Bantara Journal of Animal Science *p ISSN : 2656-9701*
Vol. 6, No. 2, Oktober 2024 DOI : 10.32585/bjas.v6i2.5917 *e ISSN : 2657-1587*

Broiler Chicken Performance with The Addition of Moringa Leaf Flour (*Moringa oleifera*) and Garlic Flour (*Allium sativum L*)

Susan E. Lumban Gaol*, Ida Ketut Mudhita, Devita Widiantari Putri
Study Program Animal Husbandry, Agriculture Faculty, Antakusuma University, Jl. Iskandar No. 63 Pangkalan Bun, Central Kalimantan
Corresponding author: Susan E. Lumban Gaol
Email: susanlgpruden@gmail.com

Abstract

This study aims to determine the effect of giving Moringa leaf flour at 1, 2.5% and 5% and garlic flour at 2% on the performance of broiler chickens. The materials used are 64 broiler chickens. Moringa leaf flour and garlic flour. This study used a completely randomized design with four treatments and four replications. P0 = 100% commercial feed, P1 = 1% Moringa leaf flour and 2% garlic flour, P2 = 2.5% Moringa leaf flour and 2% garlic flour, P3 = 5% Moringa leaf flour and 2% garlic flour for 35 days. The variables observed were feed intake, body weight gain, feed conversion ratio, mortality and performance index. The data obtained were analyzed using variance analysis, and the Duncan test was continued. The results showed that the treatment had no significant effect (P>0.05) on feed intake, weight gain, FCR, mortality and IP. Based on the study results, it can be concluded that administering Moringa leaf flour at up to 5% and garlic flour at 2% yielded good results on weight gain, FCR, and mortality.

Key words: Broiler chickens, Performance, Moringa leaf flour, Garlic flour

Introduction

Broiler chicken is a type of superior meat chicken, a cross between chickens with high productivity and high genetic quality in producing meat. Broiler chicken is the result of technological cultivation with economic characteristics and the characteristic of being a meat producer (Mulyanti, 2014).

Antibiotics are one type of feed additive that is used in feed mixtures or drinking water. The purpose of using these antibiotics is to increase livestock productivity, health, and nutritional status. Some feed additives that farmers most often use are synthetic antibiotics because they are practical and show instant results. Synthetic antibiotics can cause residues of hazardous chemicals in the products produced and cause resistance to harmful bacteria in the chicken's body (Dewiet al., 2014). An effort to replace synthetic antibiotics with natural antibiotics, such as giving Moringa Leaf Flour (Moringa oleifera) and Garlic Flour (Allium sativum L).

The enormous demand for fresh chicken meat in Indonesia is triggered by the fact that chicken meat is a source of protein. This extraordinary need for chicken meat causes producers to often ignore the quality and safety of fresh chicken meat. Microbiological contaminants are one cause of the reduced quality of chicken meat and even make it unsafe for consumption (Handarini and Tjiptaningdyah, 2014).

People in Indonesia, especially farmers who partner with companies, habitually use factory-made antibiotics that contain chemical compounds and can leave residues on broiler chicken meat, so broiler chicken meat is unsafe for consumption. With this problem, this study uses moringa leaf flour and garlic flour as alternative natural antibiotics that will not leave residues on broiler chicken

meat to make it safe for consumption. Moringa leaves have the main active ingredients: saponins, tannins, and flavonoids. Saponins function as antimicrobials that can increase immunity so that it is resistant to disease and smooth the digestive system. Flavonoids are antioxidants and maintain the body's immune system. Tannins have antiseptic properties, so they have a good effect on the digestive tract (Dewi. Tet al., 2014).

Good nutritional fulfilment is needed to support animal development and growth. In addition, to improve digestibility and feed consumption levels, people often use feed ingredients in livestock rations, and garlic can be used as an additional feed ingredient in rations that function as supplements (Ichwan, 2003).

Research conducted by (Dharmawati. S et al., 2013) using the addition of Garlic Flour (Allium sativum L) as a feed additive in rations on the appearance of broiler chickens resulted in a decrease in ration conversion; this is in line with the opinion of (Putri et al., 2017) the best feed conversion is to have the lowest value. The active compounds in garlic provide antioxidants and prevent red blood cell thickening. Garlic also plays a role in overcoming Salmonella Typhimurium and Salmonella enteritidis infections that attack the digestive system of broiler chickens (Gaol et al., 2023). This shows that garlic flour also acts as a natural antibiotic, so people can consume meat safely and avoid the effects of drug residue due to excessive use of antibiotics (Dharmawati. S et al., 2013).

Materials and Methods

Materials

The materials used in this study were commercial broiler chicken feed for feed from the beginning of the study to the end of 198 kg. Additional feed materials for the research experiment were moringa leaf flour (Moringa oleifera), 5 kg, and garlic flour (Allium sativum L), 3.5 kg. The object of the study was DOC (day-old chick) broiler chickens, as much as 64.

