The Performance and Feed Cost per Gain of Rabbit Fed Copra Meal Replacement with Fermented of Palm Oil Waste

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Abstract: The aim of this research was to Determine the effect of substitution of copra meal (CM) with fermented palm oil waste (FPW) in the ration on the performance and feed cost per gain of local male rabbit. This research have been teaching farm Faculty of Agriculture, University Tanjongpura and Animal Nutrition Laboratory, Department of Animal Husbandry and Veterinery West Kalimantan Government. It executed during 8 weeks, and used 16 rabbits. This research used Completely Randomized Design one-way classification with four treatments (P0, P1, P2, P3), and four replications and each contains one local male rabbit. The treatment given is in the farm of substitution CM with FPW, namely that: P0 = 60% Field Grass (FG) + 40% concentrate (15% CM + 0% FPW); P1 = 60% FG + 40% concentrate (10% CM + 5% FPW); P2 = 60% FG + 40% concentrate (5% CM + 10% FPW) and P3 = 60% FG + 40% concentrate (0% CM + 15% FPW). Taken Parameters were average daily gain, feed consumption, feed convertion and feed cost per gain. The result of this research were, average daily gain of 6.87 to 7.31 g / day, feed consumption from 36.64 to 42.36 g / day, feed conversion from 5.42 to 5.79, while at 15% from total ration of substitution (P3), it could depressed feed cost per gain value on Rp 7909, 90. The result of this research indicate that the substitution of copra meal with FS up to 100% (15% from the total ration) have no significant effect on the performance of local male rabbit, but at 15% from total ration of substitution (P3) it can depress feed cost per gain value.

1 INTRODUCTION

The rabbit is one of the animals that became a trend favorite food of Indonesian society after a avian influenza poultry industry. Rabbits produce meat that has a value of quality animal proteins that can be used as an alternative in the nutrition community. Increase animal protein needs in the community, this is in line with the increase in population. Increased need need to look for solutions through increased livestock production, diversification of products and the search for new sources of animal protein.

Rabbits are one of the essential commodities that can produce high-quality meat with a high content of animal protein as well. Rabbit meat has a protein content of ± 20%, it feels good, it is not forbidden religion, and low fat content. Moreover, it can be developed in the form of large-scale commercial enterprise. Cholesterol content is also low at 1.39 mg / kg (Sudaryanto, 2007).

Rabbits also has some other advantages that do not require large areas in maintenance, can take advantage of the feed material of various types of forage, kitchen waste and byproducts of agricultural products and byproducts (leather / fur, head, feet, tail and their droppings) can be utilized for various purposes, production costs are relatively inexpensive, do not require large amounts of capital, maintenance is easy and can give birth to a child 4-6 times annually and produce any birth children 4-12 (Damron, 2006).

According Gidenne et al (2010), rabbit including livestock species pseudoruminant, are herbivores that can not properly digest fiber. Fermentation occurs only in the cecum which is 50% of the capacity of the digestive tract. Still according Sarwono (2002) despite having cecum, a large rabbits are not able to digest the organic matter and crude fiber of total forage that can be digested by ruminants pure. The digestibility of forage rabbits consume only 10%.

Commercial feed for rabbits on the market are relatively expensive so we need an alternative to looking for food that is available continuously, cheap, easy to obtain, possess enough nutritional value and do not damage the health of livestock. Copra meal as one of the authors concentrate the feed material source of protein in the ration. Has some drawbacks

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include the limited availability in the market and the price is relatively expensive. One alternative feed to lower the price of commercial feed is fermentation of the sludge. Utilization of waste as animal feed is also one way of solving a problem in reducing the environmental pollution caused by industrial waste. Improved digestibility rabbit will optimize feeding so that the feed given according to the needs and nutrients contained in them will be digested and utilized optimally.

Palm Oil waste is a solution of the waste generated during the process of exploitation and extraction of oil consisting of 4-5% solids, 0.5 - 1% residual oil and most of the water is equal to 94%. For every ton of palm oil produced results approximately 2-3 tons of oil sludge. Nutrient content of oil sludge is: 12.17% crude protein, crude fiber 21.15%, fat 19.96%, 11.42% cellulose, hemicellulose and lignin 18.77% 36.40% (Lekito, 2002).

Efforts to reduce the content of crude fiber, especially lignin and cellulose is by utilizing microbial activity through a fermentation process. Palm Oil waste (Solid) is one of a number of processing waste palm oil processing plant. According to Hidayat,et al.,(2007) Solid constitute sufficient resources potential for livestock feed, inexpensive, available in large quantities and is relatively available all the time. This study aimed to determine the effect of the use fermentation of palm oil waste to replace copra meal in the ration to the digestibility and production performance of rabbits.

2 MATERIAL AND METHODS

2.1 Material Research

Research fermentation palm oil waste utilization replace copra meal in rations using local rabbits as much as 16 tails are 2 months old with an average weight of 630 g. Tools used include battery cages measuring 50x30x30 cm3.Material feed used as a constituent of the ration experimental form field grass, concentrate using fermentation of palm oil waste, corn, copra meal , rice bran, fish flour, tapioca flour and calcite.

