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THE EFFECT OF CHITOSAN IN THE RATION ON TEGAL DUCK PERFORMANCE

Eli SAHARA[1], Tuti WIDJASTUTI[2], Roostita L. BALIA[2], ABUN[2]

[1]Faculty of Agriculture, University Sriwijaya, Palembang, Indonesia
[2]Faculty of Animal Husbandry, University Padjadjaran, Bandung, Indonesia

Corresponding author email: elisahara.unsri@gmail.com

Abstract

The aim of the study is to examine the effects of chitosan in the ration on Tegal duck performance. The dose of chitosan used ranging from 0.0%, 0.5%, 2% and 2.5%, mixed into the basal ration. The basal diet used iso-protein and iso-energy, with protein content of 15.34% and Metabolic Energy 2809 kcal / kg (NRC, 1994). Parameters measured were feed intake, duck day production (DDP), total egg weight and feed conversion. This study uses a completely randomized design (CRD) consisting of 4 treatments and 5 replicates and each replicate consisted of two ducks. The basal diet (R0) = without chitosan as a control, R1 = 0.5% chitosan, R2 = 2% chitosan, and R3 = 2.5% chitosan. Data were analyzed using SPSS 16 statistical program (Statistical Package for Social Science). Results indicated that chitosan showed no significant effect (P> 0.05) on feed consumption, duck day production, total egg weight and feed conversion. In this study, treatment of chitosan 2.5% (R2) gives the best results on day duck production, total egg weight and feed conversion. From the daily egg production (DDP), treatment R2 has a result of 59%, larger than R0 (57.76%), R1 (44.1%) and R3 (46.9%). Total egg weight for R2 = 3597.7 (73.42 g / grain) also show a greater number than the treatment R0 (2769.72), R1 (2662.46), and R3 (3403.14). On feed conversion, R2 showed the smallest (1.93) compared to R0 (3.06), R1 (7.4) and R3 (2.31). This means duck in treatment R2 more efficient of feed consumption, 1.93 kilograms to produce one kilogram of eggs.

Key words*: chitosan, rations, performance, Tegal ducks.*

INTRODUCTION

Performance of duck production is highly dependent on the farm management such as seed, feed and disease prevention. Some of the advantages of duck eggs by reference are as follows:

1. Duck egg was spot used as an option to meet community nutrition. This is due to the nutrient content of duck eggs are very complete and easy to digest. Total protein content of duck eggs is 13.10% (Winarno and Koswara, 2002);
2. Economically, the selling price of duck eggs is more expensive than chicken eggs, so it is an alternative for farmers' additional income;
3. The advantages of duck are more resistant to disease and more tolerant of crude fiber, making it easier to choose the raw material feed.

Productivity of duck is determined by the farm management, especially feeding factors. Feed should contain nutrition according to the needs of duck, especially for basic living needs and production. Feed can also be added with a feed supplement or feed additives to improve livestock productivity.

Chitosan is poly-glicosamin, an animal fiber origin of crustaceans which are very abundant in nature. Chitosan has the characteristics of an anti-germ, antioxidants, enzymes mobilization and fat binder. If fed to livestock as feed additive, it is predicted to be able to launch the body's metabolism.

Anti-bacterial characteristic of chitosan when mixed in the ration will protect feed from pathogenic bacteria contamination; inhibit the growth of pathogenic bacteria in the gastrointestinal tract of duck. Therefore, it would increase a large number of good bacteria to optimize digestive metabolism. Optimizing metabolism of digestive enzymes would optimize the absorption of nutrient in the small intestine.

The result of this study is expected to improve the performance of the duck, so increase the productivity.

MATERIALS AND METHODS

The material used in this study was 40 Tegal ducks of production period (aged 10 months) were kept in a cage colony (2 ducks per unit). Size per unit is 1 x 1 meter^2, with a total of 20 units equipped with feed and drink. Cages are also equipped with a lamp as lighting at night. Rations are prepared with 15.34% protein and 2809 kcal/ kg metabolizable energy (NRP, 2004). Feed materials are yellow corn, rice bran, soybean fish meal, coconut meal, flour shells and premix. Chitosan is given as treatment with doses of 0%, 0.5%, 2% and 2.5%. Rations are given in the form of pasta, two times daily (morning and afternoon), while drinking water is given *ad libitum.*

The observation was carried out for 7 weeks. Ducks lay eggs per unit enclosure is recorded and weighed each day. The leftovers of the ration to the ducks also collected and weighed once a week. The parameters measured in this study were: feed intake, daily egg production, egg weight and total feed conversion.

Feed consumption during the study (7 weeks) is calculated based on the amount of rations given minus the leftovers ration for a week.

Daily egg production (Duck Day Productions) is calculated based on the number that indicates the average number of eggs entirely on ducks produce at a certain time and stated in percentage (Scott, 1992, cited by Manin, 2003). Total weight of the eggs is obtained from multiplying the number of eggs with egg weights.

Feed conversion is the number which indicates the duck ability to change the sum of rations into the production of one kilogram (kg) of eggs within a certain time unit.

The weight of the egg is the number which indicates the average weight of the eggs produced in a given period expressed in grams per egg. Data were statistically analyzed using SPSS 16, following the pattern completely randomized design (4 treatments, 5 replicates), if the treatment showed significant differences then it is continued with Duncan's multiple range test.

RESULTS AND DISCUSSIONS

Effect of Treatment of Consumption Rations

The average feed consumption of ducks trial during the study (7 weeks) in all treatments ranging from 6.759-7.222 g/duck. If converted, the amount of feed consumed by ducks every week was 965.6 to 1,031.7 grams (Figure 1).

This means that the experiment ducks spend ration amount from 137.9 to 147.39 grams/head/day.

