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Research Article

Quality Appearance of Quick Eggs Which in Given Flour of Morage Leaf (Moringo Oleifera Lam) In Feed

Siti Safriayanti Samuel[1], Fahria Datau[2], *Syukri I, Gubali[2]

[1]Student of Department of Animal Science Faculty of Agriculture Gorontalo of State University
[2]Faculty of Agriculture Gorontao of State University
*Coresppoonding Auhor: syukri.gubali65el@gmail.com

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Quails,
Egg shell,

Abstract. The purpose of the study was to measure the quality of quail eggs fed with Moringa leaf flour in the feed. This study used 100 quails. This study used analysis of variance (ANOVA) to analyze the quality of quail eggs. The study used a completely randomized design (CRD) with 5 (five) treatments and 4 (four) replications, and each treatment unit used 5 (five quails). The research variables were egg weight, egg shell thickness, albumen index, *Haugh unit*, and egg yolk color. The results showed that the administration of Moringa leaf flour had no significant effect (P>0.05) on egg weight, eggshell albumen index and Haugh unit and had a significant effect (P<0.05) on quail egg yolk color. Further tests showed that treatment P2 was different from P3, P0, P1 and P4, while treatment P4 was not different from treatments P3, P1 and P0. The average value of egg yolk color in treatment P3 was lower than other treatments. Duncan showed that the P2 treatment gave a better yolk color than the other treatments. It was concluded that the administration of Moringa leaf flour had the same or no different effect on egg weight, albumin index and Haugh unit. and the provision of Moringa leaf flour with a level of 4% gave a better egg yolk color. The provision of moringa leaf flour in feed did not have a significant effect (P>0.05) on the egg white index and Haugh Unit (HU) of quail eggs, but had a significant effect (P<0.05) on egg weight and quail egg yolk color

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INRODUCTION

Quail is one type of poultry that produces eggs and meat that is widely cultivated intensively and is popular with the public. The development of quail cultivation in Indonesia reached 14,107,479 in 2019. And the quail population in Gorontalo Province reached 34,702. (Directorate General of Animal Husbandry and Animal Health. 2019). Quail cultivation is very easy, does not require large capital and feed is continuously available. The advantages of quail compared to other poultry include faster growth. Egg productivity is 250-300 eggs per year, egg weight is 9-11 g/egg (Gubali, et al., (2019); Randell and Gery, 2008). Female birds lay eggs at the age of 41 days. Peak egg production is at the age of 5 months with an egg percentage of 96% (Djulardi, et al., 2006).

Eggs are poultry products that have complete nutritional value. Determination and measurement of egg quality include exterior quality (egg weight, and egg shape and size or egg index) and interior quality (haugh unit, egg content index). Quail eggs contain protein and antioxidants. These antioxidants are found in egg yolks which can reduce the effects of cholesterol oxidation in the blood and narrowing of the arteries, such as ascorbic acid, flavonoids, phenolics and carotenoids (Krisnadi 2015).

Moringa leaves (Moringa oleifera Lam) are very useful plants because they contain high antioxidants and antimicrobials due to the presence of secondary metabolic compounds such as carotenoids, selenium flavonoids and phenolics, can inhibit bacterial activity, in addition carotene is useful for increasing the color of red, orange and yellow pigments (Gopalakrishnan, et, al, 2013); Pandey, et al 2012). Lusi (2016) conveyed the effectiveness test of anti-bacterial from moringa leaf extract can affect the growth of E. Coli, and S. Aereus bacteria. The higher the concentration given, the greater the activity of inhibiting bacterial growth. This study aims to measure the quality of quail eggs given moringa leaf flour in feed

Materi and Method

This research was conducted in May-August 2023 at the Animal Production Laboratory, Animal Husbandry Department, Faculty of Agriculture, Gorontalo State University. The material used was 100 of layer phase quail, basic feed in the form of moringa leaf flour (Moringa oleifera Lam), fish meal, ground corn, concentrate, bran, premix, drinking water, and medisept.

