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THE USE OF BEAN SPROUT WASTE AS AN ALTERNATIVE FEED TO REDUCE FEED COST IN SHEEP FARM

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ABSTRACT

Feed cost is the biggest cost (around 70%) which affects the production cost in livestock business. The problem that faced by farmer is the price of feed which is very expensive so the farmer could not get much benefit on their business. Bean sprout waste is scalp of bean sprout that still have good nutrient^[1] content but wasted with useless by many people so we used it as an alternative feed to reduce feed cost. Bean sprout waste is easy to get, not complete with human food needs, and available in large quantities in Indonesia. The objective of this study is to identify the use of bean sprout waste as a sheep feed. The study showed that bean sprout waste has high nutrient content (13.6% crude protein and 49% crude fiber) which is better than concentrate (feed that usually use for sheep) and significantly increase the body weight gain equal with using concentrate (average : 114.97 gram/head/day) and also could reduce feed cost by half. This indicates that using bean sprout waste is good for sheep feed.

Keywords: Bean sprout waste, concentrate, feed cost

1 INTRODUCTION

Agricultural waste is often utilized by farmer but most of the agricultural waste cannot increase the body weight gain as much as using concentrate. The Agricultural waste needs to be further processed in order to appropriate with the nutritional content as livestock needs^[2] and this requires energy, time, and costs for the process. Therefore, most of the farmer using concentrate for fattening program which are feed ingredience that have been through treatment process and contains the value nutrition according to the livestock needs so it is very expensive. In this case, we need the high nutrient content of agricultural waste which

can be used as a sheep feed to increase the body weight gain in order to increase meet production.

One of the agricultural wastes is bean sprout waste which is originated from mung bean and there is not utilized by people. One ton or even more of bean sprout waste was produced in Bogor every day^[1] and wasted with useless. In fact it has good nutrient content that is excellent when used as an animal feed.

2 MATERIAL METHOD

This research was conducted in Mitra Tani Farm Ciampea Bogor, Indonesia from August until October 2010. This study used 24 male fat tailed sheep with range of age under 1 year old and range of body weight 9-14 kg. Sheep are divided into two groups. Small body weight (9-12.5 kg) and large body weight (12.6-14,6kg) with 11.24% of coefficient variability. The sheep were come from East Java. The equipments for this research are weighing scales capacity 10kg and 150kg, termohyrometer, bucket, sack, and vat. Sheep were housed in individual pens made by woods and bamboo with feeder and gaps floor around 1-1.5 cm. Feed is combination of bean sprout waste and concentrate depend on composition of treatments, and the drink is fresh water.

Preparation for this research includes preparation for pens, equipment and feed. Drugs given directly when sheep arrived then shave the fleece before entering the pens. Feed adaptation is given during 14 days with feeding gradually, and this research was taken during two months with four kinds of composition treatment. Pens always cleaned every day. Measurement of daily feed consumption taken by weighing feed remains every day. Daily weight gain taken by measuring body weight gain every month. Figure 1. shows the condition of concentrate and bean sprout waste before mixed.

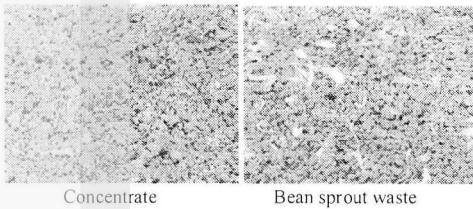


Figure 1. Photo of concentrate and bean sprout waste before mixed.

2.1 Experimental Design

The experimental design in this research was using randomized block design. Sheep divided into 2 groups with 4 different compositions treatment. The Experimental design is according to Matjijik and Sumertajaya^[3]:

$$Y_{ij} = \mu + K_j + P_i + \varepsilon_{ij} \quad (1)$$

Where:

Y_{ij} : Observations on the treatment (the addition of bean sprouts waste) at the level of the i -th until j -th group

μ : General average value of the feed consumption and body weight gain of sheep

K_j : Influence of the group (small body weights and large body weight)

P_i : Effect of mixed treatment between concentrates and bean sprouts waste at the i -th level

ε_{ij} : Random effects in the treatment (the addition of bean sprouts waste) i -th and j -th group

Research data has been analyzed by using ANOVA to determine the effect of the treatment. If the treatment significantly influenced the observed variables, it has to compare with using Tukey test to determine the best treatment.

2.2 Treatment

The treatments in this research using concentrate and bean sprout waste. There are some composition feed which divided into four groups:

- P1 = 0% bean sprout waste + 100% concentrate
- P2 = 25% bean sprout waste + 75% concentrate
- P3 = 50% bean sprout waste + 50% concentrate
- P4 = 75% bean sprout waste + 25% concentrate

3 RESULT

3.1 Feed Nutrient Content

Bean sprout waste is a part of the bean sprout which has not been utilized by many people. Bean sprout waste is a scalp of bean sprout which has green color and covering the bean. The condition of bean sprout waste are mixed with several of bean sprout because the bean sprout are sifted before sale to the costumers so that some of the bean sprout are not carry over^[1]. Concentrate is in the form of food grains, tubers, and waste grain that contains protein, fat, and carbohydrates with crude fiber content (consisting of cellulose, hemicelluloses, and lignin) less than 18% and commonly used as feed in fattening sheep among sheep farmers^[4]. Table 1. shows nutrient content between bean sprout waste and concentrate.

