



Utilization of Kepok Banana Peels Fermentation on Rabbits Pellet Feed

I.Santoso, T. H. Wahyuni, G. A. W. Siregar*

Animal Production Program Study, Faculty of Agriculture, Universitas Sumatra Utara, Padang Bulan, Medan 20155

**corresponding author : trihestiwahyuni@yahoo.com*

Abstract :The need for rabbit pellets is increasing along with the increasing maintenance of rabbits in North Sumatra. This study aims to determine the feed consumption (FC), average daily gain (ADG), and feed conversion ratio (FCR), of male local rabbits given fermented kepok banana peel (KBP) pellets. The fermentation used in this study was using local microorganisms based on KBP. This research was conducted by Dr. Hamza No. 5 North Sumatra Province from October 2020 to December 2020. The research design was used a randomized block design (RBD) with 3 treatments, 3 groups and each group consisted of 3 rabbits so that 27 male local rabbits were obtained. The treatments were P0 = 40% KBP without fermentation in pellets, P1 = 40% fermented KBP in pellets and P2 = 60% fermented KBP in pellets. Determination of groups based on body weight with the following groupings: K1: 418 g - 458 g, K2: 459 g - 499 g, and K3: 500 g - 540 g. The results of P0, P1 and P2 showed that the value of FC (g / head / day) were 83.76; 84.58; and 86.83 respectively. The ADG value (g / head / day) were 11.47; 12.79; and 15.01 respectively. The FCR value were 7.45; 6.78; and 5.93 respectively. The conclusion shows that the utilization of fermented KBP up to a level of 60% in the pellets is more efficient to use to increase Feed Consumption, Average Daily Gain, Income Over Feed Cost and reduce Feed Conversion Ratio of male local rabbits.

Keywords: kepok banana peels, local microorganisms, pellets, performance, rabbits

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1. Introduction

Banana peel is one type of agricultural waste that has the potential to be used as animal feed. KBP is a significant amount of agricultural waste but has not been used, it is only disposed of as organic waste. KBP have a profitable selling value when used as raw material for animal feed. The nutritional content of banana peels is crude protein (PK) 6,31%, crude fat (LK) 8,89%, crude fiber (SK) 11,57% and dry matter (BK) 89,75% [1].

Banana peels have a tannin content of 0,042%. Tannins are active ingredients that are bitter in nature. One of the ways to reduce the tannin content is fermentation. With fermentation, the

nutritional quality of feed ingredients will increase. Various kinds of processing are carried out on feed ingredients with the aim of increasing nutritional content and reducing anti-nutritional substances, such as physical, chemical and biological processing/fermentation. The fermentase process requires a starter such as microbes that will be grown in the substrate. The starter is a microbial population in number and physiological conditions that are ready to be inoculated on the fermentation medium. Fermentase is a chemical change process in an organic substance through the activity of enzymes produced by microorganisms [2].

KBP fermented with MOL will increase the nutritional content of the KBP. However, for animal feed, the nutritional content is still low, it is necessary to make pellets to complete the nutritional content needed by livestock. Feed that has a balanced nutritional content can be formed into pellets, so that livestock do not have the opportunity to choose feed that is given in the form of pellets [3]. Pellet-shaped feed will improve performance and animal feed conversion when compared to mash-shaped feed. Ration in pellets makes it easier for livestock to eat their feed, increases the availability of nutrients in the feed, makes handling easier, thereby reducing production costs and reducing shrinkage.

In Indonesia, many local rabbits are known, namely the Javanese rabbit (*Lepus nigricollis*) and the Sumatran rabbit (*Nesolagus nescheri* Schalagel). Local rabbits have the advantage of being very adaptable to the environment and resistant to disease, besides that, farmed rabbits are easy to care for and the price of seeds is relatively cheap, therefore this type of rabbit is suitable for life in Indonesia and is very easy to breed. [4]

2. Research Methods

2.1. Tools and Materials

The tools used are 27 units of cages and their equipment, 27 units of feed, drinking places, feed scales for weighing the feed given and the rest of the feed, carcass scales for weighing carcasses, body weight scales with each 5 kg capacity and 1 g sensitivity. Grinder to refine feed ingredients, pellet machine to form pellets, cage cleaning tools, thermometer to determine cage temperature, knives for chopping banana peels, plastic sheeting for mixing and drying feed ingredients, silos can be in the form of plastic barrels, ovens for drying feed ingredients and writing tool for writing data during research.

The materials used were 27 male local rabbits. The fermentation treatment consisted of KBP, rice bran, molasses and molasses. The treatment pellets consisted of fermented and unfermented kepok banana peels, rice bran, odot grass, fish meal, tapioca flour, palm kernel meal, soybean meal, onggok, premix, and molasses. Vitamin B complex, drinking water is given ad libitum, and rodalon for disinfectants.