The equipment used was one experimental chicken cage unit with a capacity of 64 chickens, divided into 16 cage partitions, each containing four chickens. Laboratory equipment for making moringa leaf and garlic flour included knives, digital scales, blenders, plastic trays, jars, basins, label paper, and stationery. Laboratory equipment for analyzing the water content of the feed to obtain dry matter included analytical scales, blenders, and 105oC ovens (AOAC, 2005).

Methods

This study used 4 (four) treatments and 4 (four) replications. The treatments in this study were:

P0: Given 100% Commercial Feed
P1: P0 + 2% Garlic Flour + 1% Moringa Leaf Flour
P2: P0 + 2% Garlic Flour + 2.5% Moringa Leaf Flour
P3: P0 + 2% Garlic Flour + 5% Moringa Leaf Flour
(Wiryawan et al., 2005, Oludovi et al., 2012).

Sampling Technique

All research samples were sampled for feed consumption, conversion, and weighing of broiler chickens, with as many as 64 chickens in each treatment, so each treatment was 16 chickens. Research Parameters Feed Consumption, Body Weight Gain, Feed Conversion, Mortality and Performance Index: Mortality data was taken from chickens that died only for each

treatment, while dry matter data for feed was taken from 10 chicken feed samples from each treatment and averaged.

Data Analysis

This study used a completely randomized design (CRD) with four treatments and four replications. Data analysis determined the performance of broiler chickens given Moringa Leaf flour (Moringa oleifera) and Garlic flour (Allium sativum L). The data analysis used was analysis of variance (ANOVA); if there was a difference with the treatment, it was continued with the Duncant Test at a level of 5% between treatments.

Results and Discussion

Feed Intake

Table 1. Average feed intake

Treatment	Feed Intake (FI)
P0	3261
P1	3129
P2	3080
P3	2903

^{ns} treatment: non significant

There was no significant effect (P>0.05) on broiler chicken feed intake based on moringa leaf flour and garlic flour provision. This is by research conducted by Dharmawati et al. (2013), which stated that the addition of garlic flour at a level of 0.25% to broiler chickens for 35 days had not affected (P>0.05) broiler chicken feed intake. This is in line with research conducted by (Yunus et al., 2020) that adding moringa leaf flour up to 4% did not show any significant difference in feed intake in broiler chickens. The lowest feed intake during the study was demonstrated by treatment P3 (2903). This is because using moringa leaf flour in feed gives a slightly bitter taste, and garlic flour gives a distinctive aroma or smell, decreasing feed intake in broiler chickens (Hertiandryani, 2007).

The average feed intake is 2345 g/head (Ardana, 2009), so from the observation data, it can be said that feed intake is still classified as usual, feed intake in this study, where the average feed intake ranged from 2903-3261 g/head treatment with the provision of moringa leaf flour at levels of 1%, 2.5%, 5% and garlic flour at levels of 2% for 35 days.

Weight Gain

Table 2. Average weight gain

Treatment	Weight Gain
P0	2035,5
P1	2053,75
P2	1955
P3	1942,25

^{ns} treatment: non significant

There was no significant effect (P>0.05) on body weight gain based on the provision of moringa leaf flour and garlic flour. The absence of a significant difference in effect was due to the food content, especially energy and protein in the feed given, being almost the same, resulting in

relatively the same body weight gain. This is in line with research conducted by (Yunuset al., 2020) that the provision of moringa leaf flour up to 4% in feed did not cause any significant difference in body weight gain. The group of chickens given moringa leaf flour at levels 1, 2.5 and 5% in feed were not statistically significantly different from those in the control group.

Feed consumption also affects the growth of broiler chicken body weight. The more feed consumption, the more energy is produced for growth (Hermansyah et al., 2019). This is to the study; it can be seen in Table 1 that feed consumption in the P3 treatment was (2903 grams) which is the lowest consumption of each treatment.

The highest weight gain during the study was shown in treatment P1 (2053.75) with the addition of 1% moringa leaf flour and 2% garlic flour, and the lowest was shown in treatment P3 (1942.25) with the addition of 5% moringa leaf flour and 2% garlic flour. This is due to reduced palatability to feed. However, according to Rasyaf (2004), the broiler chicken strain Lohman Broder MB 202 can grow with an average weight of around 4-5 weeks of age and a body weight of 1.2-1.9 kg/head. It can be said that the weight gain in treatment P3 is still relatively average. This is due to phytochemical compounds in moringa leaves, scordinin, and allicin in garlic (Bidura et al., 2000). Garlic contains allicin, which functions as an antimicrobial and antioxidant; in addition to allicin, scoring, which acts as a "growth promoter", is a substance that can stimulate growth because it can bind protein and break it down in the body as a protein that is absorbed more and this can promote the development of broiler chickens. The addition of moringa leaf flour at a low dose of 0.1-2% in feed as a substitute for the use of growth promoter antibiotics and does not leave residues in broiler chicken meat (Teteh et al., 2013; Ologhobo et al., 2014).

