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Utilization of Bread and Milled Corn Waste to Support Energy Sources of Kacang Goats

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ABSTRACT

This study aimed to evaluate the production performance of Kacang goats fed with bread waste and ground corn as an energy source in a concentrated arrangement. The research cattle were 12 female Kacang goats. This study used t-test analysis to compare the two treatments. The results of the t-test analysis showed that bread waste as an energy source increased body weight gain, efficiency in the use of dry matter and crude protein rations, carcass percentage, internal non-carcass percentage, external non-carcass percentage and nonedible carcass percentage compared to goats given ground corn as a source of energy in a concentrated form. However, slaughter weight, dry matter consumption, crude protein consumption, carcass weight, carcass component weight, internal non-carcass weight, external non-carcass weight, and edible non-carcass weight showed no significant difference between the treatments.

Keywords: Kacang goat, milled corn, bread waste, growth

INTRODUCTION

As a source of feed for livestock, the types of plants of the cereal family had a good potential because the types of cereals had a high carbohydrate content (Bunyamin et al., 2013; Yudhika et al., 2017). Corn plants, as part of the cereal crop, were popular enough to be used as animal feed. Corn as animal feed could not be separated from its nutritional content so this plant could be used as animal feed (Hetharia et al., 2021). The raw materials of animal feed were quite a substantial percentage. It was inseparable from the large number of breeders. It added to the increasing knowledge of breeders about the importance of providing nutritious feed for the growth and sustainability of livestock businesses (Duarsa et al., 2020). Corn, as part of the composition of livestock concentrates, contributed up to 40-50% of the total types, so corn plants' availability for breeders was very much needed. On the other hand, using corn as animal feed was inefficient because it competed with human needs; the price was relatively expensive.

Based on some problems faced by these breeders, it was necessary to find other feed sources for livestock without compromising the adequacy of nutrition for livestock. One of the good enough feed sources for livestock was by utilizing bread production industrial waste. It could be used as a potential feed source for livestock because it was not used as food for humans (expired, mouldy, dirty, etc.), but these conditions could be processed and used as animal feed (Yamashita et al., 2020). If the bread waste was studied from its nutritional content, it was clear that it had good nutritional content for livestock because this could not be separated from the raw materials for making bread, especially the content of protein and starch (Rahmah et al., 2017; Saripudin et al., 2019). Giving bread waste as feed to goats could affect their productivity because it was able to balance the nutritional needs of goats due to being made of wheat-containing starch as an energy source easily digested by livestock.

MATERIALS AND METHODS

The research was carried out in a cage owned by CV. Prima Breed Central Sulawesi. There were 12 female goats Kacang in this research, ±10 months old. The experimental cages used the stage model and were then divided into sections where each partition was 1.0 x 1.75 cm in size and contained one study animal.

The research study concentrated on forage *Panicum sarmentosum* Roxburg (Roxb). Concentrate feed was composed of several types of feed, including rice bran, refined soybeans, ground corn, and bread waste as a treatment. Given Simultaneous concentrate, the same was directed to all study livestock and starting at 07.00, as much as 1.5% on the dry matter requirement, then after giving the concentrate. The livestock was given *Panicum sarmentosum* Roxburg (Roxb) forage that was given *ad libitum*. The nutritional content and composition of the concentrates in the study can be seen in Table 1.

Table 1. The nutritional content and composition of the treatment concentrates in the study

Feed Ingredients	Dry Ingredients	Crude Protein	Crude Fiber	Crude Fat *	TDN*	Composition
Nutritional Content and Composition of Concentrate Treatment P1						
Milled Soybeans	92.13	31.35	9.73	11.65	61.00	
Rice Bran	88.83	14.24	19.72	2.41	62.30	
Milled Corn	90.23	14.06	3.35	5.80	8674	
Bread waste	91.07	13.51	0.51	4.81	79.47	
Panicum sarmentosum	26.29	11.51	30.20	1.90	59.54	
Nutrient Contents and Composition of P1 Treatment Concentrate						
Soybeans	92.13	31.35	9.73	11.65	61.00	2.00
Milled Corn	90.23	14.06	3.35	5.80	86.74	25.00
Rice Bran	88.83	14.24	19.72	2.41	62.30	73.00
Nutrient content	89.25	14.54	15.43	3.44	68.38	100.00
Nutritional Content and Composition of P2 Treatment Concentrate						
Soybeans	92.13	31.35	9.73	11.65	61.00	2.00
Bread waste	91.07	13.51	0.51	4.81	79.47	25.00
Rice Bran	88.83	14.24	19.72	2.41	62.30	73.00
Nutrient content	89.46	14.40	14.72	3.19	66.57	100.00

Note: * Animal Nutrition Lab Fapetkan Untad Year 2019.

