First Report of Protein and Fat Level of Alabio Duck (*Anas platyrhynchos* Borneo) Eggs in Hulu Sungai Utara, Indonesia for Improving Human Health

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Abstract

Indonesian local ducks are native germplasm of Indonesia which has the genetic quality and has the potential to be developed as a productive egg producer. Each type of duck has a different chemical composition in their eggs. The purpose of this study is to find out the levels of protein and fat in Alabio duck (*Anas platyrhynchos* Borneo) eggs in Hambuku Raya Village and Putat Atas Village, Hulu Sungai Utara, South Kalimantan, Indonesia. This study used a completely randomized design (CRD). Interestingly, we showed that the level of protein and fat in Alabio duck eggs was relatively good. Therefore, this finding is the basic data for further research on Alabio duck in the future.

Keywords*: Anas platyrhynchos Borneo, fat level, protein level, eggs.*

Introduction

Eggs are known as one of the nutrition sources of an animal which is highly nutritious. Egg contains a high-quality protein because it has a complete composition of essential amino acids that are used as a marker for determining the protein quality from other foods[1]. In addition, duck eggs may be eaten as table eggs where they can be scrambled, fried, poached, and boiled, or they can substitute for chicken eggs as an ingredient in quiche or baking, for example[2].

Duck poultry is one of the poultry business has been developed a lot in Indonesia, although it is not as popular as chicken. Ducks have great potential as eggs and meat producers. Compared to other poultry animals, ducks have good immunity to disease. The duck business has relatively smaller interests, so it has the potential to be developed[3]. Ducks donated more than 18,000 tons of eggs, around 16% of national egg production in 2005[4]. According to the Directorate General of Livestock and Animal Health of Indonesia, national duck egg production in 2011-2015 was relatively stable. The growth increase from 2014 to 2015 was 3.49%.

According to Muharlien (2010), Alabio duck eggs are very popular especially for the people of South Kalimantan, who value duck eggs more than chicken eggs. In the market, Alabio duck eggs are classified as pond duck eggs and beach duck eggs, which are distinguished by the size and degree of yolk, where the pond duck eggs are larger and have a reddish-yellow yolk[5]. The nutritional content of duck eggs is strongly influenced by the food consumed by these ducks[6]. One duck egg contains several components, including 66% water and 34% dry contents which are distributed into 12% protein, 10% fat, 1% carbohydrate and 11% ash. Egg yolks contain about 48% water and 33% fat. Egg yolks also contain vitamins, minerals, pigments and cholesterol. Egg white consists of protein, especially lysozyme which has the anti-bacterial ability[7].

Andriani *et al*. (2015) explained that the proximate levels are the results of chemical analysis to identify the nutritional content of food ingredients such as protein and fat content. The chemical composition of eggs is one of the important factors in poultry nutrition. Therefore,

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the selection of food has to focus on the content as well so that it can support healthy living. Factors that determine egg production are genetic or nationality, nutrition, age, age of production, type of cage, maintenance system (extensive, semi-intensive, and intensive), and temperature[7].

Egg white protein in the form of ovalbumin, ovotransferrin, ovomucoid and lysozyme is synthesized by tubular glands, while avidin and ovomucin are synthesized by goblet cells. Protein in eggs will increase if the level of protein in the feed is adequate. The determination of protein needs is always associated with the energy level in the feed because protein can be used as an energy source and is needed in the formation of protein. Jaya *et al*. (2019) stated that laying eggs period requires amino acids supplement from the feed, especially essential amino acids. Thus, a study on analyzing the level of protein and fat in Alabio duck egg is necessary in order to provide information to the public about the nutrient content of the Alabio duck egg[8].

Materials and Methods

Time and Location:

The study was conducted in May 2018. The study locations were Hambuku Raya Village, and Putat Atas Village, Sungai Pandan District, Hulu Sungai Utara, South Kalimantan, Indonesia. Hulu Sungai Utara is located between 2°-3° South Latitude and 115°-116° East Longitude, with a height of 0-7 meters above sea level.