Feed Convertion Ratio (FCR)

Table 3. Average Feed Convertion Ratio (FCR)

Treatmen	Feed Convertion Ratio (FCR)
P0	1,6
P1	1,6
P2	1,5
P3	1,4

[ns] treatment: non significant

Based on the treatment of giving moringa leaf flour and garlic flour, there was no significant effect (P>0.05) on the Feed Conversion Ratio (FCR). The results of this study showed that the FCR in the P3 treatment (1.497) was lower than the standard FCR recommended by Japfa Comfeed Indonesia (2012) for 5-week-old Lohman strain broiler chickens (MB 202), namely (1.560). This is because moringa leaves have antibacterial and antifungal properties. Pathogenic bacteria harmful to broiler chickens' digestive tract can be killed by the active compounds in moringa leaves so that the digestive tract can optimally absorb the nutrients contained in the ration. It can significantly increase the efficiency of using rations given during maintenance. Moringa leaves contain active antimicrobial ingredients such as flavonoids, saponins, tannins, and other phytochemical compounds that have antimicrobial activity (Sato et al., 2004).

Research conducted by Dharmawati et al. (2013) found that using additional garlic flour as a feed additive in rations to improve the performance of broiler chickens decreased ration conversion. Puspitaningrum et al. (2021) stated that garlic can optimize metabolic function, thereby increasing efficiency in ration use. This is in line with the opinion of Putri et al. (2017) that the best feed conversion is to have the lowest value.

Mortality

Table 4. Average mortality

Treatment	Mortality
P0	0
P1	0
P2	0
P3	0

^{ns} treatment: non significant

Based on the study results, there was no death at all with the treatment of moringa leaf flour and garlic flour. Statistically, the administration of moringa leaf flour and garlic flour had no significant effect (P>0.05) on mortality. This is possible due to the role of active compounds found in garlic. Garlic contains the active compound allicin, which functions to produce allicin as an antibacterial (antibiotic) so that broiler chickens are more resistant to disease attacks (Dharmawati et al., 2013) stated that in the treatment of giving garlic flour at a level of 0.15-0.25%, there was no death. Phytochemical compounds in moringa leaves, scoring, and allicin in garlic can kill harmful microbes in the digestive tract, increasing the number of beneficial microbes. Thus, the opportunity for the absorption of nutrients can be more optimal, which has an impact on increasing chicken growth. The active compounds in garlic provide benefits as antioxidants and prevent the thickening of red blood cells. Garlic also plays a role in overcoming Salmonella Typhimurium and Salmonella enteritidis infections that attack the digestive system of broiler chickens (Poultry Indonesia, 2012).

Performance Index

Table 5. Average Performance Index (PI)

Treatment	Performance Index
P0	363,5
P1	331
P2	355,5
P3	372,25

^{ns} treatment: non significant

Based on the research, the treatment of moringa leaf flour and garlic flour did not have a significant effect (P>0.05) on the performance index (IP). The study's results showed that giving moringa leaf flour at levels of 1%, 2.5% and 5% and giving garlic flour at a level of 2% still gave good results on the performance index during the study period. The highest performance index was treatment P3 (372.25), and the lowest was treatment P1 (322). This study is in line with research conducted by (Dharmawati et al., 2013), which stated that the study's results on giving garlic flour to broiler chicken feed showed an increase in the performance index value in broiler chickens.

The performance index at P1 can still be said to be good; this is the opinion of Santoso and Sudaryani (2011), who stated that the performance index value that was sufficient ranged from 301-325, good ranged from 326-350, and very good ranged from 351-400. Fadilah et al. (2007) stated that the higher the IP value obtained, the better the chicken's performance and the more efficient feed use. Good performance can be seen from ration consumption, weight gain, and ration

conversion. This is seen in Table 1 feed consumption in the P3 treatment (2903 grams), in Table 2 weight gain in the P3 treatment (1942.25 grams), and in Table 3 FCR in the P3 treatment (1.497).

Conclusion

The administration of moringa leaf flour (*Moringa oleifera*) up to 5% and garlic flour (*Allium sativum L*) at 2% did not affect the increase in feed consumption. The administration of moringa leaf flour (*Moringa oleifera*) at up to 5% and garlic flour (*Allium sativum L*) at 2% gave good results on Body Weight Growth (PBB), Feed Conversion Ratio (FCR) and mortality.

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