2.2 Methods

Twenty rabbits were divided into 4 treatments, 4 replicates and each treatment will get 4 treatment diets in random order, the fourth treatment the ration is: P0 = 60% FG + 40% concentrate (15% copra meal + 0% FPW);P1 = 60% FG + 40% concentrate (10% copra meal + 5% FPW);P2 = 60% FG + 40% concentrate (5% copra meal + 10% FPW); P3 = 60% FG + 40% concentrate (0% copra meal + 15% FPW). Rabbits are kept in individual cages for 3 months. Feed adaptation period (preliminary)the first two weeks of this study and in the third week to week twelve observation. Feeding 2.5-3% of body weight twice a day in the morning at 07:00 to 8:00 pm and in the afternoon at 16:00 to 17:00 pm. Feed given by way between the concentrate is mixed with the field grass, while the drinking water provided ad libitum. Feed first weighed before being given, and the rest of the feed that is not consumed also weighed daily. Weighing rabbit body weight every month.

The parameters in the study observed were feed consumption, body weight gain, feed intake, feed conversion and feed cost per gain. Data were analyzed with analysis of variance (ANOVA) and if there is a difference followed by Duncan test (Mattjik and Sumertajaya, 2002).

3 RESULT AND DISCUSSION

3.1 Body Weight Added

Anova analysis results in showed that the treatment was not significantly different with body weight gain (P> 0.05). This is because the ration at each treatment has a protein content that is compliant quality requirements stipulated in the NRC concentrates for rabbits growth of at least 12-16% content of PK resulting in body weight gain were not significantly different (NRC, 1994).

Mean weight gain rabbit value obtained during the research for each treatment P0, P1, P2 and P3, respectively, are 7.01; 5.99; 6.58; and 7.01; g / head /day. Effect is not noticeable to the weight gain is due to the replacement of copra meal with mud palm fermentation in the ration will cause the ration has an energy content and protein are relatively the same, as stated by McNitt at el (2013) that the ration of the energy that is relatively the same causing no difference in consumption and therefore contributes to weight gain.

BK needs and basic living needs are increasing with increasing live weight of cattle (Gidenne, 2010) so that the remaining amounts of nutrients for growth relatively similar study in rabbits. The average weight gain local male rabbits in this study are shown in Table 1 below:

Table 1: Mean Preliminary Results Weight, Final Weight, Average Daily, Average Daily Gain Local Rabbits Treatment of Feed Replacement Males with Copra Meal with Fermentation of Palm Oil Waste

Treatment	Weight early (kg)	Final Weight (g)	Average Daily (g / head)	Average Daily Gain (g / head / day)
P1	616	1271.2	655.2	7.28
P2	697	1299.1	602.1	6.69
P3	609	1227.3	618.3	6.87
P4	601	1258.9	657.9	7.31

Description:
P0 = field grass and feed concentrates containing copra meal 15% and fermentation of palm oil waste 0%
P1 = field grass and feed concentrates containing copra meal 10 % and fermentation of palm oil waste 5%
P2 = field grass and feed concentrates containing copra meal 5% and fermentation of palm oil waste 10%
P3 = field grass and feed concentrates containing copra meal 0% and fermentation of palm oil waste 15%

3.2 Feed Consumption

The average of consumption obtained during the research for each treatment P0 , P1, P2 and P3, respectively, are 40.11; 36.64; 37.21; and 42.36 g/head/day. ANOVA results showed that no significant feed intake. This means the replacement of copra meal with SF to 15% does not affect the local male rabbit feed intake.

No real effect due to the replacement of copra meal with fermentation of Palm Oil Waste not increase the palatability of the feed so the feed treatment have the same relative palatability. This is expected because the physical oil sludge fermentation that is used has a smooth texture and not so flavorful that after mixing with other concentrate material will be fused with the smell and texture similar to feed without oil sludge fermentation (control diet). Also in terms of the quality of oil sludge fermentation TDN has a lower content of the copra meal that is equal to 78.7%. But protein is very low. This resulted in LSF protein still under copra meal protein. Due to these reasons, the feed palm oil waste treatment using ferementation will provide the same level of palatability of feed controls. One of the factors affecting the level of feed intake is palatability. De Blas (2010) says that the palatability of the feed is reflected by the organoleptic such as appearance, odor, flavor, and texture.

The range of the percentage of dry matter consumption is between 2.2 to 2.4% of body weight. This value is still within the standard range of dry matter intake rabbit that is between 2.2% to 4% of their body weight (NRC, 1994). The level of feed intake is influenced by the quality of the ration that can be seen from the content of nutrients. According Tazzoli (2009), that the level of energy content in the feed effect on the extent of feed consumption. The content of total digestible nutrients (TDN) of oil sludge fermentation by 55.11% lower than the copra meal that is equal to 78.7%, but the energy content of the ration fourth treatment is still in the same relative range. This is what causes the same level of feed intake.

In addition the level of consumption is also influenced by a variety of factors, including that of the animal itself (weight, sex, age, genetic factors, and the type of nation rabbit), food provided, and the environment in which the animals are kept (McDonal etal.2010). Factors cage livestock and environmental conditions at the time the study was relatively similar.