This figure is much lower than Alabio ducks feed consumption which is 215-248 g/head/day. The local ducks feed intake over 20 weeks of age, in one week between 900-1.100 grams (Hardjosworo, 2001).

Chitosan which acts as a feed additive in duck ration is thought to contribute to protect the quality of ration nutrition from extreme environmental influences, so the predicted balance of protein and energy available in the feed is sufficient for life and production of duck.

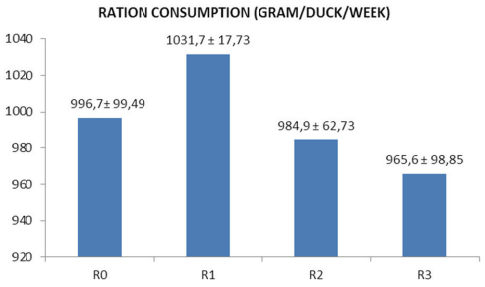

Figure 1. Diagram of Tegal Ducks Feed Consumption

Effect of Treatment of Egg Production (Duck Day Production)

The average of egg production (duck day production) for 7 weeks between 44.1 to 59%.

This figure is slightly lower than the egg production of Alabio duck, which is 58.92 to 64.63% (Setioko, 2001). This is thought because of the difference of age and the ducks species used in the research.

Beside genetic factors and the duck age, the amount and quality of feed will affect the number of eggs produced. If seen from the production percentage of trial duck eggs produced per treatment (Figure 2), the treatment with 2.5% chitosan in the ration, provided a better yield (59%) and a small ration consumption figure (984.9 g/head/week), although statistically did not show significant differences with the other treatments (P> 0.05).

Giving of 2.5% chitosan is thought to provide a good influence in protecting the nutritional quality of feed because of its characteristics as

anti-oxidant, in addition to chitosan role as dietary fiber and prebiotic (gives a positive effect on microflora proliferation which is beneficial in the duck gastrointestinal tract, so that it will facilitate the digestive system.

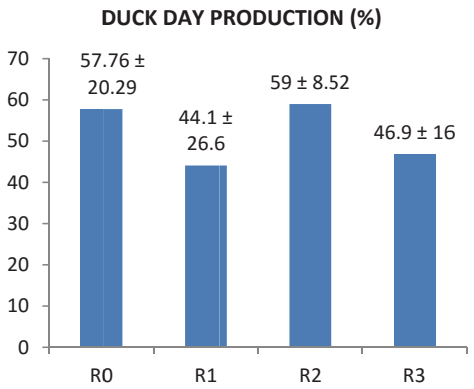

Figure 2. 7 Weeks Tegal Duck Day Production

Effect of Treatment on Mean of Eggs Total Weight

Total weight of the eggs is representing the egg production (egg weights) and obtained by multiplying the number of eggs with egg weights (Figure 3). The average total weight of egg during 7-weeks is 2662.46 to 3597.7 grams. This means that the weight of the egg treatment R0 = 56.52, R1 = 54.34, R2 = 73.42 and R3 = 69.45 grams/egg.

Based on the observation, total weight of the eggs in treatment R2 with 2.5% chitosan shows heavier than other treatments (R0, R1 and R3).The total egg weight of 3597.7 (R2 = 2.5% chitosan) is higher, presumably because this dose chitosan is able to activated the digestive enzymes in the duck gastrointestinal tract; so the nutrient absorption is better, especially the protein and fat; as the egg primary material The egg composition consisted of the albumin with 11% protein content and 0% fat, while the yolk contains 17% protein and 35%.

Effect of Treatment on Feed Conversion

The average of feed conversion was between 1.93 to 7.4. (R0 = 3.06 ± 1.98, R1 = 7.4 ± 11.23, R2 = 1.93 ± 0.16, and R3 = 1.02 ± 2.31). The lowest average of the feed conversion (1.93) is achieved from treatment R2 (2.5% chitosan in the ration). These results indicated that the treatment R2 has the highest efficiency with a reduced ration feed conversion by 6.93% (from 3.06 to 1.93) compared with the control diet (R0 = ration without chitosan).

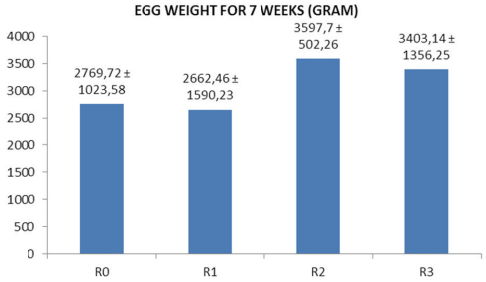

Figure 3.Total Egg Weight of Tegal Duck

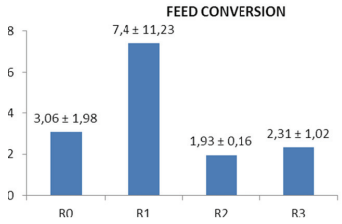

Figure 4.Tegal Ducks Feed Conversion

This result is more efficient than the feed conversion for the Indonesian ducks is 3.2 to 5.0 (Ketaren, 2007). It is further explained that the poor feed conversion in laying ducks in Indonesia is allegedly caused by three factors, namely genetic quality, the number of scattered pellet, and nutritional value of the ration supplied which does not match the needs of the ducks.

In this study it is predicted that, with a dose of 2.5% chitosan, it is able to protect the quality of the nutrient rations from extreme contamination of germs or other environmental influences, so the health of duck is well maintained and able to efficiently utilize the ration.

CONCLUSIONS

The 2.5% chitosan in the ration (R2) is able to provide better production performance (feed consumption 984.9 grams/week, duck day production 59%, egg total weight of 3597.7 grams or 73.42 grams per egg, and feed conversion of 1.93), when compared to other treatments (R0, R1 and R3).

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