

The Effect of Composition and Raw Materials Differences on Yield, Quality and Price of Forage Feed Pellets

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ABSTRACT

The aim of the research was to determine the effect of composition and raw materials differences on the yield, quality and price of forage pellet. This study used a mixture of various types of weeds as the main raw material for making forage pellets, pollard and rice bran as the ingredients. Each forage pellet is processed in the same way, namely a mixture of forage weeds (fresh), pollard and or rice bran with variation A (50% pollard, 25% rice bran and 25 % forage weed), B (70% rice bran and 30% forage weed), and C (30% rice bran and 70% forage weed). These materials were calculated based on the dry matter, but mixed in *as fed*, then pelletized, and dried it under sunlight on Integrated Technical Implementation Unit (UPT), Forage and Pasture Science Laboratory. Each treatment replicated three (3). The experimental design was completely randomized design (CRD). The variables observed were yield, dry matter (DM), crude protein (CP), crude fiber (CF) and price based on the calculation of existing materials. The data were analyzed statistically with the help of the SPSS version 26 computer program. If there was a significant difference then continued with the least significant different (LSD) test. The conclusion of this study is composition of pellets forage is crucial factor affect to the yield, CP, CF and forage pellet price. Pellets with forage mixed weed as main raw materials, the higher the concentrate content, the higher the yield, the lower the CP and CF levels, but the higher the price.

Keywords: Forage, pellet, rendement, weed

1. INTRODUCTION

Feed has an important role for livestock, both for the growth of young livestock and for maintaining life and producing animal products (milk, egg, meat) as well as energy for adult livestock [1].

The availability of forage as the main feed for ruminants is constrained due to the gap between the dry and rainy seasons[2]. Efforts are needed to find a feed source that can well survive with good production in both seasons)[3]. Weeds with various characters can be a good source of animal feed [4,5].

The ruminants require fresh forage about 10% of the body weight. There must be a lot of supplies during the dry season as well as in the rainy season. To be able

to have a stock of feed with remains good of nutrients content and not voluminous in the preservation of forage, making forage as pellets can be an alternative solution [6] that is easily stored, preserved, relatively stable in quality, compact, can be combined with other materials, and less wasting when it given to the cattle [4].

There has not been much research related to forage pellets with weed based. Therefore, needs to be conducting research activities with cooperating about weeds for feed[5].

2. MATERIALS AND METHOD

The experiment was conducted in the April until October 2020 at the Forage and Pasture Science

Laboratory, Faculty of Animal Science, UniversitasGadjahMada.

The equipments used in the implementation of the research consisted of chopper forage, trays, pelletizer machine, and pellet dryer pedestal tarp. Ingredients used in this study were rice bran, pollard, and weeds that harvested from the pasture land of Forage Forage and Pasture Science Laboratory.

This research was an experimental activity. Forage pellet with the main raw material weed mixture (DM 20%, CP 23% and CF 30%)[5], rice bran (DM 88%, CP 12% and CF 5.2%) pollard (DM 88%, CP 16% and CF 6.8%)[7]with different formulation of forage pellets as follows:

A = 5 0% pollard, 25% rice bran and 25 % forage weed

B = 70% rice bran and 30% forage weed

C = 30% rice brandand 70% forage weed

These materials were calculated based on the dry matter, but mixed in *as fed*, then pelletized, and dried it under sunlight. This research activity was based on a completely randomized design (CRD). The data were analyzed usingDuncan Multiple Range Test (DMRT) with the help of the computer program SPSS version 16.. The observed variables were the yield/ *rendement*, crude protein and crude fiber content (based on calculations of existing raw materials conditions) and the price of forage feed pellets (based on calculations of the price and composition of the raw materials).

3. RESULT AN DISCUSSION

The results of observations of *rendement* on three types of forage feed pellets based on mixed weeds are shown in Table 1. below:

Table 1.*Rendement*of forage pellets (%) with different compositions

Replication	Treatments		
	A	B	C
P1	54.0	30.9	26.5
P2	52.8	39.3	25.2
P3	62.1	37.2	28.6
Average	56.31±0.05 ^a	35.8±0.04 ^b	26.8±0.02 ^c

^{a-c}Different superscripts on the same line show significant differences (P < 0.05).

¹A, forage pellet with 50% pollard, 25% rice brand and 25% weed; B, forage pellet with 70% rice brand and 30% weed; C, forage pellet with 30% rice brand and 70% weed; P1-3, indicated the number of replication.

