

Performance of peking ducks by ration containing of leubiem fish (*Chanthidermis maculatus*) waste and probiotic

Muhammad Daud¹, M A Yaman¹, Zulfan¹, H Latif¹, and D Erfiyan¹

¹Animal Husbandry, Faculty of Agriculture, Syiah Kuala University, Banda Aceh, 23111 Indonesia

E-mail: daewood@unsyiah.ac.id

Abstract. The purpose of this study was to evaluate the performance of peking ducks by providing rations containing leubiem fish (*Chanthidermis maculatus*) waste and probiotic. The research material used was 96 peking ducks age 1-8 weeks old. The research method was conducted experimentally using a Completely Randomized Design (CRD) consisting of 4 treatments and 4 replications. The treatment ration used was as follows: R0 (basal diet/control ration), R1 (ration containing 10% leubiem fish skin and probiotic 1%), R2 (ration containing 10% leubiem fish head and probiotic 1%), and R3 (ration containing 10% leubiem fish bone and probiotic 1%). The observed variables were: feed consumption, body weight gain, final body weight, feed conversion, and mortality. Data were analyzed using Analysis of Variance (ANOVA). The results showed that the use of leubiem fish waste as much as 10% and probiotic 1% in rations had a significant effect ($p < 0.05$) on the feed consumption, body weight gain, feed conversion and final body weight, but no significant effect on mortality of peking ducks. The conclusion of the study was the use of ration containing 10% leubiem fish bone and probiotic 1% was able to accelerate the performance of peking ducks.

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1. Introduction

The determining factors for the success of a livestock business are feed, breed and management. One of the main obstacles in the duck farming business is the high cost of feed, which reaches 60-70% of the total production cost. Basically, the feed to be given must be of good quality, have a sufficient balance of nutrients (protein, energy, vitamins and minerals) and greatly affect the appearance and health of ducks [1].

One of the efforts to reduce the production costs of duck farming is by optimizing the use of local feed ingredients, so that feed costs can be reduced without disturbing livestock productivity [2]. One of the local feed ingredients that can be used as ingredients for peking duck rations is fish waste.

Fish waste is the result of cutting fish in the form of bone, head, skin, offal and other parts. Leubiem fish has a fairly good nutritional content, one of which is the protein content. The nutritional content of leubiem fish waste such as leubiem fish skin meal contains 66.20% crude protein, 2.78% crude fat, 8.51% calcium and 4.46% phosphor. Leubiem fish bone meal contains 58.28% crude protein, 1.66% crude fat, 2.55% crude fiber, 9.30% calcium and 4.62% phosphor. Leubiem fish head meal contains 49.18% crude protein, 5.08% crude fat, 1.72% crude fiber, 11.11% calcium and 5.70% phosphor [3].

Fish waste if not managed properly will cause pollution due to the decay of fish protein [4]. In addition, it can be a source of infectious diseases in humans which are transmitted by flies as

intermediaries. Planned fish waste processing can provide multiple benefits in the form of utilizing fish waste as a source of protein, especially as a component of animal feed ingredients and reducing environmental pollution. Apart from being a good source of protein and amino acids, fish waste is also a source of minerals, phosphorus, calcium and vitamins for livestock. If you look at the nutritional content of leubiem fish waste, it is very good when used as one of the ingredients in the Peking duck ration formulation because it can meet protein needs.

To support the productivity (performance) of Peking ducks, feed additives such as probiotics are needed. Probiotics are a group of beneficial live microb that are used to influence the host through the repair of microorganisms in the digestible tract [5]. The most widely used probiotic microorganisms are the Lactobacillus and Bifidobacteria strains [6]. The use of leubiem fish waste as a feed ingredient and added probiotic feed in the ration is an effort to increase the productivity (growth) of Peking ducks. This effort is the basis for the need for research to spur growth and increase the productivity of Peking ducks. The aim of the study was to evaluate the performance of Peking duck by providing a ration containing leubiem fish waste (*Chanthidermis maculatus*) and probiotics.

2. Materials and Methods

This study used 96 peking ducks aged 1-8 weeks. The rations used in this experiment consisted of leubiem fish waste (skin, head and bone), corn, rice bran, coconut meal, soybean meal, sago, coconut oil, premix, NaCl, DCP and probiotic as a feed additive. The study was conducted by an experimental method, using a Completely Randomized Design (CRD) with 4 treatment rations and 4 replications (6 ducks/repetitions).

The treatment ration consisted of: R0 (basal diet/control ration), R1 (ration containing 10% leubiem fish skin and probiotic 1%), R2 (ration containing 10% leubiem fish head and probiotic 1%), and R3 (ration containing 10% leubiem fish bone and probiotic 1%).

