Utilization of Oil Palm Fronds Processed By Ammoniation and Fermentation on Dry Material and Organic Material Digestibility in Aceh Cattle. Under supervised

E B N Capah, E Mirwandhono, Hasnudi, T H Wahyuni , Hasnudi, N D Hanafi

Animal Production Program, Faculty of Agriculture, Universitas Sumatera Utara, Medan 20155
E-mail: nurzainahginting@gmail.com

Abstract. The research was conducted at the Laboratory of Animal Biology, Faculty of Agriculture, University of Sumatera Utara in March 2015- June 2015. This study aims to determine the value of dry matter and organic matter processed leaf palm fronds fermentation and ammoniation in cattle Aceh. This study used the Latin Square Design (LSD) 4 x 4. The treatment is Po as the control (untreated), Pf = fermentation (biomol), P2 = ammoniation (urea 3%), P3 = fermentation + ammoniation.The observed variable composed of Consumption and Dry Matter (DMD) and Organic Matter Digestibility (OMD). The result showed that treatments gave not significantly different (P>0.05) on consumption of DM and OM, but gave significantly different effect on DMD and OMD (P<0.05). Average % DMD on treatments Po, PI, P2, P3 : 51.54; 56.65; 51.48; and 63.05 and average % OMD : 58.61; 63.22; 57.28; and 63.05, respectively. The conclusion from this study that utilization of oil palm fronds treated by fermentation or combination between fermentation and ammoniation can increase the dry matter digestibility and organic matter digestibility in Aceh cattle.

1. Introduction

Feed is one of the main determinants that affect the success of a livestock business. The availability of livestock feed lately has been increasingly limited. This is due to, among other things, to rising prices of livestock raw materials, and increasingly sustainable land for the development of forage production due to land use for food and residential areas. Therefore, it is necessary to look for potential new resources to be utilized as alternative livestock feeds capable of replacing some or all of the forages as well as reducing dependence on the use of concentrated materials commonly used.

Fulfill the needs of livestock consumption using feed materials derived from plantation waste, for example oil palm fronds; as well as industrial by-products, such as palm kernel cake and molasses, can be used as alternative feed materials, because besides having a good enough nutritional content also has a lot of availability because the production of the plantation is available throughout the year.

Oil palm plantations are highly interactive to develop all ruminants, especially the cattle. Oil palm plantations are rapidly growing in Southeast Asia, including Indonesia. Directorate General of Plantation (2004) stated that the area of oil palm plantations in Indonesia reached 4,686,000 Ha with production of fresh fruit bunches of 5,456,700 tons. North Sumatera itself in 2005 has an area of oil palm plantations reached 948,800 Ha with production of fresh fruit bunches of 3,439,748 tons so that in the region of North Sumatra the growth rate of oil palm plantation production is very significant in producing many by-products. This provides an opportunity for livestock in utilizing the by-

products of oil palm plantations as an alternative feed for livestock (especially cattle).
Problems encountered in the use of waste oil palm plantations, such as oil palm fronds is the high content of crude fiber and low protein value so that the digestibility becomes low. The efforts are made to overcome this is by doing food processing in physics, chemistry, and biological. Physical processing is done by changing the size and shape through chopping and grinding process. Biological processing is carried out using microbes, such as bacteria and fungi that can break down crude fiber into simpler components so that the nutritional content increases, and chemical processing is done through the process of ammoniation with the use of NaOH. This research tries to overcome the problem with the utilization of oil palm leaf fronds as feed livestock to replace forage.
On the basic of this idea, it is necessary to conduct a research on the utilization of oil palm fronds processed physically, chemically, and biologically as plantation waste and utilization of by-products of palm oil industry as a better livestock feed that is useful to meet the nutritional needs of ruminant livestock.

