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Physical Quality of Native Chicken Eggs in Laying Phase and Fed with Different Shrimp Flours

Rusli Badaruddin[1], Muhammad Amrullah Pagala[1], Musram Abadi[1], Muh Akramulla[2]
[1]Faculty of Animal Science, Halu Oleo University, Kendari City, Southeast Sulawesi. Indonesia
[2]Master's Student of Animal Production and Technology Study Program, Postgraduate School, Bogor Agricultural University, Bogor, Indonesia
*Email of corresponding author: rbadaruddin6@gmail.com

ABSTRACT

This study aimed to determine the physical quality of native chicken eggs fed with diets containing different shrimp waste flour. The sample used was 16 layer native chickens. Chickens were reared out intensively and eggs and eggs were collected every afternoon. Feeding was done twice a day, 7:00 in the morning and 14:00 in the afternoon, while drinking water was given ad libitum. The design of this study uses a completely randomized design (CRD). The shrimp waste flour treatment in native chicken feed is P0 (feed without shrimp waste flour), P1 (feed + 3% shrimp waste flour), P2 (feed + 6% shrimp waste flour) and P3 (feed + 9% flour waste shrimp). The parameters observed in this study were egg weight, egg width, egg length, yolk color, yolk width, albumen width, yolk height, albumen height, and eggshell thickness. The results showed thad the addition of shrimp waste flour in the ration to a level of 9% had no significant effect ($p > 0.05$) on egg weight, egg width, egg length, yolk width, albumen width, yolk height, and albumen height, but had a significant effect ($p < 0.05$) to the color of the yolk layer of layered chicken eggs.

Keywords : Physical Quality of Eggs, Layer Native Chicken, Shrimp Waste.

I. INTRODUCTION

Poultry is one of the Small livestock that are familiar in the community. One of poultry species that is well known in Indonesia is native chicken. Free-range chickens are local livestock that are spread throughout Indonesia. Free-range chickens produce meat and eggs that are very popular because they have a higher nutritional content compared to meat and eggs from broilers. Generally the color of eggshell and egg yolk of chicken is pale. This is due to the very low quality of the ration given considering that the native chickens are maintained extensively. One of the parameters that must be maintained in the production of native chicken eggs is the physical quality, especially the yolk. One of the biggest obstacles in the production of native chicken eggs is the high price of feed which causes very high production costs.

Shrimp waste flour is a very good alternative in supporting the productivity of native chickens because it has a high nutritional content and is very abundant in Indonesia. Shrimp waste flour contains roughly 25-40% crude protein, 45-50% calcium carbonate and 15-20% chitin. In addition, shrimp waste itself contains carotinoids in the form of astaxanthine which is a pro vitamin A for the formation of skin color (Muzzarelli and Joles, 2000). The Directorate General of Aquaculture of the Ministry of Maritime Affairs and Fisheries reports that in Indonesia of 170 shrimp processing businesses

have a production capacity of around 500,000 tons / year (Wowor et al., 2015).

Based on this description further research needs to be done on the level of use of shrimp waste flour to optimize the physical quality of native chicken eggs.

II. METHODS AND MATERIAL

This research used 16 native chicken in laying phase. The ration used was self-mixing ration composed of RK 24 concentrate, corn, and bran. Shrimp waste flour Was added to the feed according to the level of treatment. The cage used was a battery cage, with a size of 30 x 30 x 40 cm, with the distance of the cage floor from the ground is 60 cm. Other tools include digital scales to weigh eggs and weigh the consumption of feed provided.

Before the egg collection was carried out, the adaptation stage was first intended to familiarize animals with the treatment feed. This stage was held for 7 days. Feed was given ad libitum, as well as drinking water.

Egg collection was carried out after two weeks of data collection with the aim of stabilizing egg production. The eggs produced from 16 native chicken in laying phase were collected, and given an identity and weighing and recording results.

The parameters observed in this study were egg weight, egg width, egg length, yolk color, yolk width, albumen width, yolk height, and albumen height.

The study design used a completely randomized design (CRD) with 4 treatments and 4 replications. The treatment given was the addition of shrimp waste flour with different levels in the feed. The level of shrimp waste flour in layer chicken feed was as follows:

P0: 0% shrimp waste flour in ration
P1: 3% shrimp waste flour in ration
P2: 6% shrimp waste flour in ration
P3: 9% shrimp waste flour in ration

The following mathematical model of the Complete Randomized Design (CRD) according to Steel and Torrie (1995) was used:

$Yij = \mu + \alpha i + \varepsilon ij$

Note:

Yij = Observation value from the i-th treatment of jth shrimp waste flour.
μ = real average value
αi = Effect of treatment at i level
εij = Error
i = P0, P1, P2, P3 (treatment)
j = 1,2,3,4 (queries)

TABLE 1. Physical Quality of eggs laid by native chicken in laying phase and fed with Shrimp Waste Flour