This study used a completely randomized design (CRD) model, 4 treatments and 5 replications. The research was conducted in the form of: P0 = Basic ration without moringa leaf flour, P1 = Basic ration + 2% moringa leaf flour, P2 = Basic ration + 4% moringa leaf flour, P3 = Basic ration + 6% moringa leaf flour, P4 = basic ration + 9% moringa leaf flour.

The variables observed in the study were whole egg weight, yolk color, egg shell thickness, albumen height, haught unit (HU). Egg shell size is calculated using the formula:

The albumen index according to (Indrawan et al. 2012) is calculated using the following formula:

$$\boldsymbol{Egg\ Shell} = \frac{(\boldsymbol{T_1} + \boldsymbol{T_2} + \cdots + \boldsymbol{T_n})}{\boldsymbol{N}}$$

Where: T_1, T_2, T_3: Egg shell size; N: Atotal of Egg shell

$$\textbf{Abument Index} = \frac{a}{\frac{b_1+b_2+b_3}{3}}$$

Where: a: Albumen High; b1, b2, b3: egg length diameter

Haugh units are measured using a micrometer. Haugh units are calculated using the formula:

$$\textbf{HU = 100 log (H + 7,57 – 1,7.}W^{0,37}\textbf{)}$$

Where: H = Hight of Albumen; W = Egg weight (Juliambarwati et al., 2012)

Data analysis using analysis of variance, (ANOVA) (Stell and Torrie, 1995).

RESULT AND DISCUSSION

Weight of quail eggs

The weight of quail eggs was obtained by weighing the eggs using a scale. The average weight of quail eggs (g/egg) during the study is presented in Figure 1.

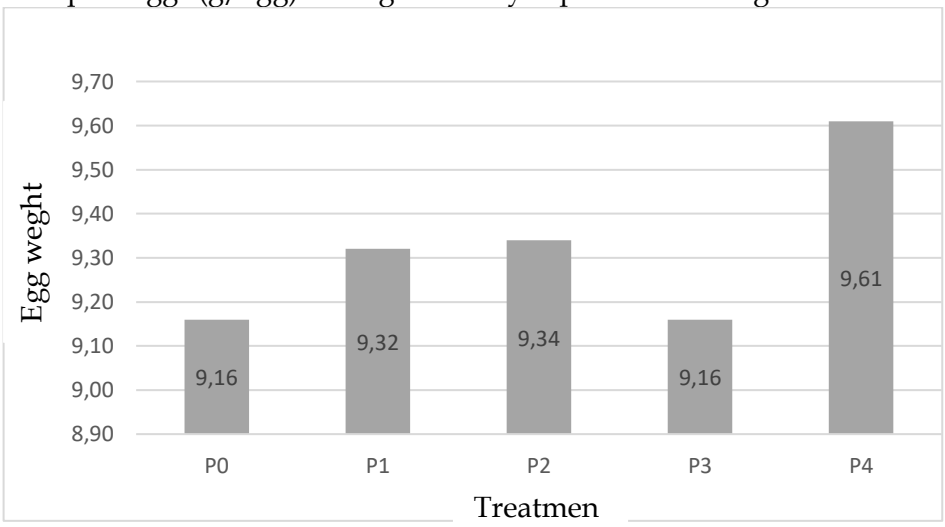

Figure 1 Average weight of quail eggs (Coturnix-coturnix japonica)

Based on the results of the analysis of variance, it is known that the provision of moringa leaf flour to quail has a significant effect (P <0.05) on egg weight. Based on table 1, it is known that the P0 treatment in feed and the P1, P2, P3 and P4 treatments showed a significant difference in egg weight. Duncan's further analysis illustrates that the level of moringa leaf flour administration of 8% produces a higher egg weight compared to moringa leaf flour of 6%. The results of this study are lower than those of Reynaldi (2020) and Gubali, et al., (2012) due to differences in the treatments given and differences in the amount of consumption. According to Argo (2013), egg weight is influenced by protein, fat and essential amino acids contained in the feed. The results of this study are in line with Miftahul (2021) that the provision of moringa leaf flour at a level of 6% resulted in a decrease in consumption which affected egg weight. Egg weight is also influenced by genetics where the eggs observed are small in size from young quails approximately 5-6 weeks old which is thought to be the early period of laying eggs. According to North and Bell (1990) That, eggs produced from new or young parents are smaller in size compared to eggs produced by old parents, where small eggs have low weight.

