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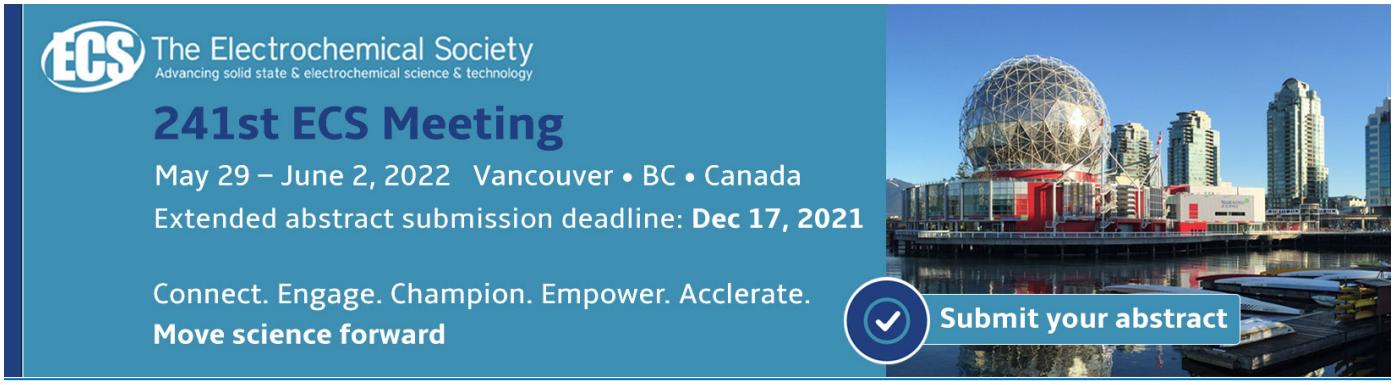

Effects of rations containing *leubiem* fish (*Chanthidermis maculatus*) waste and phytogenic suplementation on local ducks performance in the starter phase

M Daud, M A Yaman, Zulfan

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

E-mail: daewood@unsyiah.ac.id

Abstract. This study aims to examine the potential use of *leubiem* fish (Chanthidermis maculatus) waste and phytogenic supplementation on ration, in order to increase the performance of local ducks in the starter phase. This study used 100 local ducks aged 1 week old, and maintained them until 8 weeks old. The ducks were placed in 5 treatments and 4 replications groups (5 ducks / repetition). The study was conducted experimentally, using a Completely Randomized Design (CRD), consisting of 5 ration treatments, including: R1 (control); R2 (basal ration containing *leubiem* fish skin flour 10% + phytogenic 0.5%); R3 (basal ration containing *leubiem* fish head flour 10% + phytogenic 0.5%); R4 (basal ration containing *leubiem* fish bone flour 10% + phytogenic 0.5%) and R5 (basal ration containing *leubiem* fish gill flour + phytogenic 0.5%). Observed variables were feed consumption, body weight gain, final weight, feed conversion, and local duck mortality in the starter phase. The data obtained were both analyzed using Analysis of Variance (ANOVA) and Duncan's multiple range test. The results showed that the use of *leubiem* fish waste and phytogenic supplementation in the ration both increased the performance of local ducks in the starter phase and had a significant effect ($p < 0.05$) on ration consumption, weight gain, and final weight. However, they had no significant effect on feed conversion and local duck mortality in the starter phase. It was concluded that the use of *leubiem* fish (10% bone meal) and phytogenic supplementation 0.5% in the ration was able to increase body weight gain, and the final weight of the starter phase local ducks (aged 1-8 weeks).

1. Introduction

Local ducks are a type of waterfowl in Indonesia and are very popular for egg production and meat production. However, due to the high cost of commercial feed, most breeders feed ducks by utilizing the *leubiem* fish (Chanthidermis maculatus) waste as a source of protein in local duck rations. Leubiem fish (Chanthidermis maculatus) is a family of jebong fish or goats which is one of the species of fish found in the Indo-Pacific region or the Red Sea and Africa to Southeast Asia, northern Japan and south to north Australia and west west. Atlantic. The chanthidermis maculatus or better known by the people of Aceh as leubiem fish. It is commonly found on the coasts of Thailand, Indonesia, the Philippines and Japan [1].

Protein derived from fish is nutritionally superior when compared to vegetable sources, has a better balance and essential amino acids compared to all other sources of animal protein. *Leubiem* fish waste protein content is high, ranging from 46.08 to 66.2%, higher than fish meal which generally contains 53.7%. Utilization of fish processing waste will provide many benefits such as protein sources in local

duck rations, reducing environmental pollution, and mineral sources in duck rations such as, phosphorus, calcium and vitamins.

