

THE EFFECT OF PALM KERNEL CAKE FERMENTED BY *Marasmius* Sp IN THE RATION ON CARCASS PERCENTAGE AND INTERNAL ORGANS OF NATIVE CHICKEN

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Abstract

Palm kernel cake is a by product of the processing of palm oil waste, has a high gross energy so it can be used as a source of energy for chicken. Palm kernel cake contains gross energy 5088 kcal/kg used to substitute corn meal in the preparation of native chicken diets. The research was to determine the effects of palm kernel cake fermented by Marasmius Sp in the diets on carcass percentage and internal organs of native chicken. One hundred native chickens at two weeks age were raised in cages until 12 weeks old. A Completely Randomized Design with five treatment palm kernel cake fermented level in the diets, namely 0% (R0), 10% (R1), 20% (R3), 30% (R4) and 40% (R5), replicated four times and where each replication consisted of five chickens and the measured variables was carcass weight percentage, abdominal fat, gizzard weight percentage and length of intestine. The statistical analysis indicated that the effect of the addition palm kernel cake fermented by Marasmius Sp in diets was significant ($P < 0.05$) on final body weight, carcass percentage, gizzard weight percentage and length of intestine, but it abdominal fat. Using palm kernel cake fermented until 30 percent in the diets give the maximum result on the carcass weight, abdominal fat percentage, gizzard weight and length of intestine. At 40 percent palm kernel cake fermented in the diets, final body weight, carcass percentage, abdominal fat were decrease, but percentage of gizzard weight and the length of intestine was increase. The conclusion of experiment that palm kernel cake fermented can be used to alternative energy source to substitute corn meal in native chicken diet, and giving 30% gave the best of carcass percentage and internal organs of native chicken.

Key words: Palm kernel cake fermented, native chicken, carcass, gizzard, length of intestine

INTRODUCTION

The potential of palm oil is quite large, in Indonesia the production ranks second in the world after Malaysia. The area of oil palm plantations in Indonesia is 3.134.000 ha with fresh fruit bunches produced about 20.8 tons / ha / year. Four to 4.5% of fresh fruit bunches are palm kernel, while 45 - 46% of the palm kernel is produced palm kernel cake [7;4]. Palm kernel cake has potential as alternative feed ingredient of energy source. The nutrient content of crude palm kernel cake as follows: crude protein 17.14%, crude fat 6.08%, crude fiber 18.18%, calcium 0.49%, phosphorus 0.78% and gross energy 5088 kcal / kg [17].

In general, feed ingredients containing high crude fiber will have a low digestibility value, so the use of palm kernel meal in the ration becomes limited. The use of high

crude fibers, in addition to lowering easily digested components, also leads to decreased activity of enzyme breaking substances such as enzymes that help digest carbohydrates, proteins and fats [2]. Lignin can also bind with cellulose to form lingo-cellulose and lingo-hemicellulose and can bind to proteins to form lingo-proteins. Lignin can act as a physical protective barrier that blocks the digestibility of food substances [10].

The process of bioconversion of oil palm waste substrate through fermentation is an interesting alternative. Fermentation can increase digestibility, add flavor and aroma, and increase vitamin and mineral content [9;2] Fermentation of palm kernel meal can be used them as a dietary ingredient for native chicken and is expected to improve digestibility because its nutrients will have been released from their bonds with lignin. Native chicken is a type of poultry that is popular in Indonesia. The quality of the fermentation product depends on the type of microbe, dosage and

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processing time and the medium used. *Marasmius* sp. is a microbial that can degrade the content of crude fiber (lignin) to palm kernel meal and can produce glucosidase enzymes that can break glycosidic bonds so that crude fibers are stratified into simpler bonds such as polysaccharides which are a source of energy for native chicken [11].