The color of egg yolk

The color of egg yolk of quail (Cournix-coturnix japonica) in this study was obtained by comparing the color of the egg yolk with the Roche Yolk Color Fan scale (1-15). The average score of the observed quail egg yolk color can be seen in Fig. 2

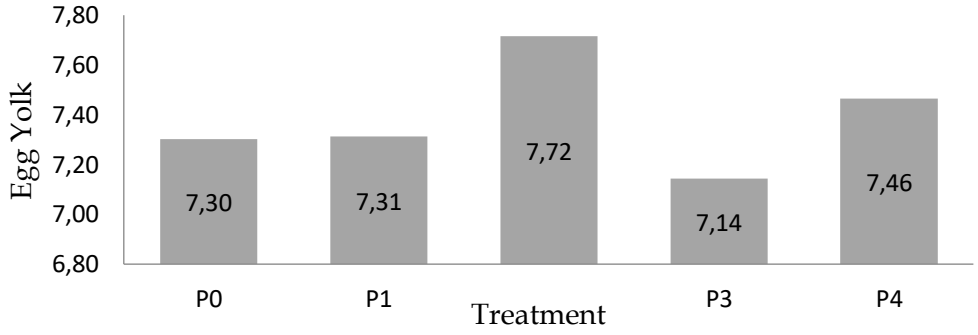

Figure 2. Average Quail Egg Yolk Graph.

The results of the analysis of variance showed that the treatment had a significant effect ($P<0.05$) on the color of quail egg yolk. Further tests showed that treatment P2 was different from P3, P0, P1 and P4, while treatment P4 was not different from treatments P3, P1 and P0. The average value of egg yolk color in treatment P3 was lower than other treatments. This is because the protein and fat content in the treatment feed affects the carotenoid metabolism process in livestock.

According to Sudrajat (2021), the carotenoid metabolism process varies in each livestock, and the priority of the type of carotenoid absorbed in the digestive system. Pigment deposits in the body of livestock, and stored in eggs are influenced by fat content. These carotenoids can dissolve in fat. The digestion of fat in the body is assisted by bile salts produced by the liver. These salts bind lipids to form complex micelles that are soluble in water, so that lipids can be absorbed.

The color of the egg yolk is influenced by the content of beta-carotene compounds found in the treatment ration containing moringa leaf flour (Dudi, 2015). Carotene also plays an important role in the formation of egg yolk color, and is reflected in yellow, orange or red. The yellow color index in quail eggs in this study ranged from 7.14-7.71 in the range of 6 and 8 with a bright yellow color. Eggs produced using both commercial feed and moringa leaf flour treatment feed are included in the category of eggs with good color quality. If the color of the egg yolk reaches a score of 7 - 8, the egg will be classified as good quality. The results of this study are higher than Tanto's study, (2017) that giving tomatoes in drinking water to the quality of quail eggs has an average value of 7.92 ± 8.03. Sedyaadi, et al., (2018) that the use of moringa leaf flour in rations to the quality of quail eggs has an average of 038.50 ± 9.65.

Egg Shell Based on the results of the analysis of variance, it is known that the provision of moringa leaf flour to quail does not have a significant effect ($P>0.05$) on the thickness of the egg shell. This is due to the Ca content in the treatment feed. In accordance with the statement of Fance (2014) that high temperatures will reduce the strength and thickness of the egg shell. The quality of the egg shell will be optimal if the environmental temperature is in the range of 16 - 21 °C.