Furthermore, to support the optimum production performance (growth) of local ducks, feed additives such as phytogenic are needed. Phytogenic feed additives are additional compounds that are the result of plant secondary metabolites (whether they contain nutritionally valuable, non-nutritive, or anti-nutritional compounds) that are fed into the ration to increase livestock productivity through improving feed properties, improving digestive tract health by controlling pathogenic bacteria, improve production performance, and improve the quality of livestock products [2].

Efforts to increase productivity (growth) of local ducks and find and provide alternative feed ingredients and feed additives should always be done. One of them is by providing a balanced feed and in accordance with the nutritional needs of the starter phase local ducks as well as the utilization of waste or by products such as leubiem fish waste as feed ingredients, and the use of phytogenic feed additives in the ration. These various efforts are the basis of the need for this research to spur growth and increase the productivity of starter phase local ducks.

This study aims to examine the potential use of *leubiem* fish waste (skin meal, gills, head and bones) and phytogenic feed additives in the ration as well as its effect on the growth of starter phase local ducks.

2. Materials and methods

This study used 100 local ducks aged 1-8 weeks (starter phase). The rations used in this experiment consisted of *leubiem* fish waste (flour, head and bone meal), corn, rice bran, coconut flour, soybean meal, sago, coconut oil, premix, NaCl, and DCP. The study was conducted by an experimental method, using a Completely Randomized Design (CRD) with 5 treatment rations and 4 replications (5 ducks/repetitions).

The treatment ration consisted of: R1 (control); R2 (basal ration containing *leubiem* fish skin flour 10% + phytogenic 0.5%); R3 (basal ration containing *leubiem* fish head flour 10% + phytogenic 0.5%); R4 (basal ration containing *leubiem* fish bone flour 10% + phytogenic 0.5%) and R5 (basal ration containing *leubiem* fish gill flour + phytogenic 0.5%).

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 flour. The ration used was formulated in accordance with the nutritional needs of starter phase ducks. It contained 19% crude protein content and 2700 kcal / kg metabolic energy. The composition of feed ingredients and nutrient content of each treatment ration is shown in Table 1.

Table 1. Composition and nutrients content of the treatment rations

Feed Ingredients	Treatment Rations				
	R1	R2	R3	R4	R5
	%				
Corn	45	40	39	38	39
Rice bran	12	18	18	18	18
Coconut meal	11	12	13	13	12
Soybean meal	24	8	8	9	9
Sago	5	9	9	9	9
Fish skin flour leubiem	0	10	0	0	0
Fish head flour leubiem	0	0	10	0	0
Fish bone flour leubiem	0	0	0	10	0
Fish gill flour leubiem	0	0	0	0	10
Coconut oil	1.5	1.5	1.5	1.5	1.5
Premix	0.5	0.5	0.5	0.5	0.5

NaCl	0.5	0.5	0.5	0.5	0.5
DCP	0.5	0.5	0.5	0.5	0.5
Total	100	100	100	100	100
Calculated nutrients content:					
Metabolizable energy (Kcal/kg)	2710	2736	2718	2730	2726
Crude proteins (%)	19.10	19.05	19.12	19.50	19,45
Crude fiber (%)	5.30	6.10	6.22	6.24	6,27
Crude fat (%)	2.92	3.31	3.34	3.30	3,38
Ca (%)	0.91	1.27	1.32	1.41	1,44
P (%)	0.60	0.82	0.84	0.87	0,89

Note: R1 (control); R2 (basal ration containing 10% leubiem fish skin flour + 0.5% phytogenic); R3 (basal ration containing 10% leubiem fish head flour + 0.5% phytogenic); R4 (basal ration containing 10% leubiem fish bone flour + 0.5% phytogenic) and R5 (basal ration containing leubiem fish gill flour + 0.5% phytogenic).

2.2. *Experimental Procedure*

This study uses starter phase local ducks and is 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 local duck mortality were measured at the end of the study.

2.3. *Research Variables and Data Analysis*

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

3. Results and Discussion

3.1. Rations consumption

The average consumption of local ducks for the starter phase during the study was 60.33 to 64.61 g/ duck/days (Table 2). The highest consumption of ration was obtained in the treatment of R2 (basal ration containing 10% *leubiem* fish skin flour + 0.5% phytogenic) and the lowest consumption of ration was found in treatment R4 (basal ration containing 10% *leubiem* fishbone flour + 0.5% phytogenic). The performances of local duck starter phase (1-8 weeks) obtained in this study are presented in Table 2.