The high crude fiber content in the ration will affect the growth rate. Rations with high fiber content are generally will be consumed less in accordance with the capacity of the crop and will lead to decreased body weight [15;16]. Body weight will affect the carcass weight generated, especially when rations are given more easily digested by poultry so that there is accumulation of meat. Good carcasses should contain lots of meat, low-yield and low fat content [5;14]. The crude fiber in the ration formulation is required between 2 - 11%, while [12] describes the maximum crude fiber content required in chickens is 8%, but until now there has been no information on what percentage of crude fiber content in rations for chicken. Consumption of chicken rations containing high crude fiber will not be much because it will exceed the capacity of the crop, so the consumption of ration is limited and slow the increase in body weight. This will result in low carcass weight and increase the diameter and length of the gastrointestinal tract.

Several studies have reported that the use of palm kernel cake in broiler rations varies from 5 to 10 %, even fermentation products can be used up to 25% without negative effects [8]. The use of palm kernel cake of fermented product up to 30% in broiler chicken ration showed no difference of feed consumption or chicken has preference to eat the same with control ration and did not cause difference of body weight performance [13;17]. The research was to evaluate effects of using palm kernel cake fermented by *Marasmius* sp in the

diets on carcass percentage and internal organs of native chicken.

MATERIAL AND METHODS

The Research used one hundred native chickens at two weeks of age were raised in cages until 12 weeks old. A Completely Randomized Design with five treatment palm kernel cake fermented level in the diets, namely 0 % (R0), 10 % (R1), 20 % (R2), 30% (R3) and 40% (R4), replicated four times and where each replication consisted of five chickens. The rations consisted of yellow corn meal, fish meal, rice bran meal, soy-bean meal ,palm kernel cake fermented, vegetable oil , bone meal, CaCo3 and premix as additive feed in 17 percent protein and 2900 Kcal/kg of metabolizable energy. The experiment rations were :

- R₀ Ration control without palm kernel cake fermented
- R₁ Ration contained 10 percent palm kernel cake fermented
- R₂ Ration contained 20 percent palm kernel cake fermented
- R₃ Ration contained 30 percent palm kernel cake fermented
- R₄ Ration contained 40 percent palm kernel cake fermented

The data was analyzed by using Analysis of Variance, and the difference among treatments were tested by using Duncan's Multiple Range Test. Variable analysis were final body weight, carcass weight, abdominal fat, gizzard weight percentage and length of intestine.

RESULTS AND DISCUSSIONS

The effect of dietary treatment using palm kernel cake fermented on final body weight, carcass weight percentage, percentage of abdominal fat, gizzard weight percentage and length intestine of native chicken is shown in Table 1.

Table 1 The average of Final body weight, Percentage of Carcass, Gizzard weight and Length of Intestinal

Variable	R0	R1	R2	R3	R4
Final Body Weight (g)	744.05 a	753.01 a	748.18 a	739.52 a	534.92 b
Carcass weight (%)	65.99 a	65.46 a	65.40 a	64.99 a	60.56 b
Abdominal Fat (%)	1.17a	1.15 a	1.05 b	0.99 b	0.97 b
Gizzard weight (%)	1.87 a	1.95 a	2.21 b	2.64 a	2.98 b
Length Intestine (cm)	15.57 a	16.54 a	17.21 b	17.43 b	19.98 b

Note : The similar superscript in the same row show no significant different (P>0.05)

Final body weight

Final body weight were variation from the lowest R4 =594.92 gram to the highest R0 = 764.05 gram (Fig. 1). The results variance analysis shows that adding of palm kernel cake fermented has significant effect ($P<0.05$) on final body weight. Adding the palm kernel cake fermented 30 percent in the ration native chicken still gave a good result.