2.2. Method

The research method used was experimental using a randomized block design (RBD) consisting of 3 treatments of 3 groups and each group consisting of 3 heads. The treatments given as follows:

P0: Ration with 40% kepok banana peel in the form of pellets

P1: Ration with 40% fermented kepok banana peels in the form of pellets

P2: Rations with 60% fermented kepok banana peels in the form of pellets

2.3. Observed Parameters

1. Feed Consumption

Feed consumption is calculated every day and night (24 hours). Data on feed consumption is obtained by weighing the feed given in the morning and then subtracting it from weighing the remaining feed which is done the following morning. Feed consumption can be formulated as follows:

$$\text{Feed consumption} = \text{feed given} - \text{leftover feed}$$

2. Average Daily Gain

Body weight gain can be calculated by dividing the difference in body weight by the number of days of observed body weight growth, which is calculated once a week, expressed in grams per head per day. Daily weight gain is formulated as follows:

$$\text{ADG} = \frac{\text{Final weight (g / head)} - \text{Initial weight (g / head)}}{\text{Maintenance time (days)}}$$

3. FeedConsumptionRatio

The ration conversion is calculated by dividing the amount of feed consumed per head per day by the production of body weight gain per head per day.

The ration conversion can be formulated as follows:

$$FCR = \frac{FC \text{ (g / day)}}{\overline{ADG \text{ (g/hari)}}}$$

2.4. Research Implementation

2.4.1. Preparation of cages and equipment

The cage and all equipment are cleaned and washed, then sprayed with Rodhalon (dose 10 ml / 2.5 liters of water) on the floor and walls of the cage before the maintenance process.

2.4.2. Preparation of the Rabbit

Rabbits used were local male rabbits as many as 27 heads with an average of 479 g.

2.4.3. Rabbit scrambling

The placement of rabbits was carried out in a randomized block system with K1 = 418 g, K2 = 459 g, and K3 = 500 g at a distance of 40 before being put into the cage.

2.4.4. Processing of Fermented KBP

a. Manufacture of Local Microorganisms

1. Prepare a jerry can with a capacity of 5 liters, put in 1.5 kg of chopped banana peels
2. Added 3% rice bran from 1.5 kg of KBP, 1% urea from 1.5 kg of KBP, 1.5% brown sugar from 1.5% of 1.5 kg of KBP, and molasses 1.5% of the 1.5 kg KBP.
3. Add 1.6 liters of coconut water and 1.6 liters of washing water of rice.
4. Stir evenly and put one end of the hose into the jerry can and the other end is put into a bottle filled with water and fermented (30 days).

b. The Fermentation Process of KBP and Making Pellets

1. Prepare polyethylene plastic with a capacity of 1 kg as a fermentation container and the KBPhas been chopped and grinder.
2. Weighed 1 kg of KBP, added 3% fine bran from 1 kg of KBP, 2% molasses from 1 kg of KBP and water. 2% of 1 kg of KBP and 5% of 1 kg of KBP.
3. Put in plastic, tied using a rubber band and fermented for 3 days.

KBP pellet process is as follows: fermentation of KBP flour mixed with ingredients such as rice bran, fish flour, odot grass flour, palm kernel meal, soybean meal, tapioca flour, molasses, oily, and onggok, then stirring until blended then after the possibility can be formed then enter it into the pellet molding machine, after it is finished the pellets are put into an oven with a capacity of 600C until the pellets are dry so that they don't grow mold.

2.4.5. Feeding and Drinking Water

The feed were given ad libitum. Feed were given in the morning at 08.00 WIB and in the afternoon at 16.00 WIB. The remaining feed is weighed in the morning the next day just before the rabbits were fed again to determine the consumption of these animals. Before carrying out the study, given the adaptation time for 2 weeks little by little. Drinking water were given ad libitum.

2.4.6. Administration of Drugs and Vitamins

Before the implementation of the research rabbits were given vitamin B complex and for the next month it was given again every month of maintenance.

2.4.7. Retrieval of Data

The research implementation consisted of two stages, namely the preliminary stage and the data collection stage. The preliminary stage includes the adaptation of rabbits to treated feed and environmental conditions (cage). At the data collection stage, feed is given twice in the morning at 08.00 WIB and in the afternoon at 16.00 WIB. Pellets are given as much as 25% of the rabbit's body weight. Data collection activities were weighing rabbits, carried out once a week, recording feed consumption and weighing the remaining feed for 24 hours.

2.4.8. Data Analysis

The data obtained were analyzed using analysis of variance (ANOVA) and continued with Duncan's Multiple Range Test.

3. Results and Discussion

3.1. Feed Consumption

The effect of treatment on feed consumption of male local rabbits is presented on "Table 1".

Table 1. Feed consumption data for male local rabbits by feeding fermented KBP

Treatments	Groups of body weight			Total	Average
	1	2	3		
P0	83.940	84.589	82.779	251,308	83.769 ^b
P1	83.946	85.464	84.344	254,754	84.584 ^b
P2	87.745	87.261	85.494	260,5	86.833 ^a
Average	85,210	85,771	83,872		

Notes: a, b, the means followed by different superscripts show significant differences ($P < 0.05$)

The best treatment was on P2 (60% fermented KBP). The results of the analysis of variance showed that giving 60% fermented KBP in pellets had a significant effect ($P < 0.05$) on the feed consumption of male local rabbits during the study.