Variables	Treatment			
	P0	**P1**	**P2**	**P3**
Egg Weight (g)	45.48±3.65	42.88±3.51	44.16±2.23	43.79±1.60
Egg Width (mm)	39.49±1.13	39.12±1.08	40.01±1.51	40.06±1.64
Egg Length (g)	51.47±1.48	49.90±1.42	49.60±2.15	50.76±3.06
Egg Index (%)	76,47±1,02	79,59±1,27	81,63±1,41	78,92±1,4
Yolk colors	8.50 ± 1.23^{a}	9.83 ± 0.43^{ab}	10.42 ± 1.03^{b}	10.25 ± 1.52^{ab}
Yolk width (mm)	40.17±1.17	40.08±1.50	39.34±1.25	40.67±1.61
Yolk Height (mm)	15.75±0.69	15.25±0.88	14.83±1.60	15.92±0.99
Yolk Index (%)	40,80±3,14	38,46±1,10	37,84±1,66	39,14±4,22
Albumen width (mm)	73.92±4.75	73.42±3.55	74.25±3.81	73.33±2.84
Albumen height (mm)	0.58±0.03	0.52±0.15	0.59±0.06	0.53±0.05

Description: Different superscripts on the same line show significant treatment effect ($p < 0.05$).

Information :

P0: 0% shrimp waste flour in ration
P1: 3% shrimp waste flour in ration
P2: 6% shrimp waste flour in ration
P3: 9% shrimp waste flour in ration

Egg Weight

The results of variance showed that the provision of shrimp waste flour in native chicken rations had no significant effect ($p > 0.05$) on egg weight. The average egg weight during the study ranged from 42.88 ± 3.51-45.48 ± 3.65 g / item. The egg weight that was not different was thought to be caused by the consumption of feed which did not show differences so that the nutritional content of the feed obtained was relatively the same. Gernal (2001) reported that the addition of shrimp waste flour in the ration did not affect egg weight and egg production of laying hens. Purnamasari et al. (2015) also reported the use of shrimp waste had no effect on egg weight.

Egg Width, Egg Length and Egg Index

Variance analysis results showed that the use of shrimp waste flour into 9% feed had no significant effect ($P > 0.05$) on egg width, egg length and egg index. In general, the use of shrimp waste flour in rations does not affect egg width and egg length because it is more influenced by genetic-make up. Scanes et al. (2004) reported that important factors influencing egg size are genetic, breed, age of chicken, feed quality, and environment. Origin and age of chickens used in this study are the same so that the eggs produced did not show different results on egg lengths of 49.60 ± 2.15-51.47 ± 1.48 mm, egg width 39.12 ± 1.08-40.06 ± 1.64 mm and the egg index was 76.47-81.63%.

Yolk color

The results showed that the addition of shrimp waste flour in the ration to a level of 9% in the ration had a better yolk color score than the ration without treatment. The high content of astaxanthin in shrimp waste makes the egg yolk reddish yellow. Pagala (2010) stated that the presence of astaxanthin in shrimp shells makes egg yolk color better. These results are in accordance with the Sahara (2011) who found that that the highest egg yolk color was obtained in the 9% shrimp waste flour treatment. Siahaya et al. (2014) found that the higher the level of addition of shrimp waste flour increases the color value of the yolk. The content of chitosan and carotenoids in shrimp waste can improve the color of yolk in eggs (Mulyadi, 2017). Aisoi (2016) stated that the highest source of astaxanthin is in crustacean (crab, lobster, and shrimp). Supplementation of shrimp waste flour in feed is one method to increase high omega-9 fatty acids (Suhermiyati, 2011).

Yolk Height and Yolk Width and Yolk Index

Substitution of shrimp waste flour in the ration did not significantly influence the height and width of the hens of the research chicken. Hartono et al. (2014) yolk height and width are strongly influenced by egg size, the larger the egg size, the higher the yolk egg width and index. Other factors that influence the yolk index are temperature, humidity, and evaporation due to long storage. These results are in accordance with the research of Mulyadi et al. (2017) who reported that the use of fermented shrimp waste flour in native chickens had no significant effect on the yolk index, and Saleh (2013) reported that fish oil supplements had no effect on the unit, the albumen index and the yolk index of laying hens.

Albumen Height and Albumen Width

The results of the study in table 1, showed that the use of shrimp waste flour in feed up to 9% level does

not have a significant influence on albumen height and albumen width. It can be said that supplementation of shrimp waste flour to 9% has no effect on albumen proportions. This is consistent with the results of a study by Juliambarwati (2010) who reported that the use of shrimp waste flour does not affect albumen height, albumen index, egg yolk index, haugh units. Anwari *et al.* (2018) also reported that the use of shrimp waste flour in feed had no significant effect on the physical quality of purebred eggs.

CONCLUSION

Based on the results of the study it can be concluded that the use of shrimp waste flour in layer chicken feed rations up to the level of 9% does not have a significant effect (P> 0.05) on egg weight, egg width, egg length, egg index, albumen height, albumen width, albumen index, yolk height, yolk width, and yolk index, but have a significant effect (P> 0.05) on the color of yolk.

III. CONFLICTS OF INTERESTS

The authors declare that there is no conflict of interest

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