2.1 Treatment rations

The rations used during the study were basal rations without antibiotics. All treatment rations used the same feed ingredients, only different in the use of leubiem fish waste. The ration used was formulated in accordance with the nutritional needs of peking ducks. It contained 18% crude protein content and 2700 Kcal/kg metabolizable energy. The composition of feed ingredients and nutrient content of each treatment ration is shown in Table 1.

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Table 1. Composition and nutrients content of the treatment rations

Feed ingredients	Treatment			
	R0	R1	R2	R3
Corn (unit.....?)	38.5	40	37	37
Rice bran (unit.....?)	17	18	18	18
Coconut meal (unit.....?)	10	13.5	13	13
Soybean meal (unit.....?)	24.3	7.5	12	10
Sago (unit.....?)	7.2	8.0	7.0	9.0
Fish skin flour leubiem (unit.....?)	0	10	0	0
Fish head flour leubiem (unit.....?)	0	0	10	0
Fish bone flour leubiem (unit.....?)	0	0	0	10
Probiotic (%)	0	1	1	1
Coconut oil (unit.....?)	1.5	1.5	1.5	1.5
Premix (unit.....?)	0.5	0.5	0.5	0.5

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NaCL (unit.....?)	0.5	0.5	0.5	0.5
DCP (unit.....?)	0.5	0.5	0.5	0.5
Total	100	100	100	100
Nutrient content				
Metabolizable energy (Kcal/kg)	2702	2767	2706	2719
Crude proteins (%)	18.02	18.12	18.08	18.15
Crude fiber (%)	5.92	6.66	6.55	6.95
Crude fat (%)	4.57	4.99	5.1	4.77
Calcium (%)	0.28	1.09	1.36	1.07
Phosphor (%)	0.58	0.95	1.09	0.91

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2.2. Experimental Procedure

This study use peking ducks and maintained until 8 weeks of age in the litter cage system. The experiment lasted 8 weeks and during that time, feed and drinking water were given ad-libitum. Feed consumption and weight gain are weighed every week. Final body weight, feed conversion, and peking duck mortality were measured at the end of the study.

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2.3. Research Variables and Data Analysis

The variables observed were: feed consumption, body weight gain, final body weight, feed conversion, and mortality. Data were analyzed using one-way analysis of variance then continued with Duncan's Multiple Range Test [7].

3. Results and Discussion

3.1. Feed consumption

The average consumption of peking ducks during the study was 5.132 – 5.516 kg/duck (Table 2). The highest consumption of ration was obtained in the treatment of R0 (basal diet/control ration) and the lowest consumption of ration was found in treatment R1 (ration containing 10% leubiem fish skin and probiotic 1%). The performances of peking ducks (age 8 weeks) obtained in this study are presented in Table 2.

Table 2. The performances of peking duck (age 8 weeks)

Parameters	Treatment			
	R0	R1	R2	R3
Feed consumption (g)	5516 ± 10.04 ^b	5132 ± 12.52 ^a	5326 ± 16.53 ^{ab}	5361 ± 12.95 ^b
Body weight gain (g/weeks)	191.59 ± 6.41 ^b	157.02 ± 11.39 ^a	147.41 ± 3.26 ^a	180.36 ± 3.76 ^b
Final body weight (g)	1567 ± 40.70 ^b	1327 ± 81.34 ^a	1256 ± 21.18 ^a	1492 ± 21.94 ^b
Feed conversion ratio	3.52 ± 0.05 ^a	3.87 ± 0.18 ^b	4.24 ± 0.03 ^c	3.59 ± 0.02 ^a
Mortality (%)	0	0	0	0

Note: Different superscript in the same line means significantly different ($p < 0.05$); R0 (basal diet/control ration), R1 (ration containing 10% leubiem fish skin and probiotic 1%), R2 (ration containing 10% leubiem fish head and probiotic 1%), and R3 (ration containing 10% leubiem fish bone and probiotic 1%).

The results showed that the use of rations containing leubiem fish waste and probiotic supplementation significantly affected ($p < 0.05$) feed consumption of peking duck. The lowest Peking

duck feed consumption was found in the R1 feed treatment (ration containing 10% leubiem fish skin and 1% probiotic), and was significantly different ($p < 0.05$) compared to the control treatment (R0) and R3 treatment (ration containing 10% leubiem fish bone and probiotic 1%) (Table 2). Feed consumption in livestock can be influenced by various factors, one of the main factors is the quality of the feed including the nutrient content contained in the feed [8], and the protein content and the level of energy content in the ration [9]. Dietary consumption is also strongly influenced by the delicacy of the ration, the type, and composition of the feed ingredients used in the formulation of feed rations [10]. Another factor being affect feed intake by livestock is palatability (color, taste, smell and texture) [11;12].