Feed consumption on P0 has no significant effect, this is thought to be due to the high content of crude fiber in unfermented KBP. Feed that contains a lot of crude fiber results in slower passage of feed so that the space in the digestive tract quickly fills up. This results in irregular feed consumption because rabbits become full quickly and tend to reduce their consumption. The lowest feed consumption (P0) results in the lowest body weight compared to P1 and P2 [5].

P2 feed treatment resulted in the highest body weight due to the highest P2 feed consumption. It is very important to pay attention to the balance of energy and protein ration in order to achieve optimal productivity [6].

3.2. Average Daily Gain

The effect of treatment on the Average Daily Gain of male local rabbits is presented on "Table 2".

Table 2. Average Daily Gain of Male Local Rabbits due to consume unfermented and fermented KBP

Treatments	Groups of body weight			Total	Average
	1	2	3		
P0	9.757	12.823	11.837	34,417	11.472 ^b
P1	11.097	12.373	14.907	38,377	12.792 ^b
P2	12.617	14.430	18.003	45,05	15.017 ^a
Average	11,157	13,208	14,915		

The best treatment was on P2 (60% fermented KBP). The results of the analysis of variance showed that the use of fermented KBP in the form of pellets had a significant effect ($P < 0.05$) on average daily gain of male local rabbits. This means that giving 60% fermented KBP in pellets had an effect on average daily gain.

Basically, the factors that influence body weight gain are genetic potential, animal sex, nutrition in feed, disease, presence of feed additives, and environmental factors. Animal body weight is directly proportional to the rate of feed consumption. This means that the consumption of feed will provide an overview of the nutrients obtained by the livestock so that it affects the body weight gain of the livestock [7]. The nutrient content in different rations in the three treatments were one of the reasons for the significantly different average daily gain because the energy and protein intake that entered the body were also different. Protein in animal feed is very important for the formation of body tissues. By increasing the feed protein content can improve the performance of local rabbits. Body weight gain can be affected by high protein, the higher the level of protein contained in the feed, the higher the rabbit's body weight gain. The protein requirement for weaning rabbits was 16%, while in this study the protein consumption was above 16%, namely 16.41, 16.43, and 16.59. Consumption of crude protein when compared to research by [8], the percentage of crude protein consumed by local weaning rabbits is 16.58%, because it uses 100% concentrate feed and there is no addition of grass feed. The final body weight is influenced by the amount of feed consumed and the nutrients absorbed in the rabbit's body. The nutrients that are absorbed more by rabbits will give a higher final body weight, this is because the development of livestock body tissues and fat deposits will be mostly carried out by the body of the livestock.

Apart from consumption, energy and protein factors, it is suspected that there is an influence from crude fiber. The increased crude fiber content in feed ingredients causes the absorption of other

food substances to decrease. The effect of this increased crude fiber resulted in decreased protein absorption, apparently still giving insignificant different results to average daily gain.

3.3.Feed Conversion Rasio

The effect of treatment on the Feed Conversion Ratio of male local rabbits is presented on “Table 3”.

Table 3. Feed Conversion Ratio for Male Local Rabbits

Treatments	Groups of body weight			Total	Average
	1	2	3		
P0	8.772	6.598	7.002	22.372	7.457 ^a
P1	7.566	7.053	5.725	20.344	6.781 ^a
P2	6.976	6.052	4.762	17.790	5.930 ^b
Average	7,771	6,568	5,830		

Note: a, b the mean followed by different superscriptions in the same column shows a very significant difference ($P < 0.01$)

The best treatment was on P2(60% fermented KBP). Based on the results of the analysis of variance, the results were very significant ($P < 0.01$). This means that fermented KBP in pellets have a significant effect on the feed conversion of male local rabbits.

Feed conversion is the amount of feed consumed to increase one kilogram of live weight. According to [9], to determine the level of efficiency of feed use, the measure used is feed conversion. Feed conversion is the amount of feed needed to form weight gain. Meanwhile, feed conversion is the value of the division between the value of feed consumption and the value of body weight gain in the same unit and time unit. The size of the conversion rate is influenced by the size of the feed consumption and the increase in body weight of these rabbits. Thus, based on the research, the effect of the different feed conversion value is very significantly related to the results of the analysis of feed consumption and average daily gain which is significantly different. The smaller the feed conversion value, the less feed is needed to produce the body weight value in the same unit. The lower the feed conversion value, the better the value, or the higher the feed conversion value, the less efficient the rabbit growth will be. Based on the results of the analysis of variance, fermented KBP greatly affect feed conversion and can be used. Feed conversion is used as a measure of production efficiency. The best feed conversion is obtained when the rabbits have a body weight of 1.8-2 kg, that is, the age of 2-3 months. In other studies, it was shown that the feed conversion at 2-3 months ranged from 6.45-10.06[10]. If the feed conversion rate is compared with

the research, the feed conversion rate is between 4.76-8.77, it shows that the conversion rate is still in the same range.

4. Conclusion

Based on the research conducted, it can be seen that the use of 60% fermented KBP in pellets can improve the performance of male local rabbits, increase feed consumption, average daily gain, and reduce feed conversion so that the use of 60% fermented KBP in pellets rabbits to be efficient.

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