62-1115.5 grams. According to Meidi et al. (2019), there is a relationship between slaughter weight and carcass weight, the greater the slaughter weight, the greater the carcass weight and vice versa. Tissue, carcass and non-carcass growth grows in balance. In addition, the absolute decrease in carcass weight was correlated with the reduction of slaughter weight, causing the relative carcass weight to have no difference.

Broiler Relative Carcass Weight

The effect of providing synbiotics from Probio_FM and MOS on the relative carcass weight of broilers can be seen in Table 4.

The analysis of variance showed that the effect of providing synbiotics from Probiotic_FM and MOS in the ration had no significant impact ($P>0.05$) on the relative carcass weight of broilers. Various factors can influence relative

Table 4. Average Relative Carcass Weight of Broilers

Treatment	Relative Carcass Weight (%)
P0	78.35 ± 0.36
P1	77.65 ± 0.58
P2	78.03 ± 0.87
P3	78.29 ± 0.81
P4	78.02 ± 1.24

Note:
P0: commercial ration + 0% Synbiotic
P1: commercial ration + 0.25 % Synbiotic
P2: commercial ration + 0.50% Synbiotic
P3: commercial ration + 0.75% Synbiotic
P4: commercial ration + 1% Synbiotic

carcass weight, such as breed, gender, ration quality, and slaughter weight. Relative carcass weight is calculated by comparing the absolute carcass weight with the slaughter weight multiplied by 100% (Juniarti et al., 2019).

CONCLUSION

Based on the results of this research, it can be concluded that giving synbiotics from Probio_FM and MOS at 0.25% - 0.50% in the ration can increase broiler carcass weight.

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