JURNAL PENELITIAN PROGRESSIF
Vol 5 No 1 (2026): SEPTEMBER 2025 - FEBRUARY 2026 | DOI: https://doi.org/10.61992/jpp.v5i1.341 | E-ISSN:2963-4369

RELATIONSHIP BETWEEN FEED CONSUMPTION, BODY WEIGHT GAIN AND FEED CONVERSION OF BROILER CHICKENS GIVEN *MORINGA OLEIFERA* LEAF FLOUR SUBSTITUTION RATION

Mulyadi [1*] , Dedhi Yustendi [1] , Nurhalifah [1]

[1] Faculty of Agriculture, Animal Husbandry Study Program, Abulyatama University, Indonesia

Email Correspondence: mulyadi_peternakan@ abulyatama.ac.id

Abstract

This study aims to determine the effect of adding Moringa oleifera leaf flour substitution in broiler rations on broiler chicken growth. The study design used a Completely Randomized Design with four treatments and four replications. The treatments consisted of P0 (100% commercial ration), P1 (97% commercial ration + 3% Moringa leaf flour), P2 (94% commercial ration + 6% Moringa leaf flour), and P3 (91% commercial ration + 9% Moringa leaf flour). The parameters observed included live weight, carcass weight. The data obtained were analyzed using SPSS 27. The results of the Spearman correlation analysis showed that the relationship between feed consumption and body weight gain of broiler chickens had a positive but insignificant correlation ($r = 0.389$; $P>0.05$). The relationship between feed consumption and feed conversion also showed a weak and insignificant negative correlation ($r = -0.218$; $P>0.05$). In contrast, the relationship between body weight gain and feed conversion showed a very strong and highly significant negative correlation ($r = -0.965$; $P <0.01$), indicating that increased body weight gain was followed by a decrease in feed conversion or an increase in feed efficiency. The results of the study concluded that there was a very strong and significant negative relationship between body weight gain and feed conversion in broiler chickens, while the relationship between feed consumption and body weight gain and feed conversion did not show a significant relationship.

Keywords: Broiler Chicken, Live Weight, Carcass Weight

INTRODUCTION

Broiler chickens are a type of poultry that plays a crucial role in providing a source of animal protein for the community. The advantages of broiler chickens lie in their rapid growth rate, high feed efficiency, and relatively short rearing period. However, feed costs remain the largest component of broiler farming, accounting for 60–70% of total production costs. Therefore, efforts to improve feed efficiency while reducing production costs are crucial for developing the broiler chicken business.

One approach is to utilize locally sourced, readily available, and nutritious alternative feed ingredients, such as moringa leaves (Moringa oleifera). Moringa leaves are known to have a relatively comprehensive nutritional profile, including relatively high crude protein, vitamins (A, B, and C), minerals (calcium, phosphorus, and iron), and bioactive compounds such as antioxidants. This potential makes moringa leaf meal a promising substitute feed ingredient in broiler chicken rations.

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The inclusion of moringa leaf flour in rations is expected to influence feed consumption, body weight gain, and feed conversion in broiler chickens. Feed consumption is a key factor in determining nutritional adequacy to support growth. Furthermore, body weight gain reflects the livestock's response to the quality and quantity of feed consumed. Meanwhile, feed conversion is an indicator of feed utilization efficiency, with a low feed conversion value indicating the livestock's ability to convert feed into body weight more efficiently.

However, the use of moringa leaf meal as a substitute in rations also requires in-depth study, as the crude fiber content and certain antinutritional compounds in moringa leaves have the potential to affect feed palatability and nutrient digestibility. Therefore, the relationship between feed consumption, body weight gain, and feed conversion needs to be analyzed to determine the effectiveness of moringa leaf meal in broiler chicken rations.

Based on this description, research into the relationship between feed consumption, body weight gain, and feed conversion in broiler chickens fed a substitute diet containing Moringa oleifera leaf meal is essential. The results of this study are expected to provide scientific information on the potential use of Moringa leaf meal as a sustainable alternative feed ingredient and to increase broiler chicken production efficiency.

RESEARCH METHODS

Place and Time of Research

The research was conducted in Bueng Sidom Village, Blang Bintang District, Aceh Besar Regency for 4 weeks, starting from April to May 2025.

Research Tools and Materials

Research Tools

The equipment used is 2 wooden cages, each cage consists of 8 sections, so that the total is 16 sections. Each cage section measures 70 cm long, 50 cm wide, 60 cm high. New digital scales , 16 incandescent lamps (40 watts), 4 lamps, food and drinking water containers, knives, buckets, sanitation equipment and stationery, tarpaulins, calculators, digital cameras, grinders and newspapers.

