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# EFFECT OF palm kernel cake - cassava MIXED FERMENTATION PRODUCT USED TOWARD broiler carcass WEIGHT PIECEs

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## Abstract

This study was conducted at Lampung State Polytechnic, which is to assess the influence of fermented palm kernel cake (PKC) - cassava (C) mixed against the percentage of broiler carcass weight pieces. Mixture of palm kernel cake (PKC) - cassava (C) is 60: 40 fermented by *Trichoderma viride* 0.2% dose for 8 days. Research was done using a complete randomized design (CRD) with a treatment rate of fermentation as 0% (T0), 10% (T1), 20% (T2), and 30% (T3) of the total ration with 5 replications.

Animal experiments was as much as 200 bird day old chick (DOC) broilers strain CP-707 produced by PT Charoen Pokphand Jaya Farm. Ration in the form of building blocks; concentrate, corn yellow, and fermentation products are palm kernel cake (60%) - cassava (40%) mix were fermented by *Trichoderma viride* 0.2% for 8 days. Ration treatments arranged with 20-22% protein content with the level of 3000-3200 kcal/kg metabolizable energy. Broilers reared for 5 weeks and were given rations and drinking water ad-libitum. Chickens were given Newcastle disease (ND) vaccine at the 3$^{rd}$ days by eye drops and at the 21 day of life through drinking water.

The variables measured were percentage of carcass weight pieces are pieces of carcass weight ratio (carcass the front, the back of the carcass, breast, wings, thighs and back) with carcass weight multiplied by 100%.

Based on the results of this study concluded that the percentage of carcass weight piece front and rear carcass highest levels of use indicated in the treatment of fermentation products as much as 10%, namely the percentage of the front of the carcass (35.95%), the back of the carcass (37.71%), chest (20.48% ), wing (15.47%), thigh (19.96%), and back (17.75%).

***Keywords:*** palm kernel cake, cassava, fermentation, pieces of carcass, broilers.

## Introduction

Farm business success is determined by several factors such as seed, feed and management. Feed is an important factor because it has a huge impact in terms of production and costs. Feed is the largest cost component in the maintenance of broilers which is about 60% -70% of the total cost of production. Broiler feed requirements for Indonesia is very high, according to the high broiler production. Some materials such as corn, soybean meal and fish meal are still imported. The government has encouraged animal feed mill that still use a mix of imported feed ingredients, and local feed ingredients locally to use to reduce the price of feed in the country. In connection with this, the search for alternative feed ingredients by utilizing agro-industrial byproducts and waste needs to be done (Priabudiman and Sukaryana, 2010).

Utilization of feed ingredients making up a ration that does not compete with human needs, which still have adequate nutritional value and, in terms of low cost economy so as to reduce the cost of rations. Alternative feedstuffs considerable potential for scale feed mills including palm kernel cake and cassava.

Palm kernel cake is a waste of the palm oil mills is quite abundant availability and do not compete with human needs and not fully utilized as broiler feed ingredients. Feed ingredients derived from agro-industrial waste are usually very limited use for broiler rations, because these materials generally contain high crude fiber. Cassava is produced from cassava that is potentially used as feed ingredients that do not compete with human needs.

Utilization of palm kernel cake as broiler feed is still not optimal due to some problems such as low palatability, deficiency in amino acids e.g methionin amino acids, tryptophan, cystine and minerals Zn, Se. Besides the digestibility of crude fiber is quite high and it ranged from 12.47 to 16.09% and approximately 27% of palm kernel cake composed of hemicellulose polysaccharides mannan fraction which is the largest (Jaelani, 2007), is to consider its use as chicken feed ingredients meat because it is difficult to digest. The use of cassava as a feed material is faced with problems of low crude protein content of about 3.34% (Despal *et al*, 2001), but containing high glucose is 19 to 51.6% (Asngad and Suparti, 2009). Need an attempt to overcome the weaknesses and exploit the advantages of both materials through the process of fermentation.

Fermentation is one of the alternative methods could be used to improve the nutritional value of a agro-waste. Fermentation can also change the feed materials that are difficult to digest into an easy to digest, resulting in a distinctive aroma and flavor, and can eliminate the toxins from the original material. Fermentation with fungi *Trichoderma viride* has been widely used on a variety of substrates that contain particularly high crude fiber such as palm kernel cake. These fungi live on suitable substrates containing glucose as cassava. Weakness of palm kernel cake that does not contain glucose will be helped by cassava containing glucose, so that the substrate mixture of palm kernel cake and fermented cassava would be optimal.