An increase in environmental temperature will reduce egg weight and egg shell viscosity, but the effect of environmental temperature does not have a direct effect because an increase in

environmental temperature will reduce feed consumption and calcium consumption, thereby affecting the acid-base balance in the blood of poultry (Yuwanta, 2010). To produce quality egg shells, the provision of protein in feed must be balanced with the provision of energy and minerals. In addition to these factors, high environmental temperatures can also affect the physical quality of eggs, especially temperatures above 29 °C. The quality of the egg shell will decrease with age (Ismawati, 2011).

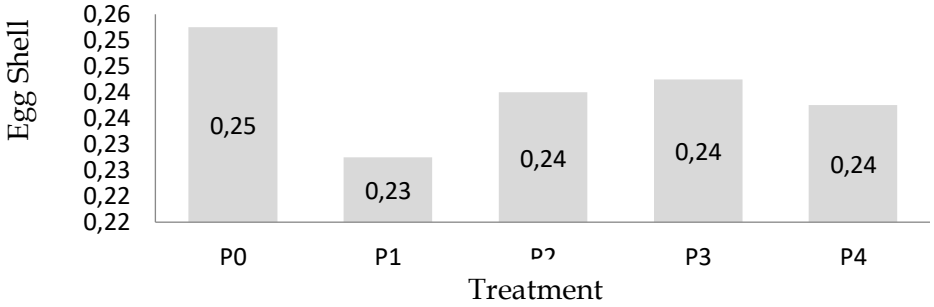

Figure 3. Average quail egg shell graph

Based on Figure 3, it can be seen that the average quail egg shell thickness (grams/item) is 0.23±0.25. The results of this study are higher than those of Purnomo (2017). He explained that quail given tomatoes in drinking water had egg shell thickness ranging from 0.18 to 0.21 mm. Research conducted by Prayanta et al., (2018) explained that the quality of quail eggs given moringa leaf solution had an egg shell thickness of 0.24 mm - 0.25. Sudrajad et al. (2014) stated that the thickness of quail egg shells is 0.22 mm.

Egg White fluid Index (Albumin)

The egg white index (albumin) is measured from the thickness of the egg white divided by the diameter of the egg white (Nasution, 2018; Nouman, et al., 2013). The average value of the quail egg white index observed was 0.113-0.116 mm, as seen in Figure 4.

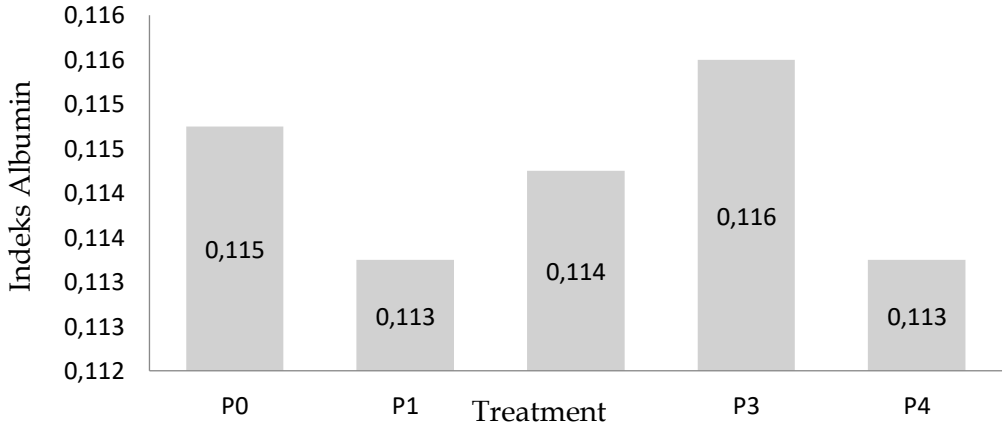

Figure 4. Average egg albumin.

