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Evaluation of Commercial Feed Replacement Fermented Local Food Mixed on Performance of Male Local Duck

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Abstract. This study aims to determine the effect of mixing of fermented feed ingredients with EM4 on feed consumption, body weight gain, feed covers, and income over feed cost. The materials were 40 Mojosari male ducks, commercial feed plus mixed feed ingredients of oil palm carnel cake, cassava sludge, and rice bran (80:10:10). Experimented is arranged in Completely Randomized Design with five treatments and four replications. The treatments were T0 (100% commercial feed), T1 (95% commercial feed + 5% fermented local feed mixed), T2 (90% commercial feed + 10% fermented local feed mixed), T3 (85% commercial feed + 15% fermented local feed mixed), and T4 (80% commercial feed + 20% fermented local feed mixed). Analysis of variance were conducted followed by Turkey test. The result showed that fermented local feed mixed until 20% in commercial feed has no negative effect ($P>0,05$) on feed consumption, body weight gain, feed conversion, and income over feed cost. The treatment of fermented local feed mixed was safe for Mojosari male duck.

1. Introduction

Local Mojosari male ducks (drake) are potential to be bred as meat producers. The constraints faced by farmers in duck maintenance are high commercial ration costs while ration costs reach 70% of the total production costs. Other constraints are high consumption and conversion ratios and slow growth rates [1]. Efforts made by duck farmers in Indonesia to reduce ration costs are by adding local feed ingredients to commercial rations.

Local raw materials that are widely used are oil palm carnel cake, cassava sludge, and rice bran. But the high content of crude fiber and the presence of anti nutrition in these ingredients can reduce digestibility and absorption of nutrients in the feed which causes the availability of nutrients to be low.

Provision of rations from cheap and quality feed ingredients is important to note so that the productivity and efficiency of male Mojosari ducks can be increased. Fermentation with Effective Microorganism-4 (EM-4) is one of the efforts that can be done to improve the quality and use of local feed ingredients. EM-4 is a mixture of useful microorganisms that mainly contain photosynthetic bacteria, lactic acid, Actinomycetes, fungi, molds and yeast [2]. The use of coconut cake fermented with EM-4 can replace commercial ration to the level of 15% in broiler rations [3].



The process of fermentation of palm kernel cake, rice bran, and onggok for feed ingredients is generally carried out by solid substrate fermentation. Solid substrate fermentation can increase the protein or essential amino acid content, reduce the content of crude fiber and dangerous cyanogenic compounds [4].

Based on the above, a study was conducted to determine the effect and the best level of use of EM-4 mixed palm oil, onggok and bran cake on the performance of male local ducks.

2. Materials and Methods

This study uses male mojosari ducks aged 3 weeks. Ducks placed randomly in a cage of 20 plots of size are 80 cm x 60 cm x 60 mm. (length x width x height). Each plot contains 2 ducks. Ducks are kept for 4 weeks.

The ration used was commercial ration (BRI), oil palm cake mixture, onggok, and bran (80:10:10) fermented with EM-4 (3%), and molasses (3%) with a fermentation period of 3 days.

Table 1. The content of nutrients mixed with fermented feed ingredients

Nutrient Content	Amount
Water Content (%) *	14,50
Rough protein levels (%)*	14,91
Gross fat content (%)*	2,93
Crude fiber content (%) **	18,49
Ash content (%)**	5,86
Metabolic energy (kcal/kg)***	2402,89

Description: *) results of the analysis of the Animal Nutrition Laboratory Unila, **) the results of the analysis of the THP Politani laboratory, ***) the results of calculations according to Clegg and Carpenter formulas [5].

Table 2. Nutrient content of the treatment ration

Nutrient Content	T0	T1	T2	T3	T4
Water Content (%) *	12	12,12	12,25	12,37	12,5
Rough protein levels (%)*	22,50	21,64	21,29	20,94	20,58
Gross fat content (%)*	5	4,90	4,79	4,69	4,59
Crude fiber content (%)**	5,0	5,67	6,35	7,02	7,70
Ash content (%)**	7,0	6,94	6,89	6,83	6,77
Metabolic energy (kcal/kg)***	3092	3057,54	3023,09	2988,63	2952,18

The ration and drinking water are given ad libitum. The variables observed were feed consumption, body weight gain, feed conversion, and Income Over Feed Cost (IOFC). Feed consumption is calculated by calculating the difference between rationing and the rest of the ration each week. Duck weighing is also carried out every week to obtain body weight gain data. Feed conversion data is calculated every week based on the ratio of feed consumption and body weight gain. IOFC data is calculated at the end of the study, which is based on the ratio of ration costs during the study to income.