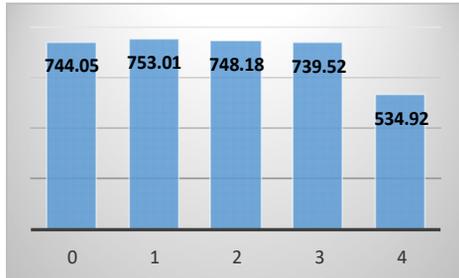


Fig. 1 Final Body weight (g)

The result was parallel with feed and protein consumption those were also no significant among the treatment (R0, R1, R2 and R3) and significant different to R4, Its mean that the palm kernel cake fermented from 10 percent up until 30 percent in the ration did not influence palatability and chicken appetite, but have limitedness on final body weight achievement. A decrease in final body weight of R4 (40%) because the amount of crude fiber donated in the ration is higher. High fiber content will affect the digestibility of other nutrients because crude fiber can not be degraded in the digestion of chicken so that nutrient needs grow chicken body is less fulfilled. According to [3] the use of high crude fibers in addition to lowering the digestible components also leads to decreased activity of the enzyme-breaking of nutrients such as enzymes that help digest carbohydrates, proteins and fats. This is because only a portion of the crude fibers can be digested by microflora in caecum and colon.

Carcass Percentage

In Table 1 can be seen that highest of carcass percentage on native chicken which receiving ration control R0 (65.99%) and the

lowest was R4, ration contained 40 percent palm kernel cake fermented (60.56%). Fig 2

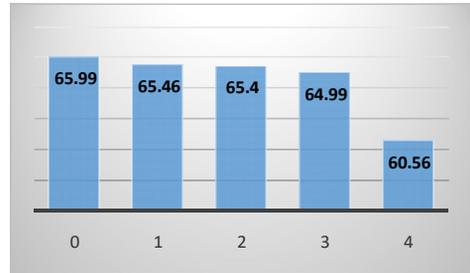


Fig. 2 Carcass Percentage (%)

The results of variance analysis showed that treatment by giving of palm kernel cake fermented until 30 % in the ration did not significantly influence ($P>0.05$) on carcass percentage but has significant effect ($P<0.05$) when using 40 percent in the ration on carcass percentage of native chicken. No difference on treatment R0, R1, R2 and R3 because protein consumption were relatively equal in each treatment. The function of protein is primarily to build muscle or meat. R4 was the lowest produced on carcass weight and percentage. The proportion of palm kernel cake fermented was higher than among treatment, so the ration contain more fiber and lignin. Rations with high fiber content are generally will be consumed less in accordance with the capacity of the crop and will lead to decreased body weight [16]. Body weight will affect the carcass weight generated, especially when rations are given more easily digested by poultry so that there is accumulation of meat. So the carcass percentage of treatment R4 was decreased.

Abdominal Fat Percentage

The abdominal fat percentage were variations, from the lowest R4 = 0.97 % to highest R0 = 1.05% (Fig 3). In Table 1, shows that abdominal fat percentage decreased with increased the level palm kernel cake fermented in the diets.

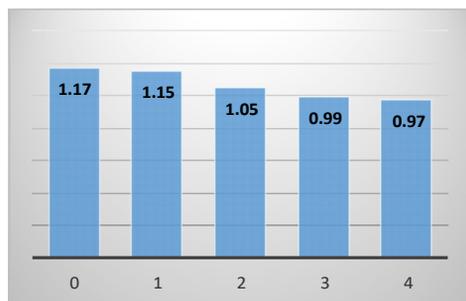


Fig. 3 Abdominal Fat Percentage (%)

The analysis of variance showed that using palm kernel cake fermented in the diets have significantly effect ($P < 0.05$) on the abdominal fat percentage. From using 20 percent of palm kernel cake fermented in the ration, there was tendency that the level abdominal fat percentage content going to decreased. In the treatment of R2, R3 and R4 the proportion of the fermented palm kernel cake is higher than R1, so the ration contains more fiber and lignin, consequently the consumption of the ration will also decrease. The weight loss of abdominal fat is also associated with feed consumption, due to lack of palatable rations, then the consumption of feed to be a little so that the weight gain becomes small and eventually even a little body fat. In chickens that are fed with fermented palm kernel cake there is no possibility of excess energy so that not much is deposited into abdominal fat. According to opinion with [8] that the excess energy in livestock will be stored in the form of fat. The low percentage of abdominal fat (0.97 – 1.05 %) results because native chickens on development period, much of fat is formed because the nutrients are absorbed by body is still used for growing [18].