3.2. Body weight gain

The average weight gain of peking ducks during the study ranged from 147.41 - 191.59 g/weeks (Table 2). Statistical analysis showed that the use of leubiem fish waste and probiotic supplementation in peking ducks rations had a significant effect ($p < 0.05$) on body weight gain. Ration consumption correlates with body weight gain of Peking ducks. The highest body weight gain was obtained in the control treatment and was not significantly different from the R3 treatment ((ration containing 10% leubiem fish bone and probiotic 1%) namely 191.59 and 180.36 g/week (Table 2).

The increase in animal weight is strongly influenced by the consumption of rations. Livestock growth rate is indicated by body weight gain. Body weight gain is closely related to ration consumption, because ration consumption determines the input of nutrients into the body which is then used for growth and other purposes [13]. The results of this study are in line with the results of the study [14], by using liquid waste of steaming fish as feed material can increase the weight gain of peking mojosari crossing ducks. Furthermore, the use of phytogetic and probiotics as feed additives in rations can increase the growth of local ducks [10].

3.3. Final body weight

The results showed that the weight of the final peking ducks ranged from 1256 - 1567 g/bird (Table 2). The ration containing leubiem fish waste and probiotic supplementation had a significant effect ($p < 0.05$) on the final body weight of peking ducks. The highest final body weight was in the control (R0) and R3 treatment (ration containing 10% leubiem fish bone and probiotic 1%) which was 1567 and 1492 g/bird and the lowest final body weight was in the control treatment (R2) which was 1256 kg/bird. Feeding containing leubiem fish waste and probiotic supplementation (R3) resulted in relatively higher final body weight of Peking ducks ($p < 0.05$) compared to other treatments (R1 and R2), but not significantly different from the control treatment (R0) (Table 2).

The use of rations containing leubiem fish waste (skin flour, head, and bone) can have a positive impact on improving the performance of the peking ducks. The final body weight of ducks is influenced by weight gain, and age of the animals, while the growth of the animals is influenced by nutrient intake and digestion in the animal's body [15]. Where the better absorption and digestion will have an influence on the growth of ducks [16].

3.3. Feed Conversion Ratio (FCR)

The results showed that the use of leubiem fish waste and probiotic supplementation in rations a significant ($p < 0.05$) effect on feed conversion of Peking ducks (Table 2). The lowest feed conversion values were found in the control treatment (R0) and R3 treatment (ration containing 10% leubiem fish bone and probiotic 1%), namely 3.52 and 3.59, and the results of statistical analysis showed no significant difference (Table 2). This finding shows that the use of ration containing 10% leubiem fish bone and probiotic 1% produces FCR similar to control ration.

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The results of this study indicate that the ration containing 10% leubiem fish bone and probiotic 1% is able to provide a level of delicacy, quantity and nutritional balance and is effective in increasing the growth of peking ducks. The smaller the feed conversion rate, the more efficient the use of rations by livestock [17]. The value of feed conversion depends on the quality of feed given to livestock. The higher the nutrients contained, the better the conversion of the resulting feed. This happens because with good feed livestock consumes less feed to produce the same body weight compared to less good. High growth reflects the efficiency of feed consumption and can be seen from the reduction in feed conversion rates (16).

3.4. Mortality

The results showed that the use of rations containing leubiem fish waste and probiotic supplementation did not affect the mortality of peking ducks. This shows that the use of leubiem fish waste can be a reliable source of feed ingredients as a source of good nutrition in the formulation of duck rations and also the role of probiotic as an antibacterial so that it can maintain the health of ducks [8;15].

In addition, regular rations and drinking water greatly affect the immune system of ducks. The cleanliness of the cage also greatly influences the mortality of ducks, where a dirty and untreated cage will easily cause germs that can cause death in ducks. One of the causes of the high mortality rate in livestock is caused by poor maintenance management factors and the presence of disease sources. Good maintenance management can control and prevent the occurrence of disease in ducks and can inhibit the occurrence of infection so as to minimize the mortality rate in ducks [18]. The results of the study on the use of 0.5% multistrain probiotic preparations in commercial broiler chicken rations and the combination of vitamins and minerals have the potential to improve digestive function and physiological status of broiler chickens [19]. Selanjutnya iriyanti et al 2018 menyatakan penggunaan pakan enceng gondok dan prebiotik yang berbeda menghasilkan performan profil saluran pencernaan yang relatif sama pada itik tegal jantan

4. Conclusions

It was concluded that the use of ration containing 10% leubiem fish bone and probiotic 1% was able to increase body weight gain, and the final weight of peking ducks (aged 8 weeks).

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