The experimental design used in the study was a completely randomized design (CRD) with five treatments and four replications. The composition of the treatment ration is:

T0: 100% commercial ration

T1: 95% commercial ration + 5% fermented feed ingredients

T2: 90% commercial ration + 10% fermented feed ingredients

T3: 85% commercial ration + 15% fermented feed ingredients

T4: 80% commercial ration + 20% fermented feed ingredients.

The data obtained were statistically analyzed using analysis of variance, and if there were differences in treatment, Duncan Test was done [6].

3. Results and Discussion

3.1. Male Mojosari Duck Performance

Male Mojosari Duck Performance is shown in table 3.

Table 3. Performance of ducks given fermented feed ingredients

Variable	Treatment				
	T0	T1	T2	T3	T4
Feed consumption (g/head /week)	727,70	704,69	770,52	788,23	846,04
Increased body weight (g / head / week)	209,67	200,00	203,02	195,16	204,22
Feed conversion	3,54	3,58	3,94	4,08	4,10
IOFC	1,48	1,21	1,22	1,40	1,36

3.2. Feed consumption

Results indicate that feed consumption between treatments was not significantly different ($P > 0.05$). This is due to the relatively similar content of the nutrient ration treatment. Feed consumption is influenced by a variety of factors including type, composition, and nutrient content or nutritional ration [1]. The content of ration nutrients that can affect feed consumption is the content of crude fiber. In this study, the crude fiber content of the rations of all treatments was still within the tolerance limits that can be consumed by ducks. According to [7], ducks can still tolerate rations with a crude fiber content of 10-20%.

Feed consumption is relatively increased with increasing levels of fermentation ingredients. This is consistent with the results of [7] study. The higher content of crude fiber causes the rate of food in the digestive tract to get faster which results in ducks eating more. Feed consumption which is relatively increasing is also caused by ration conditions that are increasingly palatable with the addition of fermented ingredients. According to [8], feed consumption was influenced by ration palatability. Treatment rations given fermented ingredients with EM4 are more palatable because of the fragrant smell. [9] stated that generally poultry palatability is influenced by odor, taste, ration structure, and crude fiber content in rations. The results of this study indicate that the administration of a mixture of oil palm, onggok, and bran can still be given up to a level of 20% in the ration.

The results of variance analysis showed that rationing with a mixture of feed ingredients fermented with EM-4 up to a level of 20% did not give a significant effect ($P > 0.05$) on the body weight gain of male mojosari ducks aged 3 to 7 weeks. This is caused by feed consumption between treatments which is not significantly different due to the nutritional quality of the treatment ration which is also not much different. Ducks that consumes rations of good quality with large amounts causing nutrients that enter the body of the animal are not only used to fulfill basic life but also for and for growth, which is characterized by high body weight gain. High ration consumption can increase nutrient intake, such as protein, carbohydrates, fats, vitamins, and so as to produce higher body weight gain [10].

In this study, the growth of male local ducks tends to decrease with increasing fermentation. Fermentation of feed ingredients with EM4 has not been able to break down lignocellulotic bonds so that the food digestibility is still low, consequently the amount of nutrients absorbed and utilized for growth is reduced. According to [11], high protein content followed by high levels of fiber and lignin content caused ducks to take a considerable amount of time in the digestive process to feed absorption. According to [12], high crude fiber content resulted in low nutrient digestibility in broiler ducks.

3.3. Feed Conversion

The conversion value of duck rations is not much different from the conversion of various types of duck rations obtained by [13] between 3.03 and 4.49 with an average of 4.02. The results showed that the conversion of local male duck rations in each treatment was not significantly different ($P > 0.05$). According to [9], the efficiency of ration use is related to feed consumption and body weight gain, but high ration consumption is not always followed by high ration use efficiency.

FCR is a unit to calculate feed efficiency in poultry enlargement cultivation. The smaller FCR figures indicate that the ration is getting better [14]. The FCR duck in this study is relatively high. This is caused by the eating behavior of ducks including the habit of ducks who immediately look for drinking water after eating. The ration is generally wasted when the ducks move from the ration to the drinking place or also dissolved in the drinking water container.

Income over Feed Cost (IOFC)

The provision of a mixture of feed ingredients fermented with EM4 in the ration had no significant effect ($P > 0.05$) on male mojosari duck IOFC. IOFC is considered good if the figures obtained are as high as possible, which means that in terms of economy, the maximum income earned. This is in accordance with [15] opinion, the more efficiently the cattle convert food substances into meat, the better IOFC is obtained. The higher the IOFC value means the higher the income earned.

Based on IOFC, this study found that good growth does not necessarily guarantee maximum profit, but good growth and followed by good conversion of rations and ration costs that will get the maximum profit.

4. Conclusion

Based on the results of the research conducted, it was concluded that oil palm cake, tapioca waste and bran cake can be given up to 20% without giving a negative effect on the performance of male Mojosari ducks.

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