

THE MEAT AND BONE RATIO OF MALE RABBITS (*Oryctolagus cuniculus*) GIVEN A RANSUM CONTAINING FERMENTED CATTLE'S RUMEN CONTENT

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Abstract

*This research aimed to determine the effect of ransum containing fermented cattle's rumen content given to male rabbits (*Oryctolagus cuniculus*) on the ratio between their meat and bone. The experimental design of this research was a completely randomized design using 20 male rabbits aged 3-4 months, which were divided into four treatment groups with five repetitions. The four treatments were P0: containing 40% of hay, P1: containing 20% of fermented rumen content, P2: containing 40% of fermented rumen content, and P3: containing 60% of fermented rumen content. Analysis of Variance (ANOVA) was used as the statistical analysis method, followed by the Duncan Multiple Range Test, which was conducted through the Statistical Package for Social Sciences (SPSS). The result of P2 showed that there was a significant difference ($p < 0.05$) between the total meat and bone, but there was no significant difference ($p > 0.05$) in the meat and bone ratio compared to P0. It was concluded that a ransum containing 40% of fermented rumen content could be considered as a part of the rabbit's ransum because it might help improve the total amount of meat and bone. However, the usage of fermented rumen content with the percentages of 20%, 40%, and 60% did not affect the meat and bone ratio significantly.*

Keyword: *fermented rumen content, bone and meat ratio, rabbit.*

INTRODUCTION

Rabbits, as a kind of small animal, are a potential livestock in Indonesia. Supported by good productivity, a rabbit farm might be a great choice for a business. In one reproduction cycle, a rabbit may produce 4-10 liters with 5-6 birth periods. A 4-month-old rabbit has a body weight ranging between 2.0-2.2 kg for a meat rabbit, around 2.5-3.0 kg for a 6-month-old fur rabbit,

and 4-6 kg for a large-sized rabbit (Murtisari, 2010).

Rabbit farming is a very relevant business alternative for farmers who can not afford the maintenance of larger livestock with the need for larger space. In terms of nutrition, rabbits need hay and concentrate feed (Lestari, 2004). Countryside farmers might not find it difficult to

fulfill rabbits' hay needs, unlike urban farmers. That's why a substitute feed source is highly demanded.

Cattle's rumen content is one of the options to substitute hay. Based on Putri *et al.* (2013), the advantage of using fermented rumen content as rabbits' feed is that farmers will not compete with human needs since rumen content is considered a waste.

Cattle's rumen content is the result of the cattle's digestive process, stored in the rumen before it becomes feces. Although often considered as a waste, rumen content is high in nutrients, just like the cattle's feed, since it has not been absorbed (Soepranionondo, 2002).

Cattle's rumen content is categorized as a high fiber feed source in the form of lignocellulose with low digestibility (Adeniji *et al.*, 2015), making it yet ready to be rabbits' feed.

Moningkey *et al.* (2020) stated that to utilize the rumen content, a proper technology is needed so that the complex organic compounds can be simplified and have better digestibility. Fermentation of the rumen content that has been conducted by Ubaidillah (2020) showed that the crude fiber was 29.45% and the crude protein was 13.87%.

Each component of livestock's body has a growth rate of their own starting from bones, muscles, and followed by fat (Mu'tazi *et al.*, 2019). Muscle tissues always require bones for their attachment, and this allows the assumption that the percentage of meat has a positive correlation with bone growth. The meat and bone ratio is the ratio between the total mass of meat and the total mass of bone, these numbers are presenting how much meat is produced compared to the bones (Wibowo *et al.*, 2014).

RESEARCH METHODS

This research was conducted from December 2020 until 2021 at Arthur Rabbitry, Taman District, Sidoarjo City. This study is true experimental research with a completely randomized research design. This research used

20 male rabbits (*Oryctolagus cuniculus*) aged 3-4 months, which were divided into four treatment groups with five repetitions. Rabbits were given a complete feed ration in the form of iso protein pellets.

Rabbits were put in battery cages with dimensions of 30 x 30 x 40 cm³ for each space and equipped with a feeding bowl and water bottle. The equipment used in this research were 4 anaerob drums with 100 liters capacity for fermentation process of rumen content, digital measurement with 0.1 gram accuracy, surgical tools, proximate analysis tools, bowl, mask, and gloves.

Started by the collection of rumen content from newly slaughtered cattle from Surabaya SlaughterHouse and stored in the drum. The rumen content is then mixed with mineral, 0.5% molasses, 0.2% urea, and tightly closed with a lid. A tap and a tube were installed into the lid with the other end of the tube connected to a bottle filled with water to create an anaerobic environment. The fermentation process went on for 5 days.