The presence of glucose in the substrate used by fungi as a source of energy for growth and development. Growth and spur the development of a good mold fungi produce cellulase enzymes in large quantities that can be used to

remodel and lower crude fiber. Cellulase is an enzyme that can break glycosidic bond β (1, 4) on cellulose. The high population of fungi can increase the crude protein content of the substrate due to mold a single cell protein (Sukaryana *et al*, 2013). If palm kernel cake is mixed with cassava is expected to be a suitable medium for the fungus to the fermentation process by increasing the value of good nutrition.

Broilers have higher life skills and able to turn feed into meat efficiently. Carcasses are part of the body is crucial in the production of broilers. Carcasses are the body parts after the cut off and discarded chicken feathers, abdominal fat, organs, legs, head, neck and blood, except the lungs and kidneys. Factors affecting carcass weight was genetic and environmental factors. Environmental factors can be divided into two categories: physiological and nutritional content of food in the diet. Carcass weight also influenced by the weight of the cut chicken. Carcass percentage is calculated by dividing carcass weight by live weight multiplied by 100% (Priabudiman and Sukaryana, 2010).

Chicken carcass consists of muscle tissue, adipose tissue or fat, and bone. In general, the main factors that determine the variation of meat are the size, sex, body conformation, and genetic chicken. Carcasses can be divided into two parts, namely the front of the carcass and the carcass back. Part carcass pieces commonly marketed commercially consisting of thigh, chest, back and wings. The average percentage of weight on the chest Resnawati (2004) study, was from 24.13 to 26.79%, the average weight of the wings from 24.13 to 26.79%, the average weight of the back between 23.20 to 23.95%, and the average weight of the thigh between 29.78 to 30.82%. Weight percentage will increase with increasing chest body weight and carcass weight. In addition to the influence of the feed, the development of breast meat are also influenced by gender, age, genetic factors, and strains of chickens (Rezaei *et al*., 2004). Furthermore; Shanin and Abd El Azeem (2005) suggested that the carcass chickens fed with a high content of fiber, both with high or low protein content of carcass weight in proportion with higher bone than chickens fed with a low content of fiber, both with content high or low protein. Our research is directed to determine how much influence various levels of use of palm kernel cake mix - dried cassava fermentation products on the percentage of broiler carcass weight pieces.

## Materials and Methods

Animal experiments are as much as 200 bird DOC broiler strain CP-707 t produced by PT Charoen Pokphand Jaya Farm. Used ration was composed of concentrate, corn yellow, and fermentation products are palm kernel cake (60%) - cassava (40%) mix were fermented by *Trichoderma viride* 0.2% dose for 8 days. Ration treatments arranged with 20-22% protein content with the level of 3000-3200kcal/kg metabolizable energy. Broiler ration composition studies for 5 weeks are presented in table (1) and the nutritional content of concentrate, yellow corn and fermentation products are presented in table (2).

Table (1): Broiler ration composition studies for 5 weeks.

| Ration | Treatment Rate | | | |
|---|---|---|---|---|
| | T0 | T1 | T2 | T3 |
| | ---------- % ---------- | | | |
| Concentrate | 40 | 40 | 40 | 40 |
| Yellow corn | 60 | 50 | 40 | 30 |
| Fermentation products | 0 | 10 | 20 | 30 |

Table (2): Nutrient content of concentrate, yellow corn and fermentation products.

| Nutrient content | | Concentrate | Yellow corn | Fermentation products |
|---|---|---|---|---|
| Crude Kasar | (%) | 32.00 | 9.50 | 11.81 |
| Crude Fiber | (%) | 6.00 | 2.50 | 4.41 |
| Crude Fat | (%) | 5.00 | 2.50 | 4.00 |
| Metabolizable energy | (kkal/kg) | 2700.00 | 3250.00 | 3807.49 |
| Ca | (%) | 2.10 | 0.10 | 2.30 |
| P | (%) | 1.10 | 0.13 | 0.90 |