Table 1. Nutrient content of concentrate and bean sprout waste based on dry matter (%)

Feed	DM	Ash	CP	CF	CF	Beta-N	TDN
CS	100	14.11	13.14	16.92	5.97	49.86	62.11
SW	100	7.35	13.63	49.44	1.16	28.42	64.69

Where:

- CS : Concentrate
- DM : Dry matter
- CF : Crude Fiber
- TDN : Total Digestible Nutrient
- SW : Bean sprout waste
- CP : Crude Protein
- CF : Crude fat

Table 1 showed that bean sprout waste has a crude protein content almost same with concentrate which are around 13% and the crude fiber from bean sprout waste is higher than crude fiber in concentrate. Crude protein and crude fiber are two materials which are very important for sheep growth^[5].

3.2 Palatability of bean sprouts waste

Palatability is acceptance of feed or feed ingredients through taste or level of acceptance to be eaten by livestock which can be determined by appearance, smell, taste, texture, temperature, and other senses to feed^[6]. The large number of ration consumed by one animal can describe the palatability ration^[7]. Daily feed consumption could be seen on Table 2.

The result showed that addition of bean sprout waste significantly affect ($P < 0.05$) on feed intake. The further test result showed that P1 and P2 are significantly different with P3 and P3 is different with P4. The highest consumption is P4 then continuous to P3, P2 and P1. The result shows that feed with contains more of bean sprout waste

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has a higher consumption than feed with contains less of bean sprout waste. The composition of 75% Table 2. Daily feed intake and weight gain of sheep

Parameter (g/head/day)	Treatment				Average
	P1	P2	P3	P4	
Consumption	645.6±69.8 ^C	871.9±194.4 ^C	1358.0±131.0 ^B	1669.9±165.5 ^A	1136.3±432.6
Weight Gain	96,3±27,1	112,1±63,4	145,83±21,59	105,7±30,9	114,97±41,32

intake that goes along with the feed consumed by sheep cannot be utilized by them even they would

bean sprout waste with 25% concentrate (P4) has the highest of daily feed consumption which is 1669.9±165.5 g/head/day so that P4 has the highest palatability. The average of concentrate daily intake for sheep is 580 g/head/day^[8] and the average of daily intake in this research is 1136.3±432.6 g/head/day, so it means that the use of bean sprout waste is better than concentrate. Palatability reflected by organoleptic such as appearance, smell, taste (sour, salty, sweet, bitter), texture, temperature which gives the attractiveness and stimulation to eat^[9]. The bean sprout waste has a fresh green color, smoother texture than concentrate and not dusty. The palatability of bean sprout waste can be affected by the color, appearance and texture.

3.3 Daily weight gain

Body weight gain is the most common parameters used in the measurement of growth^[10]. Livestock's body weight gain affected by the total protein obtained per day, type of livestock's, age, state of genetics, environmental and management condition of each individual governance^[10]. The result of daily weight gain could be seen on Table 2.

The result showed that the addition of bean sprout waste are not significantly affect (>0.05) on daily weight gain. The average of daily weight gain in this research is 114.97±41.32 g/head/day. The amount of daily weight gain in this research is closed to Maryati's research which reached 119.26±58.41 g/head/day^[11]. She used full of concentrate in her research. According to National Research Council^[5], 10-20 kg of sheep body weight could reach 200-250 g/head/day. In this research, the average of body weight gain is still below from National Research Council because the research held on a different environmental condition between the tropic and the temperate.

The thing that may cause daily weight gain were not significantly different is the content of anti-nutrient which called anti-trypsin in the bean sprout waste which can inhibit the growth process. Anti-trypsin is a compound of trypsin enzyme inhibitor which naturally present in nuts including mung bean^[12]. The enzymes are protein, so protein

lose protein from the body through the excess of enzyme so that the sheep with high consumption of bean sprout waste like sheep on the treatment of P3 or P4 couldn't increase the body weight gain too much.

National Research Council^[5] also stated that the daily body weight gain is influenced by total protein obtained per day. However, we can state that bean sprout waste is useful for sheep feed because it could make daily weight gain equal as using concentrate which is more costly than using bean sprout waste.

3.4 The feed cost reduction due to the use of bean sprout waste

The price of concentrate is \$ 0.1882/kg and in this research, the price of bean sprout waste is \$0.0058/kg. If we use P3 (50% bean sprout waste + 50% concentrate) which can reach the body weight gain up to 145,83 gram/ head/ day in 2 months with price about \$0.097/kg, it can reduce feed cost by a half which is around \$ 0.0912/kg.

4 CONCLUSION AND DISCUSSION

Bean sprout waste could increase body weight gain of sheep equal with using concentrate which is more costly. The best composition treatment for increasing body weight gain is P3 which contains 50% of bean sprout waste on feed and it can reduce feed cost by half rather than using 100% concentrate.

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