After 5 days, the fermented rumen content was sundried for about 2 days then proximately analyzed to understand the nutrient content. The rumen content was then mixed with other pellet-shaped feed formulated with pollard, corn, rice bran, fish meal, soybean meal, mineral, salt, and vitamin for the treatment group. While the control group was given pellet feed made of pollard, corn, rice bran, fish meal, soybean meal, mineral, salt, vitamin, and hay. The crude protein for each ration was made into 17%.

The treatment groups were:

- P0 = ration containing 40% hay (control group)
- P1 = ration containing 20% fermented rumen content
- P2 = ration containing 40% fermented rumen content
- P3 = ration containing 60% fermented rumen content

The next step was to measure the initial body weight, then rabbits were placed randomly in the

individual cages. Every treatment group consisted of 5 rabbits and were given ransum with different percentages of fermented rumen content accordingly.

The treatments were carried for 5 weeks. The adaptation process to the cage and feed was 3 days and 7 days. Rabbits were fed twice a day at 7 am and 4 pm. Water supplies were *ad libitum* and were changed everyday.

Data were taken after the treatments were completed. Rabbits were slaughtered after being fasted for 7 hours. The slaughtered rabbits were then skinned, separated from the head, tail, internal organs, front legs, and hind legs in order to get the carcass and determine the meat and bone ratio.

The collected data were then analyzed using Analysis of Variance (ANOVA) and followed by Duncan Multiple Range Test ($\alpha=0.05$) (Al-Arif, 2016). All statistical analysis tests were carried through Statistical Package for Social Sciences (SPSS).

RESULT AND DISCUSSION

The results of the provision of fermented cattle's rumen content with several levels of concentration, namely P0 (40% of hay), P1 (20% of fermented rumen content), P2 (40% of fermented rumen content), and P3 (60% of fermented rumen content) on the total amount of meat, bone, and the ratio between them are shown in the Table 1.

Table 1. The mean of the total meat, the total bone mass, and meat-bone ratio.

Treatment	Parameter		
	Total Meat (g) $\bar{x} \pm SD$	Total Bone (g) $\bar{x} \pm SD$	Meat-Bone Ratio (g) $\bar{x} \pm SD$
P0	111,60 ^a $\pm$ 8,860	57,00 ^a $\pm$ 11,247	1,996 ^a $\pm$ 0,3829
P1	135,80 ^{ab} $\pm$ 45,898	88,60 ^{ab} $\pm$ 39,677	1,572 ^a $\pm$ 0,2212
P2	176,40 ^b $\pm$ 49,525	105,00 ^b $\pm$ 29,824	1,684 ^a $\pm$ 0,2574
P3	130,25 ^{ab} $\pm$ 38,038	72,50 ^{ab} $\pm$ 18,138	1,817 ^a $\pm$ 0,4826

The different superscript in the same row shows a significant difference ($p<0.05$).

Based on the data analysis as seen on Table 1., the treatment group of P0, P1, and P3 showed there were no significant differences ($p>0.05$), unlike the P2 treatment group that showed a significant difference ($p<0.05$) towards the P0 group.

The P2 group resulted in a higher total of meat compared to the P0 group. This result was allegedly caused by the higher crude fiber content in the P0 group's ransum (16.94%) compared to the P2 group's (16.04%), resulting in the lower digestibility of the P0 group's ransum compared to the P2 group. Puger *et al.* (2016) stated that a low

crude fiber content will increase the digestibility of a ransum.

Based on the analysis of rabbits' total bone mass of P0, P1, and P3 group, it was shown that there are no significant differences ($p>0.05$), unlike the P2 group that was significantly different compared to the P0 group.

The P2 group showed a higher amount of the total bone mass than the P0 group. It might be caused by the P2 group's higher nutrient absorption, especially the minerals such as calcium and phosphorus. Probiotics

have been suggested to enhance bone health by improving nutrient absorption and dietary supplementation has been reported to result in greater bone mineralization and increased bone weight. Calcium and phosphorus are two minerals needed in bone formation (Rasidi, 1999). So it could be said that might be one of the reasons for the P2 group having a higher number in the total bone mass.

Based on the meat and bone ratio analysis, there were no significant differences between all the treatment groups. It showed that the addition of different percentages of fermented rumen content to the ransum did not affect the meat and bone ratio of the rabbits.

The insignificant difference ($p > 0.05$) of the meat and bone ratio between treatment groups showed that the growth ability of the rabbits given fermented rumen content were normal all along. The meat and bone ratios in this research ranged between 1.572-1.996 and were higher than Prasetyo (2007) which only resulted in the range between 1.73-1.82.

It was hoped that the produced meat was as high as possible in proportion compared to the bones. If the bone proportion were much lower, a high meat-bone ratio would be the result, and vice versa.

CONCLUSION

It was concluded that a ransum containing 40% of fermented rumen content could be considered as a part of the rabbit's ransum because it might help improve the total amount of meat and bone. However, the usage of fermented rumen content with the percentages of 20%, 40%, and 60% did not affect the meat and bone ratio significantly.

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