PROCEEDINGS OF
THE INTERNATIONAL CONFERENCE ON ENVIRONMENTALLY SUSTAINABLE ANIMAL INDUSTRY (ICESAI) 2020
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“Achieving Resilient and Environmentally Sustainable Animal Industry in the post COVID-19 Pandemic Era”
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The Effect of Corn Substitution with Palm Kernel Meal with Addition of Enzyme Mananase in Feed on Carcass Weight, Carcass Percentage, Pieces of Carcass Hybrid Ducks

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Abstract

The purpose of this study was to evaluate the substitution of maize with palm kernel meal processed in feed on carcass weight, carcass percentage and carcass pieces of hybrid ducks. The material used in this study were 100 hybrid ducks from the cross strains of Peking and Khaki Campbell without differentiating gender (aged 21 days) with an average body weight of $421.31 \pm 183.90$ g. with a diversity coefficient of about 31%. The treatments used were P0: 20% corn, P1: 15% corn + 5% processed PKM (Palm Kernel Meal), P2: 10% corn + 10% processed PKM, P3: 5% corn + 15% processed PKM, and P4: 20% Processed PKM. The treatments used were carcass weight, percentage of carcass, and pieces of carcass (chest and lower thigh). Data were analyzed by covariance analysis (Ancova) which consisted of 5 treatments and 4 replications. Each replication contained 5 hybrid ducks. If the treatment shows a difference, it is continued with Duncan's Multiple Range Test. The results showed that the processed palm kernel meal flour had no significant effect ($P>0.05$) on carcass weight, carcass percentage, wing percentage, breast percentage and dorsal percentage but had a very significant effect ($P<0.01$) on lower thigh percentage. It was concluded that replacing maize with processed palm kernel meal up to 20% in feed had the same effect on carcass weight, carcass percentage, and carcass pieces of hybrid ducks.

Keywords: Palm kernel meal (PKM), corn, carcass, hybrid ducks

INTRODUCTION

Duck meat is an alternative to meet the needs of animal protein, which is cheap and easy to obtain. Based on data obtained from the Director General of Animal Husbandry (2019), where the development of duck cultivation in Indonesia is based on 2018 livestock statistics, the population of ducks in 2018 was 51,239,185, and the population from 2014 to 2018 increased by 13.19%, and an average growth rate of 3.16% per year.

Corn is one of the main feed ingredients in poultry farming. Corn is a food plant or feed with a good source of carbohydrates, as well as the most widely used feed ingredient in feed preparation. Each variety of maize has a different protein content and quality ranging from 9-13.5% (Arifin, Sjofjan and Djunaidi, 2011). Corn has a metabolic energy content of 3370 kcal / kg, 8.6% crude protein, and 3.9% crude fat (Hidayatullah, Djunaidi, and Natsir, 2013). Corn production shows that maize production tends to decline, while the population growth rate is always positive, which means that demand continues to increase. In fact, the total production and national needs from year to year show a widening gap and if this continues, the consequence will be an increasing number of imports of maize and Indonesia increasingly dependent on foreign countries. Fluctuations in the price of feed ingredients and competition in their use are obstacles that often shake livestock businesses because they have an impact on feed costs (Dewanto, et al., 2013). Therefore, it is necessary to substitute imported feedstuffs from energy sources (maize) with other energy source feed ingredients cultivated in Indonesia with abundant production to reduce the cost of procuring feed ingredients, for example Palm kernel meal (PKM).

Palm kernel meal (PKM) is one of the by-products of processing palm kernel with a content of 45-46% from palm kernel. PKM contains nutrients, namely crude protein 15.40%,
crude fat 6.49%, crude fiber 19.62%, Ca 0.56%, P 0.64%, with metabolic energy 2446 kcal / kg (Noferdiman, 2011). The high content of crude fiber causes the use of PKM in poultry feed to be limited (Ramli et al., 2008) because it is difficult to be digested and utilized optimally by poultry.

One of the processing technologies that can be used to improve the digestibility of PKM is the addition of the enzyme mannanase. Mananase enzyme is an enzyme that is able to hydrolyze the manooligosaccharide substrate and a little manose, glucose and galactose. The mananase enzyme comes from mannan, mannan is a source of biomass after cellulose and xylan are found in oil palm plantation waste (Yopi, et al., 2006). The addition of the mananase enzyme aims to break down crude fiber in PKM into simpler compounds, namely breaking down mannans and galactomannans into mannose and galactose, so that non-ruminant livestock can optimally absorb the nutrients contained in PKM.