Research using completely randomized design (CRD) with treatment was adopted, as the level of use of fermented 0 (T0), 10 (T1), 20 (T2), and 30% (T3) of the total feed. DOC at the research level at which the fermentation is maintained in a sealed enclosure litter as needed with size 1x1, 5 m2 for each plot as many as 20 plots. DOC initially weighed and randomly divided into 20 equal groups, then randomly divided into 4 treatments with 5 replicates feed (10 bird each). Chickens reared for 5 weeks and were given rations and drink ad-libitum. ND vaccine given at 3 days old chickens by eye drops and by the age of 3 weeks through drinking water. At the end of the fifth week was cutting chicken.

Variables measured were as follows: 1) The percentage is calculated by dividing the weight of carcass live weight multiplied by 100%, 2) Percentage of carcass weight piece is pieces of carcass weight (carcass front, rear carcass, breast meat, wings, back, and thigh) divided carcass weight multiplied by 100% (Priabudiman and Sukaryana, 2010). The data were tabulated and analyzed using a variety of completely randomized design (Steel and Torrie, 2010). To determine the significance of between treatments was followed by Duncan's Multiple Range Test.

## Results and Discussion

Broiler carcasses are beef cuts with bone outcomes after separated from the head to the nape of the neck border, knees and feet to limit the contents of the abdominal cavity. The obtain expressed as carcass percentage of each treatment

are presented in Table (3). Carcass percentage is calculated by dividing carcass weight by live weight multiplied by 100%.

Table (3): Mean Live and carcass weights as well as and the percentage of carcass weight of each treatment.

| Treatment | Live | Carcass weights | Percentage of carcass weight |
|---|---|---|---|
| | ---------- g ---------- | | --- % --- |
| T0 | 1303.33 | 868.33 | 66.62 [b] |
| T1 | 1342.67 | 989.00 | 73.66 [a] |
| T2 | 1302.67 | 752.00 | 57.73 [c] |
| T3 | 1272.67 | 749.00 | 58.85 [c] |

Means in each column with different superscripts are significantly different (p<0.05)

Data in In Table 3 clearly pointed out that the real effect of feed treatment (P<0.05) the highest percentage of carcass is shown in T1 (73.66%) and the lowest at T2 (57.73%) treatment. Duncan's multiple range test results showed that the treatment significantly different from treatment T1 T0, T2, and T3. A significantly differentness from T0, T2 and T3 treatments were recorded, while those of treatments T2 and T3 were not significant. Broiler carcass weight are influenced by genetic factors, gender, physiology, age, body weight and nutritional diet. Broiler excellence will be formed when supported by the environment, because of a genetic trait alone does not guarantee excellence can be seen immediately. It can support the superiority of broilers are food, maintenance, and environmental temperature. Environmental temperature also plays an important role. When the ambient temperature is too high will make a lot of broilers prefer to drink rather than eat, so that nutritional needs are not met well and affect the growth of broilers (Priabudiman and Sukaryana, 2010).

Broiler carcass pieces in this study were divided into the front of the carcass pieces of breast meat and wings, pieces of the carcass back thighs and back. Effect of fermentation products from each of the treatment of the average percentage of the front of the carcass pieces (Table 4) and the average percentage of carcass cuts back (Table 5).

Table (4): The percentage of the front of the carcass, chest, and wings of each treatment

| Treatment | the front of the carcass | chest | wing |
|---|---|---|---|
| | ---------- % ---------- | | |
| T0 | 31.82 [b] | 17.26 [b] | 14.56 [b] |
| T1 | 35.95 [a] | 20.48 [a] | 15.47 [a] |
| T2 | 26.80 [c] | 14.62 [c] | 12.18 [c] |
| T3 | 26.92 [c] | 14.95 [c] | 11.97 [c] |

Means in each column with different superscripts are significantly different (p<0.05)

Table (5): The percentage of the back of the carcass, thighs, and back of each treatment

| Treatment | the back of the carcass | thighs | back |
|---|---|---|---|
| | ---------- % ---------- | | |
| T0 | 34.80 [b] | 18.82 [b] | 15.98 [b] |
| T1 | 37.71 [a] | 19.96 [a] | 17.75 [a] |
| T2 | 30.93 [c] | 15.96 [c] | 14.97 [c] |
| T3 | 31.93 [c] | 16.43 [c] | 15.50 [c] |

Means in each column with different superscripts are significantly different (p<0.05)

In Table 4 it can be seen that the effect of feed treatment (P<0.05) on the percentage of carcass pieces as shown on the front of the highest is of T1 treatment (35.95%) and the lowest (26.80%) in T2 treatment. Duncan's multiple range test results showed that the treatment significantly different from treatment T1 T0, T2, and T3. Significantly different from T0 T2 and T3 treatments is seen while T2 and T3 treatments were not significantly different. Similarly, the percentage of carcass pieces chest and wings.