Experimental Animal:

This study consisted of three groups. Each group was located in a different cage and not close to one cage with another. The distance between one cage and another was approximately 1 km. Each group consisted of 200 female Alabio ducks. This 200 population was then divided into 10 flocks with a size of 1.5 m×1.0 m×0.5 m. Each flock had one place to eat and one place to drink made of plastic material. For the lighting, one lamp was placed in each cage with 25 Watt of power. Ten eggs per group were tested to determine the quality of protein and fat levels. The examination was conducted at the Post Harvest Laboratory, Faculty of Agriculture and Animal Husbandry, Lambung Mangkurat University, Banjarmasin, Indonesia.

Experimental Design:

This study used a complete randomized design (CRD) with unidirectional patterns. It consisted of three groups with the same treatment. The study was exploratory or non-experimental because researchers did not perform different treatments.

Data Analysis

Egg production, feed conversion, and egg quality data were analyzed by using analysis of variance (ANOVA) and continued with LSD (if the result is significant). Kruskal-Wallis test was used for data that were not normal, then continued with the Wilcoxon-Mann-Whitney test (if it is significant).

Result and Discussion

The test results are significant if *p*-value is less than 0.05[9]. The average level of protein of Alabio duck eggs in each group was almost the same. Group 1 showed an average of 11.13%, followed by group 2 of 11.06% and group 3 by 11.03%. The fat level of Alabio duck egg in each group was no different. The highest level of fat was experienced by Putat Atas group (group 3). It had 33.34% fat, while group 1 had 33.67% and group 2 had 34.34 % of fat.

Table 1: Protein and Fat Level of Alabio Duck in Putat Atas (PA), Hambuku Raya 1 (HR 1), and Hambuku Raya 2 (HR 2), Hulu Sungai Utara, South Kalimantan, Indonesia.

Variables	N	Groups		
		PA	HR 1	HR 2
Protein Level (%)	10	11.13±0.52	11.06±0.57	11.03±0.67
Fat Level (%)	10	33.34±1.50	33.67±1.04	34.34±1.47

Fats, proteins, and carbohydrates are a group of macronutrients. Protein and fat content in food are very important for animals' and humans' life, because it has inorganic compound needed by the body, namely: C, H, O and N. The roles of protein in the body, among others, are as a mold in the manufacturing process (in chromosomes), antibodies, and to replace damaged tissue cells. While fat plays a role as a constituent of cell walls and biomolecular materials. Fat is also the source of bio-calories, essential sources of unsaturated fatty acids are linoleic and linolenic, and natural sources of oil-soluble vitamins which are vitamins A, D, E, and K[1,4].

Fat has many functions in the body. It plays role as a source of energy after carbohydrates, as energy stored from fat tissue, the fat under the skin works as an isolator to maintain body's temperature, to protect vital organs such as bones and eyeballs, and source of vitamins A, D, E, and K. Some examples of fat sources are meat, oil, and cholesterol, including eggs, and dairy products[1,4].

In this study, the highest egg protein levels were 11.13±0.52. There were no significant differences between each group. Egg protein decreases during the storage period. The egg protein level after 28 days of storage was 9.85%-10.4%. Meanwhile, the protein level of a fresh egg was 12.8%-13.4%[9,10]. Protein is one of the main sources of egg formation. The formation of vitellogenin (vitellogenesis) is the synthesis of lipoprotein in the liver which is controlled by estrogen. Then, vitellogenin is accumulated by blood in the follicles which will then develop into yolk (egg yolk). The follicle is surrounded by blood vessels, when the oocyte is mature, the stigma will tear and ovulation will occur[11,12].

On the other hand, the highest level of duck egg fat in this study was 34.34±1.50. However, there were no differences between each group. This condition is different from Sari *et al*. (2015), that the yolk content in the Rantau Karau Hilir and Hambuku Baru was 34.05-35.95%. This shows the concentration of egg yolk can be influenced by several factors such as the nutritional content of the feed[13].

Conclusion

In sum, the study present that the quality of protein and fat level of Alabio duck eggs was relatively good. Therefore, this finding is the basic data for further research on Alabio duck (*Anas platyrhynchos* Borneo) in the future.

Conflict of Interest : The authors declare that they have no conflict of interest.

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