Material

The materials used in this study include: 64 Day Old Chicken (DOC) broiler chickens, medicines (Vita Chicks, Trimezyns), commercial rations for the BR1 starter phase (1-3 weeks) and commercial rations for the BR2 finisher phase (3-4 weeks). The feed ingredients used are ready-made commercial feed and moringa leaf flour.

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Research Design

This study used a Completely Randomized Design (CRD) with 4 treatments and 4 replications. The research treatments consisted of:

P0 = 100% Commercial Ration + 0% Moringa Leaf Flour
P1 = 97% Commercial Ration + 3% Moringa Leaf Flour
P2 = 94% Commercial Ration + 6% Moringa Leaf Flour
P3 = 91% Commercial Ration + 9% Moringa Leaf Flour

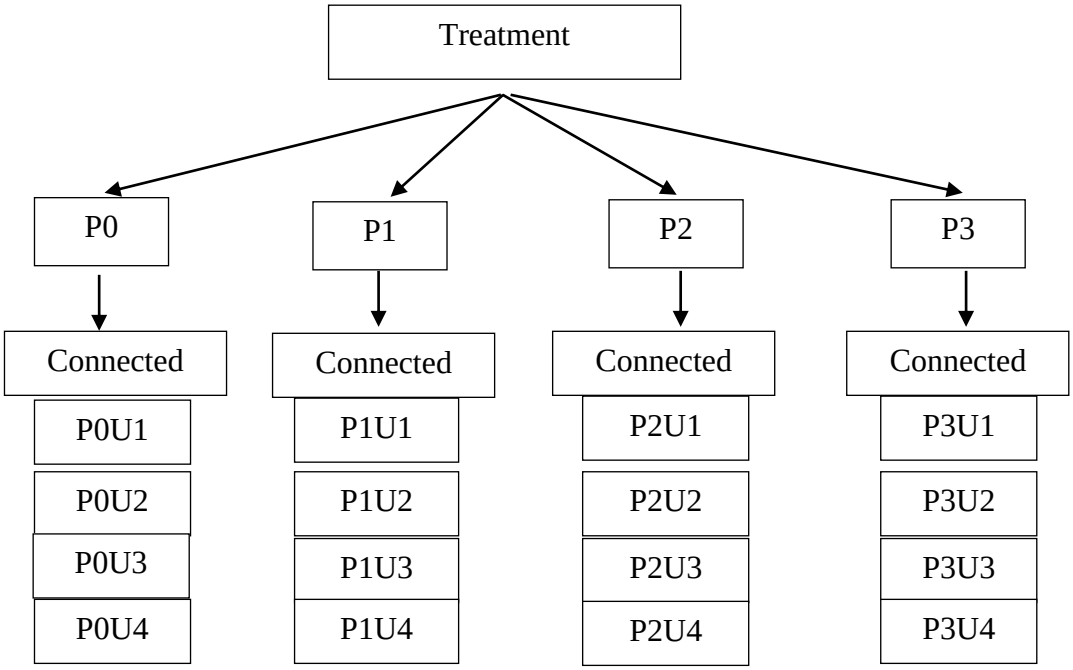

Figure 3. Completely Randomized Design (CRD)

Research Procedures

The rations given to broiler chickens during the study were commercial rations mixed with moringa leaf meal. The ration formulations were created using a trial and error method . *The* nutrient content of the commercial rations and moringa leaf meal used is listed in Tables 1 and 2, while the nutrient content of the rations is listed in Tables 3, 4, and 5.

Table 1. Nutritional Content of Commercial Rations

Food Substances	Rations for Starter Phase (BR 1)	Rations for Finisher Phase (BR 2)
Water Rate (%)	12	12
Protein Country (%)	21	19
Fat (%)	5	5
Crude Grain (%)	5	5
Abu (%)	7	7
Calcium (%)	0.95	0.95

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Phospor (%)	0.5	0.5
ME (kkal/kg)	3000	3100

Table 2. Nutritional Content of Moringa Leaf Flour

Nutritional Content (%)	Percentage (%)
Word	10,56
BETN	38.49
Protein Kasar	30,3
Crude Fat	6.13
Crude Fiber 12.48	
Abu	12,6
Ca	2,66
P 0.95	

Source: Proximate Analysis Results at the Animal Feed Chemistry Laboratory, Hasanuddin University(Panjaitan, 2023)

Table **3.** Composition of Treatment Rations

Treatment Feed	P0	P1	P2	P3
Commercial Rations	100	97	94	91
Moringa Leaf Flour	0	3	6	9
Amount	100	100	100	100