In Table 5 it can be seen that the real effect of feed treatment (P<0.05) the percentage of carcass cuts back. Percentage of carcass pieces shown on the back of the highest T1 treatment is 37.71% and the lowest at T2 treatment, which was 30.93%. Duncan's multiple range test results showed that the treatment significantly different from treatment T1, T0, T2, and T3. Significantly different from T0, T2 and T3 treatments, while T2 and T3 treatments were not significantly different. Similarly, the percentage of carcass cuts the thighs and back. While the rear carcass consists of a lot more bone than flesh. Percentage of carcass cuts the front lower than the rear carcass percentage.

Level of use in food fermentation gives a significantly different effect (P<0.05) the percentage of carcass pieces front and rear. This is presumably because the content of live weight and carcass weight of chicken on each treatment resulting in a significantly different percentage cuts carcass weight (carcass front, back, breast meat, wings, thighs, and back) are also significantly different. Percentage of carcass weight the front of this piece was much lower than that reported by Priabudiman and Sukaryana (2010) where the average percentage of carcass weight of the front piece in broilers aged 37 days was 53.6%. The low percentage of carcass weight discount compared to the front of the allegedly

literature apart from the technical aspects of the way and limit cuts of chicken body parts are also caused by differences in feed used. The average percentage of weight on the chest in this study ranged from 14.62 to 20.48%. Used as benchmarks for assessing the magnitude of chest bone quality because most of the muscles which is a major component of the carcass are around the chest. Development of breast meat is mainly influenced by the protein content in the feed rather than energy. Priabudiman and Sukaryana (2010) reported that there were no real differences in the characteristics and the percentage of pieces of carcass weight in chickens fed with an energy content between 3100-3400 kcal / kg.

Resnawati (2004) stated that the percentage of the weight of the chest will increase with increasing body weight and carcass weight. In addition to the influence of the feed, the development of breast meat also influenced by gender, age, genetic factors, and strains of chickens (Rezaei et al., 2004). The average percentage weight of the wing in this research is from 11.97 to 15.47%. The average percentage weight of the wing in this study with the proposed higher Resnawati (2004), was from 11.64 to 12.41%. This is probably due to the energy and protein content in each treatment. Thigh is one part commercial carcass pieces. In this study, the percentage of thigh weights were measured in their entirety without separated into upper and lower thighs. The average percentage weight of thigh in this study between 15.96 to 19.96%. According Resnawati (2004) thigh is part of carcass meat contains a lot of that development is heavily influenced by the protein content of the feed. Furthermore; Shanin and Abd El Azeem (2005) suggested that the carcass chickens fed with a high content of fiber, both with high or low protein content of carcass weight in proportion with higher bone than chickens fed with a low content of fiber, both with content high or low protein. Besides the real difference is also due to body weight and carcass weight were significantly different as well. The average percentage of weight on the back of this study ranged from 14.97 to 17.75%. Broiler backs almost entirely a bone whose development is more influenced by the content of Ca in the diet rather than protein or energy. Resnawati (2004) suggested that broiler backs contain more bone tissue, so that the mineral content in the feed is more influential on the back compared to the weight of protein. Instead Shanin and Abd El Azeem (2005) suggested that the feed does not affect bone weight distribution. Suspected that the bone weight distribution independent of the feed.

## Conclusions

Based on the results of this study concluded that the percentage of carcass weight piece front and rear carcass highest levels of use indicated in the treatment of fermentation products as much as 10%, i. e the percentage of the front of the carcass (35.95%), the back of the carcass (37.71%), chest (20:48% ), wing (15:47%), thigh (19.96%), and back (17.75%).

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