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The Effect of Urea Level and Ripening Time on Nutrient Content on Ammoniation of Sugarcane Shoots Waste

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ABSTRACT

Raising livestock on a large scale, especially ruminants, requires large amounts of green fodder, the availability of natural feed is not yet fully reliable, therefore breeders must provide extensive forage areas that require investment costs. the big one. To obtain nutritional value, as well as good crude fiber and easy to digest, it needs processing first. One of the effective animal feed processing methods which can increase the crude protein content, reduce the crude fiber content, increase the flavor and soften the structure of the feed ingredients so that it is preferred by livestock is the ammoniation method. The purpose of this study was to see the effect of ammonia on the nutritional content of feed waste, to increase the nutritional content of the waste, to find the best urea level, to obtain the best curing time for the ammoniation of sugarcane shoots on the ammonia content of sugarcane shoots waste. This study used a completely randomized design method, the factorial pattern consisted of 3 types of treatment with 3 replications with urea percentage A: 2%, B: 3%, C: 4%, with curing time of 7 days, 14 days and 21 days. Parameters measured, dry matter content, organic matter, crude protein content, crude fat (LK), crude fiber (SK).

Keywords: *Sugarcane Tops, Ammonia, Nutrient Content, Fiber Fraction*

INTRODUCTION

The availability of land for cattle grazing and forage cultivation is decreasing. This happens because of the conversion of land into agricultural land, settlements, construction of public facilities and infrastructure. Therefore, it is necessary to find alternative sources of forage for livestock. The requirements for alternative fodder include being available in large, continuous quantities, at low prices and not containing ingredients that are harmful to the health of the livestock themselves. One of the potential plantation wastes that can be used as alternative animal feed is sugarcane shoots waste. In the Ketol District, Kab. Central Aceh has approximately 5,000 hectares of sugar cane plantations, where the waste has so far only been burned and has not been utilized (Central Aceh in Figures, 2015). The potential of the existing sugarcane shoots has not been able to support livestock productivity, because of its low nutritional value. Therefore, it is necessary to process sugarcane shoots waste through the ammonia process. Ammonia is one of the efforts to improve the quality of ruminant feed ingredients. The ammonia process can increase protein and reduce crude fiber, so that the quality of the waste becomes better. Sugarcane shoots waste can be used as alternative animal feed to substitute forage. With the enormous potential of sugarcane shoots waste, it is possible for farmers to raise cattle on a large scale without the hassle of looking for natural grass.

According to the Central Bureau of Statistics in 2014, the population of ruminants in Central Aceh was 12,398 buffaloes, 6,886 cattle, 25 dairy cattle, 12,707 goats and 312 sheep. Ruminants experienced good growth in Central Aceh and its surroundings. because the climate is suitable, with an average air temperature of 20 degrees Celsius. Therefore, so that livestock do not lack feed during the dry season and can raise livestock on a large scale, the ammoniated sugarcane shoots waste can be used as a source of fiber substitute for grass for ruminants.

MATERIALS & METHODS

The design used was a completely randomized design (CRD) with a factorial pattern (3x3) with 3 replications. The first factor (A) is the dose of urea, namely A= 2%, A=3%, A=4%. And the second factor (B) curing time B1=7 days, B2=14 days, B3=21 days. With further tests usingDuncan's test (Steel and Torrie, 1980).

Table 1. Analysis of RAL Diversity with 3x3 factorial pattern with 3 replications.

Source Diversity	Db	JK	KT	F. Hit	F. Table		
					0.10	0.05	0.01
A		Jka	Kta	Kta/KTs			
B		JKb	KTb	KTP/KTs			
AB		Jkab	Ktab	Ktab/KTs			
Remainder		JKs	KTs				
Total		**Jktot**					

RESULT

Effect of Treatment on Dry Matter (BK) Ammonia of Sugarcane Shoots.

The average dry matter content of ammoniated sugarcane shoots at various urea levels and fermentation time can be seen in table 1. Below

Table 2. Effect of Treatment on Dry Matter (BK)

Urea level (%)	Ripe time (Days)			Average
	B1:7	B2 :14	B3:21	
A1: 2%	94,60	96,05	96,45	95,70
A2 :3%	96,11	94,33	95,84	95,42
A3 : 4%	97,12	95,04	97,04	96,40
Average	**95,94**	**95,14**	**96,44**	

In table 2 above, it can be seen that the highest average dry matter is at the level of 4% urea with a curing time of 21 days. The results of the analysis of diversity showed that there was no interaction between the urea level factor and the length of fermentation. This is thought to be caused by the urea level and the long curing time which is not too far apart. Factor A (urea level) and factor B (curing time) gave no significant difference (P≥0.05).

Effect of Treatment on Organic Matter (BO) of Ammunition of Sugar Cane Waste

The average content of organic matter (BO) of sugarcane shoots waste at various levels of urea and different fermentation times can be seen in table 2. below.

Table 3. Effect of treatment on organic matter

Urea level (%)	Fermentation time (Days)			Average
	B1 : 7	B2 : 14	B3 : 21	
A1 : 2%	83.01	82.74	84.86	83.55
A2 : 3%	82.16	81.85	84.28	82,76
A3 : 4%	83.94	82.84	85.44	84.07
Average	**83,04**	**82.48**	**84,86**	

If we look at table 3. above, the A3 treatment with the highest urea content of organic matter (BO) increased more in the A3B3 treatment with a value of 84.86% and the lowest was in the A2B2 treatment of 82.48% while without ammonia it was 86.89%. The ANOVA table showed no interaction between urea level, duration of fermentation on organic matter content, duration of fermentation also showed no significant effect (P≥0.05).The results of the analysis of variance that between treatments gave no significant difference (P≥0.05).