Gizzard Percentage

Gizzard percentage of native chicken obtained at the end of the 12-week study was presented in Table 1. The percentage of gizzard weight ranged from 1.87 to 2.98 percent (Fig 4). The result of statistical analysis shows that by addition of palm kernel cake gives a significant effect on the percentage of gizzard weight.

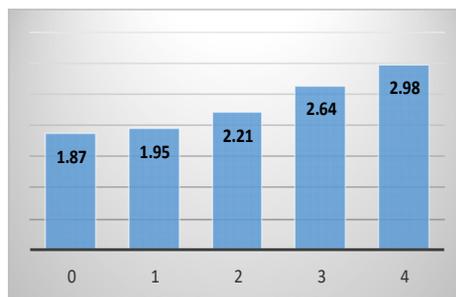


Fig. 4 Gizzard Percentage (%)

From Table 1 it is shown that treatment R1 without fermented palm kernel cake (1.87%) and R1 (10% fermented palm kernel cake) = 1.95% no significant different resulted in percentage of gizzard weight. This is because the crude fiber content in R0 and R1 rations is still within the limits tolerated by the chicken, so the gizzard does not work too heavily in digesting the rations that ultimately produce the weight of the gizzard was normal. The percentage of gizzard weight produced in the R2 treatment (20% fermented palm kernel cake) = 2.21%, as high as the percentage of gizzard weight produced by R3 (30% fermented palm kernel cake) = 2.64% and R4 (40% fermented palm kernel cake) = 2.98%. This occurs because the given ration contains a crude fiber level above the tolerance limit of 8%. The function of the gizzard is to grind the feed material into smaller particles and if the coarse fiber in the ration is too high it will cause more severe gizzard work which in turn the gizzard thickens and enlarges. According [5; 10] that the crude fiber content in the diet will affect the weight of the gizzard, the weight of the gizzard will increase with the increase in the crude fiber content in the ration caused by increased gizzard contraction while digesting the crude fiber.

Length Intestine

The average length of bowel from chicken can be seen in Table 1. The average length of bowel in chicken ranged from 15.57 - 19.98 cm. The length of the intestine tends to be longer with high crude fiber feeding. The result of statistical analysis showed that using the fermented palm kernel cake gave a significant effect on the length of intestine.

This means that the use of fermented palm kernel cake in ration adds crude fiber content up to 8 percent, causing the intestine to become longer. This is because the quota with high crude fiber content causes the rate of rations in the digestive tract to be slow, the contraction of the intestine becomes longer, consequently the intestine becomes longer. Between treatment of R2, R3 and R4 did not show any significant difference to intestinal length. This means that the provision of palm kernel cake fermented products from 20 to 40% no longer can increase the length of the intestine. This is because the intestine also has a habit to adjust to the crude fiber content in the ration. According [1] that the high crude fiber in the ration will increase the length of the intestine per kilogram of body weight.

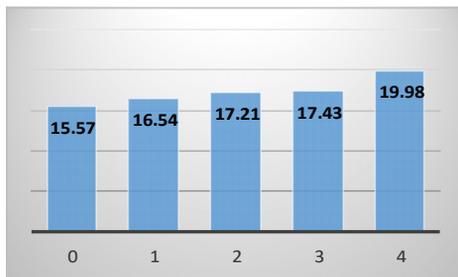


Fig. 5 Length Intestine (Cm)

CONCLUSIONS

The conclusion of experiment that palm kernel cake fermented can be used to alternative energy source to substitute corn meal in native chicken diet, and giving 30% gave the best of carcass percentage and internal organs of native chicken.

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