The study was designed by comparing two types of feed sources on energy sources, as it was a combination of two treatments, and then each treatment was done six times so that there were 12 research data distributions. The first treatment was the utilization of ground corn, and the second treatment was the utilization of bread waste. The variables of the research were growth, carcass, and non-carcass weight. The study's results were analyzed using the t-test comparing the two treatments.

RESULTS AND DISCUSSION

The Effect of Treatment on Growth

The results of observing the growth of Kacang goats fed ground corn and bread waste as an energy source in concentrates are shown in Table 2. The average body weight gain, dry matter use efficiency, and crude protein use efficiency were significantly ($P<0.05$) higher in goats, given bread waste as an energy source of concentrates than ground corn. In contrast, dry matter consumption and consumption the crude protein feed for goats fed bread waste as an energy source in the form of concentrates was lower than ground corn but did not provide a significant difference ($P>0.05$).

Feed quality during the rearing period was the most important part in determining the achievement of livestock growth, especially weight gain. The nutritional content of the feed from the two treatments showed a higher amount of protein and TDN, namely the treatment of ground corn as an energy source compared to bread waste. Still, when viewed from the quality of bread waste, it was better than corn because it was made of wheat, so its digestibility was higher. The high and low levels of digestibility and feed conversion were very dependent on the form and quality of the feed given. If those were following the needs of livestock, it was possible to provide a good level of digestibility and feed conversion (Indah et al., 2020). The digestibility of starch certainly varies depending on the source of starch. Starch from wheat flour had a digestibility level of up to 97.41%, while starch derived from corn was around 95.83% (Harmini, 2021).

The high consumption of dry matter and protein in feed from ground corn in treating ground corn as an energy source was due to its higher nutritional content, so the consumption of dry matter and crude protein was also high. The ability of local goats to digest and consume protein feed was limited and highly dependent on the performance of their digestive tract. The feed protein consumption was directly correlated to the feed consumed and hydrolyzed by the livestock digestive system (Prihatiningsih et al. 2015). In addition, the palatability of the feed served as a supporting factor in increasing the interest of livestock to continue to increase their consumption. The animal's liking for the feed given during the rearing process was triggered by smell, taste, sight, appearance and so on (Christi et al., 2018).

Table 2.The Average body weight gain, ration consumption and efficiency of ration

Parameter	Treatment	
	Milled Corn	Bread Waste
Body weight gain (g/head/day)	33.81±1.64$_a$ (n = 6)	39.76±2.97$_b$ (n = 6)
Consumption of dry matter ration (g/head/day)	475.89±39.77$_a$ (n = 6)	440.70±43.64$_a$ (n = 6)
Ration crude protein consumption (g/head/day)	148.03±9.07$_a$ (n = 6)	135.29±13.29$_a$ (n = 6)
Efficiency of use of ration dry materials	0.072±0.009$_a$ (n = 6)	0.091±0.014$_b$ (n = 6)
Efficiency of utilization of crude protein ration	0.229±0.022$_a$ (n = 6)	0.297±0.040$_b$ (n = 6)

Note: Numbers followed by different letters in the direction of the line indicate a significant difference

The ability of livestock to increase feed consumption is determined by the characteristics of the feed itself (Tarigan and Ginting, 2011). The comparative value of the amount of consumption and body weight gain of the resulting livestock shows the feed efficiency value. The results showed that the efficiency of using dry matter and crude protein rations was significantly higher in goats given bread waste as an energy source compared to those given ground corn. It was possible because the body weight gain obtained in the treatment of bread waste was higher with a lower amount of ration consumption. According to Agustina (2013), if livestock were given feed in small amounts but resulted in high body weight gain, it could be said that feed utilization by livestock was quite efficient. Providing feed with maximum quality and quantity allowed livestock to experience faster and better performance improvements than livestock given feed that did not match their needs (Bahar, 2016).

Carcass and Non-Carcass Weight

The results of carcass and non-carcass observations of Kacang goats given ground corn and bread waste as an energy source in concentrates are shown in Table 3.

Table 3. The Average weight and percentage of carcass and non-carcass components on Kacang goat.