**MATERIALS AND METHODS**

The materials used in this study were 100 cross hybrid ducks of Peking ducks (male) and non-sexing Khaki Champbell ducks (female) aged 21 days with an average body weight of 421.31 ± 183.90 g with a diversity coefficient of about 31%. Hybrid ducks are obtained from smallholder farms in Blitar Regency at a price of Rp 10.000 per head.

The number of cages used in this study was 20 flocks with 5 ducks in each flock. The duck cage is equipped with a place for feeding & drinking, hygrometer and other cage equipment. Feed and drinking water were given *ad-libitum*.

The research method used in this study was a field experiment using a completely randomized design (CRD) consisting of 5 treatments and 4 replications. Each replicates consisted of 5 hybrid broiler ducks. The treatments used were as follows:

- P0: feed without corn substitute (basal feed)
- P1: feed substituted for corn with 25% palm kernel meal flour
- P2: feed substituted for corn with 50% palm kernel meal flour
- P3: feed substituted for corn with 75% palm kernel meal flour
- P4: feed substituted for corn with 100% palm kernel meal flour

**Table 1. Feedstuff Nutrient Analysis**

<table>
<thead>
<tr>
<th>Feed Ingredients</th>
<th>Crude Protein (%)</th>
<th>Crude Fiber (%)</th>
<th>Crude Fat (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice Bran</td>
<td>12.85</td>
<td>1.83</td>
<td>9.66</td>
</tr>
<tr>
<td>Corn</td>
<td>9.01</td>
<td>1.73</td>
<td>3.87</td>
</tr>
<tr>
<td>Concentrat</td>
<td>28</td>
<td>4.80</td>
<td>4.70</td>
</tr>
<tr>
<td>PKM</td>
<td>13.83</td>
<td>20.68</td>
<td>9.92</td>
</tr>
<tr>
<td>PKM Fermentation</td>
<td>14.22</td>
<td>17.63</td>
<td>9.71</td>
</tr>
</tbody>
</table>

Source: Analysis Result from Feed Nutrition Laboratory, Faculty of Animal Science, Brawijaya University

**Table 2. Composition and Nutritional Content of the Treatment Feed**

<table>
<thead>
<tr>
<th>Feed Ingredients</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice Bran</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Concentrat</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Corn</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>PKM</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Nutrition Content**

| GE (Kcal/kg)     | 3846.3 | 3854.9 | 3863.7 | 3890.9 | 3880.8 |
| PK (%)           | 17.19  | 17.54  | 17.89  | 18.32  | 18.59  |
| SK (%)           | 2.23   | 2.77   | 3.31   | 3.91   | 4.39   |

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The variables observed in this study were carcass weight, percentage of carcass, and pieces of carcass (thighs and breasts). The research data were processed using Microsoft Excel software, then analyzed using covariance analysis (ANKOVA) from a completely randomized design (CRD) with 5 treatments and 4 replications. If there is a real or very real effect on the treatment, it is followed by Duncan's Multiple Range Test (UJBD) to determine the differences between treatments.

**RESULTS AND DISCUSSION**

The effect of giving palm kernel meal flour in the feed to Carcass weight, percentage of carcass and pieces of carcass (thighs and breasts) can be seen in Table 3.

Table 3. Average effect of treatment on carcass weight, percentage of carcass and pieces of carcass.

<table>
<thead>
<tr>
<th>Variable</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass weight (grams)</td>
<td>1203.75±38.35</td>
<td>1301.50±21.44</td>
<td>1260.00±148.04</td>
<td>1293.25±46.56</td>
<td>1192.25±79.68</td>
</tr>
<tr>
<td>Carcass (%)</td>
<td>61.47±3.45</td>
<td>65.87±1.15</td>
<td>63.70±1.70</td>
<td>63.23±3.18</td>
<td>61.72±2.73</td>
</tr>
<tr>
<td>Thigh (%)</td>
<td>15.79±3.17a</td>
<td>17.22±3.15a</td>
<td>11.81±1.51a</td>
<td>19.03±1.32a</td>
<td>17.21±1.36a</td>
</tr>
<tr>
<td>Chest (%)</td>
<td>27.09±3.05</td>
<td>28.82±0.91</td>
<td>29.60±2.75</td>
<td>26.45±4.05</td>
<td>25.14±3.85</td>
</tr>
</tbody>
</table>

Attn: different ab superscripts on the same line indicate a significant difference in each treatment (T<0.01).