The results of the analysis of variance of the average quail egg albumin fed with moringa leaf flour showed no significant effect (P>0.05). Where the average value of each treatment has the same egg white index value from the 0% - 8% treatment.

The average in each treatment is P0 (0.115), P1 (0.113), P2 (0.114), P3 (0.116), and P4 (0.113). The results of this study are higher than Nasution's study (2017) which used papaya waste flour up to 15% in the ration formulation resulting in a quail egg white index of 0.076 - 0.097. This is due to the consumption of protein that produces ovomucin which determines the height of the egg white. Yuanta, (2002) The quality of egg white largely depends on the amount of ovomucin secreted by magnum. Ovomucin is a material that determines the height of egg white and the formation of ovomucin depends on protein consumption.

According to Agro, et al., (2013) that, ration protein will affect the viscosity which reflects the quality of the egg interior, further expressed as affecting the egg white index. Based on the Indonesian National Standard (SNI) (SNI, 2008) the fresh egg white index is 0.050-0.174. The older the egg, the wider the egg white diameter will be, and the egg white index will be smaller (Purnomo, 2017). Changes in egg white are caused by gas exchange between the outside air and the contents of the egg through the pores of the egg shell and water evaporation due to storage time, temperature, humidity and porosity of the egg shell (Yuwanta, 2010).

Haught Unit

Haugh units are measured using a depth micrometer to determine the height of the egg white, and to determine the weight of the egg is obtained by weighing. Haugh units are calculated using the formula suggested by Juliambarwati et al., (2012)

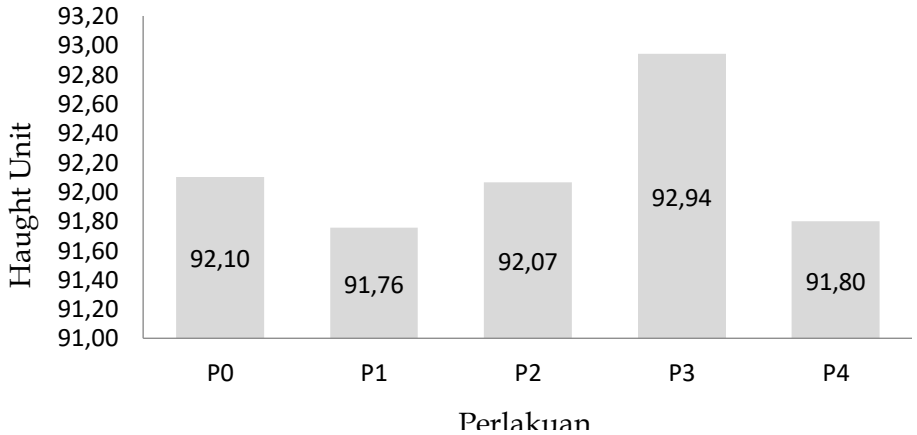

Figure 5. Average haungh unit graph

Based on the results of the analysis of variance, the administration of moringa leaf solution to quail did not have a significant effect (P>0.05) on the Haught Unit (HU) value. This is thought to be because the Haught Unit value is influenced by the ovoseasonal content in egg white. According to Mulyadi, et al., (2017) there is a positive correlation between the value of egg white (egg white) and the haugh unit value. If the egg white value increases, the haugh unit value will increase.

The HU value produced in this study was lower than that of Paryanta et al. (2019) where the HU value of quail eggs was HU 94.89 mm - 95.97.

Figure 6. Shows the average HU value with the addition of moringa leaf flour to the feed of 92.10 - 92.94. The HU value obtained from the results of this study is included in the HU category with AA quality. The United States Department of Agriculture (2000) stated that eggs with HU above 72 are of AA quality, HU between 60-71 are of A quality and HU values 31-59 are of B quality.

CONCLUSION

The provision of moringa leaf flour in feed did not have a significant effect (P>0.05) on the egg white index and Haugh Unit (HU) of quail eggs, but had a significant effect (P<0.05) on egg weight and quail egg yolk color.

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