Parameter	Treatment	
	Milled Corn	Bread Waste
Cutting weight (kg)	15.32±2.60$_a$ (n = 6)	14.99±2.46$_a$ (n = 6)
Carcass Weight (kg)	6.37±0.86$_a$ (n = 6)	6.64±0.76$_a$ (n = 6)
Carcass Percentage (%)	41.78±1.56$_a$ (n = 6)	44.59±2.61$_b$ (n = 6)
Carcass Component Weight		
Neck	0.610±0.087$_a$ (n = 6)	0.673±0.100$_a$ (n = 6)
Shoulder	0.497±0.109$_a$ (n = 6)	0.518±0.078$_a$ (n = 6)
Ribs	0.750±0.095$_a$ (n = 6)	0.728±0.124$_a$ (n = 6)
Loin	0.402±0.054$_a$ (n = 6)	0.431±0.034$_a$ (n = 6)
Leg	2.155±0.295$_a$ (n = 6)	2.168±0.255$_a$ (n = 6)
Flank	0.300±0.049$_a$ (n = 6)	0.305±0.036$_a$ (n = 6)
Breast	0.262±0.055$_a$ (n = 6)	0.287±0.027$_a$ (n = 6)
Shank	1.396±0.233$_a$ (n = 6)	1.528±0.169$_a$ (n = 6)
Internal Non-Carcass Weight (kg)	1.26±0.24$_a$ (n = 6)	1.39±0.22$_a$ (n = 6)
Persentase Non Karkas Internal (%)	8.20±0.34$_a$ (n = 6)	9.26±0.47$_b$ (n = 6)
Percentage of Internal Non-Carcasses (%)	2.34±0.40$_a$ (n = 6)	2.37±0.39$_a$ (n = 6)
Percentage of Non-External Carcasses (%)	15.29±0.27$_a$ (n = 6)	15.78±0.31$_b$ (n = 6)
Edible Non-Carcass Weight (kg)	2.33±0.40$_a$ (n = 6)	2.49±0.39$_a$ (n = 6)
Percentage of Non-Edible Carcasses (%)	15.20±0.46$_a$ (n = 6)	16.65±0.42$_b$ (n = 6)

Note: Numbers followed by different letters in the direction of the line indicate a significant difference

The study's results using ground corn and bread waste as an energy source in the composition of concentrates did not provide a significant difference in slaughter weight, carcass weight, carcass component weight, internal non-carcass weight, external non-carcass weight, and non-carcass edible weight. Still, the use of bread waste as a natural energy source ($P<0.05$) was higher than ground corn for the percentage of carcasses, internal non-carcass percentages, external non-carcass percentages, and edible non-carcass percentages. The difference in slaughter weight was probably due to almost the same feed quality: the protein and energy concentrates given by corn, respectively, 14.54% and 68.38% and bread waste, 14.40% and 66.57%. The slaughter weight results in this study were lower when compared with research by Elvanuddin et al. (2018), in which the slaughter weight of Kacang goats ranged from 14.96-20.95 kg. The study's results reported by Khotijah et al. (2019) showed that the slaughter weight of male Kacang goats was 19.17-19.68 kg. This study's energy sources from ground corn and bread waste gave the same results for slaughter weight, carcass weight, carcass component weight, internal non-carcass weight, external non-carcass weight, and non-carcass edible weight.

Several research reports show that the rate of body weight gain and the efficiency of using feed affect the percentage of carcasses and non-carcasses. The Kacang goat, which produced a carcass weight of 42.70%, was produced from the Kacang goat, which weighed 23,500 kg (Hatta et al., 2015). In this study, carcass weight was lower when compared to Khotijah et al. (2019). Kacang goat carcass reached 49.57% through prolonged feeding time. Furthermore, the weight and percentage of non-carcass produced were by the picture of high and low slaughter weight, where if the slaughter weight was high, the non-carcass weight and percentage were also higher. The percentage of non-carcass results from the study gave a significant difference caused by different body weight gains.

CONCLUSION

Kacang goats fed bread waste as an energy source significantly increased body weight gain, efficiently used on dry matter and crude protein feed, carcass percentage, internal non-carcass percentage, external non-carcass percentage and nonedible carcass percentage compared to goats given ground corn as an energy source in a concentrated manner. However, slaughter weight, dry matter consumption, crude protein consumption, slaughter weight, carcass weight, carcass component weight, internal non-carcass weight, external non-carcass weight, and non-carcass edible weight did not significantly differ between the two treatments.

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