Based on the results of statistical analysis in Table 3, it shows that giving PKM processed products in feed did not have a significant effect (T>0.05) on carcass weight, carcass percentage, and breast percentage. This is because the live weight of the ducks is almost the same.

Carcass weight is the weight of ducks that are weighed after being separated from non-carcass parts, such as blood, head, legs (claws), feathers and all contents of the chest and stomach cavities (Akhadiarto, 2010). According to Putra, Rukmiasih and Afnan, (2015), carcass weight is not influenced by the sex of the livestock. Carcass weight is directly affected by slaughter weight, the higher the slaughter weight, the carcass weight of an animal will be higher as well. The results of the research that have been done, obtained the average carcass weight, namely 1192.25 - 1301.50 g / head. The carcass weight of the results of this study is still higher than the research conducted by Nova, Sabrina and Triniawati (2015), which is 857.00 - 881.80 g / head.

The percentage of carcass was obtained by comparing the carcass weight with the live weight of the hybrid ducks and then multiplying it by 100%. Percentage of carcass weight of broiler ducks at 8 weeks of age ranging from 55.54 - 57.52% (Rukmiasih, Matitaputty, Hardjosworo and Prasetyo, 2015). According to Sukirmansyah, et al., (2016), the percentage of carcass is influenced by live weight, internal organs, wasted parts and the quality of the feed given. According to Lestari, Rukmiasih, Suryati, and Hardjosworo, (2017), the percentage of carcass is influenced by the large slaughter weight of hybrid ducks. This is because the carcass weight will give results that are in line with the resulting cut weight, so that the higher the cutting weight, the higher the carcass weight. The results of the carcass percentage in Table 3 show that each treatment has no significant effect (T> 0.05). This shows that feeding with the addition of maize and PKM to hybrid ducks produces the same percentage of carcass. This is explained in the opinion of Dewanti, et al., (2013), that the percentage of carcass showed no significant difference because the energy and protein content contained in the feed were almost the same. The percentage of carcass can
produce results that are not significantly different because the percentage of carcass is closely related to the weight of cattle slaughtered. If the cut weight produces almost uniform weight, then the carcass percentage will produce the same.

The chest is the place for the most desposition of meat and protein from other parts of the body. In addition, breast contains a large amount of meat and a small amount of fat (Primasanti, Mahfudz and Sarengat, 2014). The results of the percentage of breast of hybrid ducks presented in Table 3 indicate that the breast percentage has no significant effect (T>0.05). According to Primasanti, et al., (2014), the results of the study did not have a different effect because the protein and energy content in the feed given to each treatment were almost the same. The high or low percentage of breast is generally influenced by the high or low percentage of carcass. Daud, Mulyadi and Fuadi, (2016) stated that breast weight decreases faster than carcass, which means that the lower the carcass weight, the lower the percentage of breasts. This is in line with the percentage of hybrid duck carcasses which showed that P2 treatment showed the highest average yield and P4 treatment showed the lowest average yield.

The use of PKM in feed had a very significant effect (T<0.01) on the percentage of lower thighs. This is thought to be due to the thigh muscles affecting the movement activities. According to the opinion of NS Nita, E. Dihansih and Anggraeni (2015) that the function of the thigh muscles of ducks plays a bigger role in carrying out movement activities compared to other parts of the body, so it can be assumed that the feed substances from all the treatment rations consumed are used for the growth of all parts. therefore the percentage of thighs from all treatments was relatively the same as the percentage of carcass. Treatment T2 (11.81 ± 1.51%) by giving 10% corn + 10% PKM in feed is the average of the smallest lower thigh percentage, while T3 treatment (19.03 ± 1.32%) by giving 5% corn + 15% PKM in feed is the largest average of the percentage of hybrid ducks' hamstrings. This is thought to be due to genetic factors of the ducks in the P3 treatment which had a large percentage of thighs, so that the P3 treatment produced the largest average thigh percentage. Said that the thigh is a part of a duck's body that grows first compared to other body parts. When other parts experience high and fast growth, the thighs experience a slow increase with a decreasing percentage of carcass weight (Putra, et al., 2015).

CONCLUSION

Replacing maize with processed palm kernel meal up to 20% in feed has the same effect on carcass weight, carcass percentage and carcass cut of hybrid ducks.

AKNOWLEDGMENT

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