Table 4. Nutritional Content of Rations for the Starter Phase

Food Substances	P0	P1(3%)	P2(6%)	P3(9%)
Water Rate (%)	12	11.95	11.91	11.87
Protein Country (%)	21	21.28	21.55	21.83
Fat (%)	5	13.04	5.06	5.1
Crude Fiber (%)	5	5.22	5.44	5.67
Abu (%)	7	7.16	7.33	7.5
Calcium (%)	0.95	0.99	1.04	1.09
Phospor (%)	0.5	0.50	0.52	0.53
ME (kkal/kg)	3000	2.911	2.823	2.734

Table 5. Nutritional Content of Rations for the Finisher Phase

Food Substances	P0	P1(3%)	P2(6%)	P3(9%)
Water Rate (%)	12	11.95	11.91	11.87
Protein Country (%)	19	19.33	19.67	20.01
Fat (%)	5	13.04	5.06	5.1
Crude Fiber (%)	5	5.22	5.44	5.67
Abu (%)	7	7.16	7.33	7.5
Calcium (%)	0.95	0.99	1.04	1.09
Phospor (%)	0.5	0.50	0.52	0.53
ME (kkal/kg)	3100	3.008	2.917	2.825

Caption: Multiplication results of Tables 2, 3 and 4

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Observed parameters

The parameters observed were the relationship between live weight, feed consumption and feed conversion of broiler chickens.

Weight Gain

Body weight gain is calculated using the formula:

$$Pertambahan\ Bobot\ Badan = Bobot\ Akhir(gr) - Bobot\ Awal(gr)$$

Feed consumption

During each treatment, data was collected on weight gain, feed consumption, and feed conversion by calculating the difference between the feed given and the remaining feed using the following formula:

Feed consumption (gr) = feed given (gr) – remaining feed (gr)

Feed conversion

After obtaining live weight and feed consumption data, feed conversion calculations are carried out using the formula:

$$Konversi\ pakan = \frac{Total\ konsumsi\ pakan\ (gr)}{Pertambahan\ bobot\ badan\ \ (gr)}$$

Data Design and Analysis

The relationship between feed consumption, body weight gain, and feed conversion was analyzed using the Spearman correlation test if the data was not normally distributed, with a significance level of 5%.

RESULTS AND DISCUSSION

Results of the analysis of the correlation between body weight gain, feed consumption and feed conversion

Based on the results of the Spearman correlation analysis, the relationship between body weight gain, feed consumption and feed conversion is shown in table 4.1 below:

Variable Relationship	r_s (Spearman)	Say.	Information
Feed consumption (kp) ↔ PBB	0,389	0,137	Not significant
Feed consumption (kp) ↔ FCR	−0,218	0,418	Not significant
PBB ↔ FCR	−0,965**	0	**Very significant**

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Vol 5 No 1 (2026): SEPTEMBER 2025 - FEBRUARY 2026 | DOI: https://doi.org/10.61992/jpp.v5i1.341 | E-ISSN:2963-4369

Correlations					
			kp	United Nations	fcr
Spearman's rho	kp	Correlation Coefficient	1.000	.389	-.218
		Sig. (2-tailed)	.	.137	.418
		N	16	16	16
	United Nations	Correlation Coefficient	.389	1.000	-.965**
		Sig. (2-tailed)	.137	.	.000
		N	16	16	16
	fcr	Correlation Coefficient	-.218	-.965**	1.000
		Sig. (2-tailed)	.418	.000	.
		N	16	16	16
**. Correlation is significant at the 0.01 level (2-tailed).					

Based on the correlation analysis above, increased feed consumption tended to be accompanied by increased weight gain, but the relationship was not statistically significant. This suggests that feed quantity alone does not guarantee weight gain; it is likely influenced by the nutritional quality of the ration, digestibility, and anti-nutritional fiber content of the moringa leaves.

The results of the Spearman correlation analysis showed that the relationship between feed consumption and body weight gain of broiler chickens had a positive but insignificant correlation ($r = 0.389$; $P>0.05$). The relationship between feed consumption and feed conversion also showed a weak and insignificant negative correlation ($r = -0.218$; $P>0.05$). In contrast, the relationship between body weight gain and feed conversion showed a very strong and very significant negative correlation ($r = -0.965$; $P<0.01$), which indicates that an increase in body weight gain is followed by a decrease in feed conversion value or an increase in feed efficiency.

The insignificant relationship between feed consumption and body weight gain is thought to be related to the crude fiber and antinutritional compounds in moringa leaf flour, which can affect nutrient digestibility. Despite increased feed consumption, nutrient utilization by broiler chickens is not necessarily optimal. The very strong negative relationship between body weight gain and feed conversion indicates that broiler chickens that are able to utilize ration nutrients well will produce high body weight gain accompanied by low feed conversion values.

CONCLUSION

There is a very strong and significant negative relationship between body weight gain and feed conversion of broiler chickens, while the relationship between feed consumption and body weight gain and feed conversion does not show a significant relationship.

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