Bantara Journal of Animal Science **p-ISSN: 2656-9701**
Vol. 7, No. 1, April 2025 **e-ISSN: 2657-1587**
DOI: https://dx.doi.org/10.32585/bjas.v7i1.6470 Journal homepage: https://journal.univetbantara.ac.id/index.php/bjas/index

Effects of Different Local Commercial Feeds on the Performance of Layer Chickens at Zacky Farm, Blitar

Muhammad Zacky Putra Bagaskara[1], Salnan Irba Novaela Samur*[1], and Resti Yuliana Rahmawati[1]

[1]Faculty of Agriculture and Animal Science, University of Islamic Balitar, Indonesia

*Corresponding author: salnanirbanovaela@unisbablitar.ac.id

* *Received for review April 17, 2025 Accepted for publication April 21, 2025*

Abstract: This study assessed the Performance of layer chickens fed with different local commercial feeds at Zacky Farm. The research was conducted at Zacky Farm, Kanigoro District, Blitar Regency, from October 2024 to November 2024. An experimental research method was employed, with a Completely Randomized Design (CRD). Data analysis was performed using One-Way ANOVA, followed by Duncan's Multiple Range Test if significant differences were found. The study included four treatments: P1 (brand J commercial feed), P2 (brand D commercial feed), and P3 (brand S commercial feed). Each treatment had five replications, with five-layer chickens per replication, resulting in a total population of 75-layer chickens. The results showed significant differences (P<0.05) between treatments P1, P2, and P3 for Feed Conversion Ratio (FCR) and Feed Intake (FI), which were 2.25; 3.08; 2.23 and 116.99 g/chicken/day; 155.014 g/chicken/day; 114.52 g/chicken/day, respectively. However, no significant differences were observed (P>0,05) for Hen Day Production (HDP), which were 92.40%, 92.40%, and 91.80%. This study concludes that the best Performance was observed in treatment P3, with an FCR of 2.23, an FI of 114.52 g/chicken/day, and an HDP of 91.80%.

Keywords: Commercial Feeds; Layer Chicken; FCR; FI; HDP

Introduction

The livestock sector is one of several crucial sectors in the Indonesian economy. The livestock sector is important in human resource utilization and forming the Gross Domestic Product (GDP) value (Haryuni, 2018). Laying hens are livestock included in poultry and provide benefits to meet egg consumption needs. Based on the increasing need for egg production along with the times (Samur and Esti, 2024), the laying hen farming business has become a favourite of the community as an additional income (Saelan et al., 2024). However, in running this business, farmers must pay attention to the success of developing the laying hen farming business. One of them depends on the feeding system and how the content in the feed can improve chicken egg production so that to get quality egg production results, good feed must also be provided (Han et al., 2017).

Laying hens to fulfil their needs requires nutritional intakes such as energy, protein, minerals, water, and vitamins and the interaction between protein and energy in feed (Samur & Esti, 2024). If the main needs have been met, the rest is used for the egg formation process (Sakomura et al., 2019). Now, there are many laying hen farms, and on average, in the Blitar area, farmers have made their feed, so farmers are more economical in spending costs and profits for their laying hen feed and can better understand the contents of chicken feed (Widodo, 2022).

The success of egg production levels regarding HDP (Hen Day Production) and the percentage of egg production in a certain period can be reviewed. HDP is influenced by feed and the chicken's age and genetics (Hastuti et al., 2024). The percentage of HDP will decrease with the increasing age of the chicken and the quality of feed, and the adequacy of energy and protein in the feed can affect HDP. In addition to HDP, FCR is also important to note. FCR is a measure of feed efficiency that shows how much feed is needed to produce 1 kilogram of egg weight (Sulaiman et al., 2019). The

effect of FCR on laying hens is the low FCR value, indicating that egg production is more effective and the feed used is of high quality. In addition, FI also affects the Performance of laying hens, especially on optimal FSH and LH hormones, which can stimulate an increase in follicles and increase the amount of egg production and lighting that boosts the activity and metabolism of the chicken's body (Prastiya et al., 2022).

Based on the description above, it is necessary to research the quality and influence of different local commercial feeds from Blitar on the HDP, FCR and FI values of laying hens raised at Zacky Farm, Blitar Regency.

Materials and Methods

Location and Time of the study

This study was conducted at Zacky Farm. Kanigoro District, Blitar Regency. This study was carried out in one month, from October 2024 to November 2024, for 30 days.