Data in Table 1. shows that differences in the formulationof raw materials had a significant effect on the yield of forage pellets. The higher proportionof

concentrate in the pellet resulted in the higher yield . This is a reasonable resultbecause the dry matter content of the ingredients has an effect on the final result, which is then called the *rendement*. The water content of grass is higher than that of rice bran and pollard[2,7]. Therefore, the *rendement* of forage pellets after drying (water reduction) at C was significantly smaller than that of B and A.

Table 2. Crude proteincontentof forage pellets (%) based on the calculation results from its composition

Replication ¹	Treatments		
	A	B	C
P1	18.6%	19.3%	22.0%
P2	18.7%	19.3%	22.0%
P3	18.7%	19.3%	22.0%
Average	18.67%±0.00 ^c	19.3%±0.00 ^b	22.0%±0.00 ^a

^{a-c}Different superscripts on the same line show significant differences (P < 0.05).

¹A, forage pellet with 50% pollard, 25% rice brand and25% weed; B, forage pellet with 70% rice brand and30% weed; C, forage pellet with 30% rice brand and70% weed; P1-3, indicated the number of replication.

The data in Table 2. shows that differences in the proportion of raw materials have a significant effect on the crude protein (CP) content of forage pellets. The higher the proportion of concentrate resulted in the lower the CP content. This is a reasonable resultbecause the CP of the ingredients has an effect on the final result. The CP content of weeds was higher than that of pollard and rice bran[2,7], therefore the CP of forage pellets at C was significantly higher than that of B and A.

Table 3.CF value of forage pellet (%) based on the calculation results from its composition

Replication	Treatments		
	A	B	C
P1	18.9%	21.7%	27.7%
P2	19.3%	21.7%	27.7%
P3	19.3%	21.7%	27.7%
Average	19.12%±0.00 ^c	21.7%±0.00 ^b	27.7%±0.00 ^a

^{a-c}Different superscripts on the same line show significant differences (P < 0.05).

¹A, forage pellet with 50% pollard, 25% rice brand and 25% weed; B, forage pellet with 70% rice brand and 30% weed; C, forage pellet with 30% rice brand and 70% weed; P1-3, indicated the number of replication.

The data in Table 3. shows that differences in the proportionof raw materials have a significant effect on the crude fiber (CF) content of forage pellets. The higher the proportion ofconcentrate level, the lower the CF content was resulted. This is a reasonable result because the CF of the ingredients will affect to the final result of forage pellet. The CF content of weed mixture was higher

than that of pollard and rice bran[2,7], therefore the CF of forage pellets in C was significantly higher than that of B and A.

Table 4. The price of forage pellets (IDR), based on the calculation of the composition

Replication	Treatments		
	A	B	C
P1	2994.9	2666.7	2185.3
P2	2885.8	2666.7	2185.2
P3	2959.6	2666.7	2185.3
Average	2946.8±55.67 ^a	2666.7±0.00 ^b	2185,3±0.03 ^c

^{a-c}Different superscripts on the same line showsignificant differences (P < 0.05).

¹A, forage pellet with 50% pollard, 25% rice brand and 25% weed; B, forage pellet with 70% rice brand and 30% weed; C, forage pellet with 30% rice brand and 70% weed; P1-3, indicated the number of replication.

The price range of each ingredients are forage weeds IDR 2,000/kg, pollard IDR 4,500/kg and rice bran IDR 4,000/kg.

The data in Table 4. shows that differences in the proportion of raw materials have a significant effect on the price of forage pellets. The higher the proportionof concentrate level, the higher the price was resulted. This is a reasonable resultbecause the price of the pellet ingredient has an effect on the final result. The price of mixture weed (IDR 2,000/kg) was lower than the price of rice bran (IDR 4,000/kg) and pollard (IDR 4,500/kg). Therefore the price of forage pellets at A was significantly higher than that B and C.

4. CONCLUSION

The composition of the forage pellets determines the yield/ *rendement*, nutrient content (CP and CF) and the price of forage pellets. Composition of the feed ingredient affect the quality of forage pellet. Thus, the higher the concentrate content, the higher the yield, the lower the CP and CF levels, but the higher the price.

SUGGESTION

To find out more actual efficiency (nutrition, price and productivity of livestock) it is necessary to try it on livestock (*in vivo*).

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