Table 2: Mean Research of Average Daily Gain, Feed Consumption, Feed Conversion Local Rabbits Treatment of Feed Replacement Males with Copra Meal with Fermentation of Palm Oil Waste

Treatment	Average Daily Gain (g/h/d)	Feed Consumption (g/h/d)	Feed Conversion
P0	7.28± 0.91	40.11±to 0.88	5.51± 0.08
P1	6.69± 0.62	36.64± 0.52	5.48± 0.06
P2	6 87± 1.73	37.21± 0.81	5.42± 0.03
P3	7.31± 1.01	42.36± 0.34	5.79± 0.05

Description:
P0 = field grass and feed concentrates containing copra meal 15% and fermentation of palm oil waste 0%
P1 = field grass and feed concentrates containing copra meal 10% and fermentation of palm oil waste 5%

P2 = field grass and feed concentrates containing copra meal 5% and fermentation of palm oil waste 10%
P3 = field grass and feed concentrates containing copra meal 0% and fermentation of palm oil waste 15%

3.3 Feed Conversion

Based on ANOVA analysis showed the study treatment outcomes were not significantly different (P> 0.05) on conv ersi feed (Table 2). Feed conversion value in this study were treated P0 of 5.51; P1 5.46; P2 and P3 of 5.42 by 5.79. Feed conversion was lowest for the treatment P3 (field grass and feed concentrates containing 35% fermented palm oil sludge and cornmeal%) of 0.15 means that every 1 kilogram of ration produce daily body weight gain of 0.15 kg. The results showed that the average value of rabbit feed conversion during the study ranged from 5.42 to 5.79. These results are consistent with research infallible that male rabbit feed conversion by 5.01 -5.67 weaning.

Feed conversion value in the study using the oil mud is also the same fermentation studies using sweet potato pellets ranging from 5.1 to 9.9 (Sunarwati, 2001). Ensminger (1991) said the rabbit feed conversion value between 2.4 to 4.0 by using good management and high-quality ration, high conversion in the fourth of this treatment due to the high crude fiber fermentation lumpir oil contained in the feed treatment. Oil sludge fermentation of a substance containing lignin complex of plant parts such as oil palm bunches are very difficult to digest.

3.4 Feed Cost per Gain

Rationtreatment using oil sludge fermentation in livestock local male rabbit does not affect *Feed Cost per*Gain. *feed Cost per Gain* is divided by the cost of feed conversion ration. The results of the economic analysis of each treatment feed containing oil sludge fermentation as a substitute for copra meal in the concentrate at a local rabbit in detail is shown in Table 3. The total cost of the ration is P0 treatment Rp. 1,785 / kg, treatment P1 Rp. 1,645 / kg, treatment P2 Rp. 1,505 / kg and treatment P3 Rp. 1,365 / kg, the lowest for the treatment P3 and the highest at P0 treatment.calculation results *Feed Cost per gain* from the lowest to the highest in treatment P0 Rp. 9838.66 per cow /day,treatment P1 Rp. 9009.39 per cow / day, treatment P2 Rp. 8151.54 per cow / day, and the treatment P3 Rp. 7909.90 per cow / day.

Table 3: Calculation *Feed Cost Gain Per* Local Rabbits Treatment of Feed Males with Replacement Copra Meal with Fermentation of Palm Oil Waste

Parameters	Treatment			
	P0	P1	P2	P3
Feed Conversion	5.51	5.48	5.42	5.79
Cost of making ration (IDR / kg)	1,785	1,645	1,505	1,365
Feed cost per Gain (IDR / head / day)	9838.66	9009.39	8151.54	7909.90

Description:
P0 = field grass and feed concentrates containing copra meal 15% and fermentation of palm oil waste 0%
P1 = field grass and feed concentrates containing copra meal 10% and fermentation of palm oil waste 5%
P2 = field grass and feed concentrates containing meal copra 5% and fermentation of palm oil waste 10%
P3 = field grass and feed concentrates containing copra meal 0% and sludge oil fermentation of palm oil waste 15%

Average of *feed cost per gain* during the study for each treatment P0, P1, P2 and P3 respectively namely Rp 9834.66; IDR 9009.39; IDR 8151.54 and IDR 7909.90. Table 3 shows that the cost of feed at P2 treatment is the most efficient because the same consumption tend to result in weight gain higher than other treatments, resulting in lower feed conversion value. Due to the low feed conversion values obtained when the same consumption produces a high body weight gain (Chen & Li, 2008), so as to reduce the cost of feed.

Damron (2006) to get the *feed cost per gain is* lower then the selection of feed ingredients to prepare the ration should be as cheap as possible and provided continuously or can also use agricultural waste which is not competitive. *Feed cost* per *gain is* considered good when the rate was as low as possible, which means economically efficient use of feed.

4 CONCLUSIONS

Based on the results of ANOVA and discussion on this research can be concluded that the use of sludge

oil fermentation in the diet in the treatment of P0 (0%), P1 (5%), P2 (10%) and P3 (15%) did not significantly affect the performance of local rabbit male.

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