Research Materials

The materials used in this study were 75 laying hens aged 25-29 weeks, three different types of local commercial feed as treatment materials, vitamins, vaccines, disinfectants and tools that support the study, such as open house cages, livestock feed and drink equipment and measuring/scales.

Research Methods

This study used an experimental method. The research design used a Completely Randomized Design (CRD) with four treatments and five replications. Each replication contained five livestock. The following is a description of the treatments used:
P1: Local commercial feed brand “J”
P2: Local commercial feed brand “D”
P3: Local commercial feed brand “S”

Each feed nutrient content of each feed can be seen in table 1.

Table 1. Nutrient Content of Feed Ingredients

Nutrient Content	Treatment		
	P1	**P2**	**P3**
Ash Content (%)*	14,22	16,13	14,02
Crude Fiber (%)*	4,19	3,99	5,40
Crude Fat (%)*	4,82	5,42	5,13
Crude Protein (%)*	17,17	21,24	18.42
Ca (%)*	4,04	5,38	3,43
P (%)**	0,95	-	0,59
Energy/ME (kcal/kg) **	2626	-	2835

Source: *Results of analysis of the Laboratory of the Animal Husbandry and Fisheries Service of Blitar Regency
**Results of analysis of the ALSC Laboratory, Faculty of Animal Husbandry, Gadjah Mada University

Research Variables

1. FI (Feed Intake)

Feed intake is the total amount of feed consumed completely by chickens using the feed formula given minus the remaining feed.

2. FCR (Feed Conversion Ratio)

FCR is the calculation of the amount of feed needed by chickens to produce one kilogram of egg weight; the calculation method is the cumulative feed consumed divided by the total weight of eggs produced

3. HDP (Hen Day Production)

HDP is a value used to determine daily egg production. How to calculate HDP is the number of eggs divided by the number of chickens at that time multiplied by 100%

Data Analysis

Data analysis used one-way anova analysis using the one-factor RAL (Complete Randomized Design) method. This measurement utilizes the SPSS Vers. 24 application. If a difference is found, continuing with the Duncan test is necessary.

Results and Discussion

Table 2. FI (Feed Intake), FCR (Feed Conversion Ratio), and HDP (Hen Day Production) Values in Layer Chickens Given Different Local Commercial Feeds

Treatment	Variables		
	FI	FCR	HDP
P1	116,99 ± 0,004^{b}	2,25 ± 0,12^{a}	92,40 ± 4,7
P2	155,014 ± 0,06^{a}	3,08 ± 0,02^{b}	92,40 ± 0,8
P3	114,52 ± 0,06^{c}	2,23 ± 0,11^{a}	91,80 ± 4,1

The results showed that providing different commercial feeds to layer chickens gave significant differences (P<0.05) in FI and FCR. The FI values in layer chickens given treatments P1, P2, and P3 were 116.99 ± 0.004 g/head/day, 155.014 ± 0.06 g/head/day, and 114.52 ± 0.06 g/head/day. While the FCR values of each treatment (P1, P2, P3) were 2.25 ± 0.12; 3.08 ± 0.02; 2.23 ± 0.11. In addition, there was no significant difference in HDP values (P>0.05). Treatments P1, P2 and P3 produced HDP of 92.40 ± 4.7; 92.40 ± 0.8; and 91.80 ± 4.1.

FI (Feed Intake)

The P3 treatment of FI showed the lowest value, 114.52 g/head/day. Then, it was followed by the P1 treatment of 116.99 g/head/day, and the highest FI was in the P2 treatment, which was 155 g/head/day. This happened because the highest feed energy value was found in the P3 treatment feed, which was 2835 kcal/kg. The high energy content in the feed will reduce the consumption rate. Livestock that have had their energy needs met will stop eating. Conversely, if the energy content is too low, the livestock will continue to eat so that it can increase FI to meet the energy needs of their bodies (Luthfi et al., 2020).

The energy needed for egg production in chickens is 2650 - 3000 kcal/kg (Komalig et al., 2016). The P3 treatment feed still meets the energy requirement standards for poultry, but the P1 treatment is still insufficient. The standard energy requirement in feed for laying hens aged 32-45 weeks is 2875 kcal/kg (Leeson & Summers, 2005). So, the consumption level in P3 is lower than in P1.