Table 2. The performances of local duck starter phase (1-8 weeks)

Parameters	Treatment				
	R1	R2	R3	R4	R5
Feed consumption (g/duck/days)	$60,45 \pm 1,10^{a}$	$64,61 \pm 1,20^{b}$	$63,68 \pm 1,39^{b}$	$60,33 \pm 2,11^{a}$	$61,89 \pm 3,14^{ab}$
Body weight gain (g/duck/days)	$18,8 \pm 0,87^{a}$	$19,7 \pm 2,10^{b}$	$19,4 \pm 1,56^{b}$	$19,5 \pm 1,18^{b}$	$19,6 \pm 1,18^{b}$
Final body weight (g/duck)	$1061 \pm 18,7^{a}$	$1124 \pm 17,8^{b}$	$1164 \pm 28,3^{b}$	$1184 \pm 30,1^{b}$	$1176 \pm 30,1^{b}$
Feed conversion ratio	3,48 ± 0,18	3,46 ± 0,37	3,41 ± 0,24	3,36 ± 0,25	3,47 ± 0,28
Mortality (%)	0	0	0	0	0

Note: Different superscript in the same line means significantly different ($p<0.05$); R1 (control); R2 (basal ration containing 10% leubiem fish skin flour + 0.5% phytogenic); R3 (basal ration containing 10% leubiem fish head flour + 0.5% phytogenic); R4 (basal ration containing 10% leubiem fish bone flour + 0.5% phytogenic) and R5 (basal ration containing leubiem fish gill flour + 0.5% phytogenic).

The results showed that the use of rations containing *leubiem* fish waste and phytogenic supplementation significantly affected ($p<0.05$) consumption of starter phase local duck feed. The highest consumption of the local starter diet was found in the treatment of rations R2 and R3 (rations containing skin flour and head of fish *leubiem*), significantly higher ($p<0.05$) compared to ration control (R1). 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 [3], and the protein content in the feed and the level of energy content in the ration [4]. 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 [5]. In addition, the palatability of rations is also influenced by the ration itself [6].

3.2. Body weight gain

The average weight gain of starter phase local ducks (1-8 weeks) during the study ranged from 18.8 to 19.7 g/duck/days (Table 2). Statistical analysis showed that the use of *leubiem* fish waste and phytogenic supplementation in starter phase local ducks rations had a significant effect ($p<0.05$) on body weight gain. The increase in animal weight is strongly influenced by the consumption of rations [7]. 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 [8]. The results of this study are in line with the results of the study [9], by using liquid waste of steaming fish as feed material can increase the weight gain of Peking Mojosari crossing ducks.

3.3. Final body weight

The results showed that the weight of the final local duck starter phase ranged from 1061 to 1184 g/ duck (Table 2). The ration containing *leubiem* fish waste and phytogenic supplementation had a significant effect ($p <0.05$) on the final weight gain of starter phase local ducks. The highest final body weight was in the R4 treatment (basal ration containing 10% *leubiem* fish bone flour + 0.5% phytogenic) which was 1184 g/duck and the lowest final body weight was in the control treatment (R1) which was 1061 g/duck. The use of diets containing *leubiem* fish waste and phytogenic supplementation (R2, R3, R4 and R5) increased the duck body weight relatively higher than the control treatment ($p <0.05$).

The use of rations containing *leubiem* fish waste (skin flour, head, bone, and gills) can have a positive impact on improving the performance of the starter phase local 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. Where the better absorption and digestion will have an influence on the growth of ducks [10].

3.4. Feed Conversion Ratio (FCR)

The results showed that the use of *leubiem* fish waste and phylogenic supplementation in starter phase local rations had no significant effect on feed conversion (Table 2). This finding shows that the use of phytogenic supplemented *leubiem* fish waste in starter phase local rations produces FCR similar to control ration. The results of this study indicate that the basal ration containing *leubiem* fish waste and phytogenic supplementation is able to provide a level of delicacy, quantity and nutritional balance and is effective in increasing the growth of starter phase local ducks.

The smaller the feed conversion rate, the more efficient the use of rations by livestock [11]. 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 [12].

3.5. Mortality

The results showed that the use of rations containing *leubiem* fish waste and phytogenic supplementation did not affect the mortality of starter phase local 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 phytogenic as an antibacterial so that it can maintain the health of ducks [7] [9]. 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 [12] [15].

4. Conclusions

It was concluded that the use of *leubiem* fish waste (10% bone meal) and phytogenic supplementation 0.5% in the ration was able to increase body weight gain, and the final weight of the starter phase local ducks (aged 1-8 weeks).

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