Effect of Treatment on Crude Protein (PK) Content of Ammonium Sugar Cane Waste

Based on the Proximate test in the appendix, the crude protein content of fermented coffee husk waste ranged from 8.08% to 14.92% higher than sugarcane shoots waste (control), sugarcane shoots

waste without ammonia had a crude protein content of 5.13%. There was an increase in the crude protein content almost 3 times after ammoniation with the highest value being 14.92%. With chemical, biological and physical processing, it can significantly increase digestibility, nutritional content and feed consumption (Dwiyanto, et al., 2001).

Table 4. Effect of Treatment on Crude Protein (PK)

Urea level (%)	Fermentation time (Days)			Average
	B1 : 7	B2 :14	B3:21	
A1 : 2%	11.98	8.94	13.09	11.37[a]
A2 : 3%	8.08	9.27	12.24	9.86[b]
A3 : 4%	8.23	11.58	14.92	11.58[a] [c]
Average	9.42[a]		9.93[a]	13,42[b]

[a,b,c] : Means with different superscripts in rows and columns showed significantly different effects (P≤0.05) and different superscripts in columns showed significantly different effects (P≤0.05).

In the results of the analysis of diversity, it can be seen that factor A (urea level) and factor B (fermentation time) have significantly different effects (P≤0.05). Urea level and curing time significantly affect crude protein content.

The results of the Duncan's Multiple Range Test (DMRT) further test, on factor A, showed a very significantly different effect (P≤0.05) between the dose levels of 2% and 4% urea. The results from the ANOVA table show that the fermentation time is very significant (P≤0.05) affecting the crude protein content of ammoniated sugarcane shoots waste. In this study, it can be seen in the analysis of diversity between factor A and factor B that there is an interaction.

The Effect of Treatment on the Crude Fiber Content (SK) of Ammunition of Sugar Cane Waste

Based on the results of the laboratory test analysis of crude fiber (SK) of ammonia shoot waste, it can be seen that the data ranged from 29.48% to 38.83% while without fermentation it was 47.04%. The average crude fiber content (SK) of farm coffee husk waste at various prebiotic percent levels and different fermentation times can be seen in table 5. below.

Table 5. Effect of Treatment on Crude Fiber (SK)

Urea level (%)	Fermentation time (Days)			Average
	B1: 7	B2: 14	B3: 21	
A1: 2%	37.78	33.16	34.67	35,20[a]
A2: 3 %	38.55	37.03	38.83	38.14[b]
A3: 4 %	31.05	31.96	29.48	30.83[c]
Average	35.79	34.05	34.32	

[a,b,c] : The mean with different superscripts showed a very significant difference (P≤0.05)

If we look at table 5. above, the urea level gives a very significantly different effect between each treatment. The urea level of 4% gave the lowest crude fiber reduction effect. While the curing time did not give significantly different results (P≤0.05)

The results of the analysis of diversity showed that the interaction between urea level and fermentation time gave a very significant difference to the crude fiber content. DMRT test results obtained between treatments gave a very significant difference (P≤0.05) on the crude fiber content of the material. The combination of A3B3 treatment which has the lowest crude fiber content is the best treatment.

Effect of Treatment on Crude Fat (LK) Content of Ammunition of Sugarcane Shoots Waste

Based on the results of the laboratory test analysis of crude fiber (SK) of fermented coffee husk waste, it can be seen that the data ranges from 35.78% to 49.84% while without fermentation it is 47.04%. Close to the crude fiber content obtained by Nobertine (2014), the unfermented coffee skin obtained 50.26 after being fermented to 45.87%. Compared to the results of laboratory tests obtained by Budiari (2014), the crude fiber content obtained was 18.74% before fermentation and decreased to 13.05% after fermentation. The difference in data on crude fiber content is due to the different types of coffee skin waste samples. This chemical composition

may vary due to the type or variety of coffee, factors from the geographical area, climatic conditions, soil chemistry and fertilization carried out in the plantation area.

The average crude fiber content (SK) of fermented coffee skin waste at various levels of prebiotic percent and different fermentation times can be seen in table 6. below.

Table 6. Effect of Treatment on Crude Fat (LK)

Urea level (%)	Incubation Length (Days)			Average
	B1: 7	B2: 14	B3: 21	
A1: 2%	0.57	0.68	1.57	0.92
A2: 3 %	1.89	1.57	1.48	1.65
A3: 4%	1.29	1.91	1.89	1.70
Average	**1.25**	**1.39**	**1.65**	

^{a,b,c} : The mean with different superscripts showed a very significant difference ($P \leq 0.05$)

CONCLUSION

The limiting factor of sugarcane shoots waste as animal feed is the high lignin content, sugarcane shoots waste samples found in Kec. Central AcehKetol also contains high lignin, that is, without treatment, the content is 39.74%, with rice husk ash water treatment and urea reduced to 37.15%. Lignin is a part of plant fiber that cannot be digested by ruminants. However, ammonia treatment with urea and rice husk ash can loosen the lignocellulose bonds, so that rumen microbial enzymes are expected to break the lignocellulosic bonds in the feed fermentation process that occurs. in the rumen of the cattle, it is assumed that the lignocellulosic from sugarcane shoots waste will be digested more.

If the digestibility value of ammoniated sugarcane shoots waste is the same as without ammoniation, it can be concluded that sugarcane shoots waste with ammonia treatment is not effective, it is necessary to look for bacterial strains that can digest lignin, to ferment sugarcane shoots waste so that its lignin content can be reduced.

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