In addition to energy content, protein can also affect feed consumption. The lower the protein content, the livestock will increase their consumption to meet protein needs (Fadillah, 2022). In this study, P3 had a feed protein content of 18.42%, higher than P1, 17.17%, so the consumption level was lower in P3. However, the P3 feed has more than 20% protein content. This protein content has exceeded the standard limit of 18% (Leeson & Summers, 2005). If the protein and energy content are not balanced, the protein will experience deamination, where the nitrogen (N) content in the protein

is excreted through uric acid and the carbon in the protein is stored in energy. If the energy in the chicken's body is fulfilled, then the energy will be stored as fat rather than egg production (Kim & Kang, 2022).

FI in this study has met the standards based on age; when laying hens are over 5 months old, the standard feed consumption is 115-120 g/head/day (Luthfi et al., 2020). Only in P2 did the FI value above the standard, 155.01 g/head/day. In addition, factors that can affect feed consumption are environmental temperature, breed, age, gender, body weight, palatability, and production level (Fadillah, 2022).

FCR (Feed Conversion Ratio)

The lowest FCR results in this study were in the F3 treatment, which was 2.23, followed by P2, which was 2.25, and the highest FCR was 3.08. The difference in FCR values is due to the different FI values for each treatment. The lowest FI was in the P3 treatment. This FCR value is obtained by comparing feed consumption and egg weight (Sulaiman et al., 2019). In addition, FCR is also influenced by several things, such as the form of feed, the level of chicken stress, the weight of the chicken, and the sex of the chicken (Purnamasari et al, 2022). The FCR value can be used to determine the level of feed efficiency given to chickens (Li et al., 2024). The lower the FCR value, the more efficient the feed is. Conversely, the higher the FCR value produced, the less efficient the feed given. If the FCR value is too high, this could indicate a waste of feed due to not maximizing feed use for egg production (Santosa et al., 2023).

Based on the study's results, the highest FCR was in the P2 treatment. This happens because the protein content is quite high and exceeds the standard, so there is no balance between the amount of egg production and feed consumed. The nutritional content in feed, such as the balance of protein and energy, can affect feed conversion (Utomo, 2017). Ideally, laying hen feed's protein and energy content is 18% and 2800 kcal/kg (Alwi et al., 2019). In addition, the balance of crude fibre and metabolic energy can also affect the FCR value. Crude fibre can affect feed consumption, production and weight of chicken eggs (Purnamasari et al., 2022).

Treatment P2's FCR value was below the standard for the ISA Brown strain, which was 3.08, while the standard was 2.33 (Bunchasak & Silapasorn, 2005). Meanwhile, the FCR of treatments P1 and P3 did not exceed the standard, although it was higher than other studies (Sipayung, Wattiheluw, & Patty, 2024), which was 2.11. The lower the FCR value, the better the production and the more efficient the feed utilization (Alwi et al., 2019).

HDP (Hen Day Production)

Based on the research results, the HDP value did not provide a significant difference ($P>0.05$). HDP can be influenced by the energy-protein balance that has been given. The better the balance, the better the productivity (HDP) (Alwi et al., 2019). Treatment P3 has a more ideal protein-energy balance than other treatments, but numerically, treatment P3 has the lowest HDP value even though it is close to the HDP value of treatments P1 and P2. This is thought to be due to other factors, such as details of amino acid content and maintenance cage conditions (Sipayung et al., 2024). Although the protein content is high in feed, the broken-down amino acids do not meet the needs (deficiency), which will affect the productivity of laying hens (Fadillah, 2022). One of the amino acids that is important for laying hens is methionine. This amino acid plays an important role in metabolism, growth, feed efficiency and reproduction, which are later related to egg production (Lisnahan et al, 2018).

Protein-energy balance is also very important for the sustainability of laying hen activities, such as maintaining body temperature regulation, physical activity, metabolism, reproduction and

production. If the protein-energy levels are not balanced, this will affect the productivity level of laying hens and the HDP level (Purnamasari et al., 2022). Protein is important in egg formation (Leeson et al, 2001).

The HDP standard for ISA Brown strain chickens is 92% (Alwi et al., 2019). The HDP from the P1 (92.40%) and P2 (92.40%) feed treatments have been met, and P3 (91.80%) only has a small difference from the standard. However, based on the analysis of variance, the three treatments did not provide significant differences. The HDP value of this study is also higher than that of other studies (Sipayung et al., 2024), which only obtained an HDP value of 86.50%.

Conclusion

Based on the study's results, it can be concluded that different local commercial feeds provide significant differences in FI and FCR of laying hens but not for HDP. The best treatment was obtained from the P3 treatment feed, namely the "S" brand feed, with FI results of 114.52 g/head/day, FCR of 2.23 and HDP of 91.80%.

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