2. Materials and Methods

The research type used is teak square 4 x 4 design. The research has been conducted in Laboratory of Livestock Biology Program, Faculty of Animal Husbandry, Jalan Prof. Dr. Sofyan No. 1 North Sumatra University. This research lasted for 4 months, starting from March until June 2015. The purpose of this study to determine the value of digestibility of dry material and organic material of palm oil fronds that is processed physically, chemically, and biologically in Aceh cattle.
According to Maynard and Loosli (1962), the collection period can be done for 7 days before the research, including measurement of feed consumption and feces. Osuji et al., (1993) stated that the total collection of feces was done every day for one week where the weight of the feces was weighed daily. The method was done in the following ways:

1. Feces samples were taken every 08.00 Western Indonesia Time by collecting total feces excreted every day (24 hours) then collected in a shelter.
2. Taken 10% of the feces from each replication, then put in plastic, tied, and labeled according to treatment.
3. Stored the feces of every treatment in the freezer during collection.
4. Homogenized the feces by stirring until evenly distributed.
5. Incorporated the feces into the oven at 60 ° C for 24 hours.
6. Milled the feces every treatment taken ± 2 grams put into oven with temperature 105°C for 24 hours for dry material.
7. Incorporated samples ± 2 grams each treatment into an oven with a temperature of 600°C for 8 hours to obtain ash content.
8. Performed of the proximate analysis of feces in the laboratory.

Feed collection period was done in the following ways:

1. Weighed the feed given to the cows at 08.00 Western Indonesia Time.
2. Weighed residual feed on the next day at 08.00 Western Indonesia Time.
3. Done every day of weighing feed during the research. Preparation of samples for analysis in the laboratory.

3. Results and discussion

3.1. Feed Consumption

Feed consumption can be calculated by reducing the amount of feed given with the remaining feed available. The average consumption of dry material feed can be seen in table 6.

Table 6. The average consumption of dry material

Periods	Aceh				Total	Average[th]
	1	2	3	4		
Po	5.05	4.24	3.75	3.38	16.43	4.11±0.7
P_1	4.02	3.84	3.52	4.96	16.36	4.09±0.6
P2	3.44	4.49	4.35	3.68	15.97	3.99±0.5
P3	3.78	3.48	4.76	4.26	16.30	4.07±0.5

The average consumption of treatments feed can be seen in table 7.

Table 7. The average consumption of organic material

Periods	Aceh				T	Average
	1	2	3	4		
Po	4.47	3.81	3.5	3.1	14.9	3.74±0.56
P_i	3.63	3.60	3.2	4.3	14.9	3.72±0.47
P2	3.20	3.93	3.9	3.5	14.6	3.65±0.36
P3	3.52	3.22	4.2	3.8	14.8	3.70±0.42

The analysis results of variances showed that utilization of oil palm fronds processed by ammoniation and fermentation give effect which was not significantly different in feed consumption (P> 0.05). The unreal results was caused by factors of livestock that is the age of livestock, body weight, nation, livestock health and environmental conditions.

The good quality feed, the level of consumption is higher than the low quality feed. This is also expressed by Tomazweska et a1., (1988) which stated that the quality of the meal at the end of the task for the fulfillment of livestock needs[1]. This is also supported by Kartadisastra's (1997) stated that the palatability is the performance of feed ingredients as a result of the physical and chemical conditions possessed by material feeds that are reflected by the organoleptic, such as the appearance, smell, taste and texture of the feed[2].

3.2. Dry Materials Digestibility

Based on the research results that have been done on the dry materials digestibility, it could be obtained from the observation data of Aceh cattle as follows:

Table 8. The average of dry material digestibility value in Aceh cattle.

Period	Aceh				T	The Average
	1	2	3	4		
Po	50.41	54.35	51.07	50.34	206.17	51.54[B]
P_i	56.54	63.07	51.72	46.19	226.62	56.65[A]
P2	50.80	50.06	54.11	50.98	205.95	51.48[B]
P3	54.93	56.17	52.61	57.67	221.38	55.34A

The analysis results of variances showed that utilization of oil palm fronds showed a significant difference (P<0,01, dan P>0.05) to dry matter digestibility coefficient *in vitro* ration of Aceh cows. The oil palm fronds is rough feed materials derived from the industrial wastes high in crude fiber and anti-nutrional content, so it can be reduce the dry material digestibility. As the statement of Prayitno (2010) that industrial waste crops have an inhibiting chemical compound. Mikrobia rumen were not

able to digest a feed rich in silica and lignin[3].

3.3. Organic Materials Digestibility

Based on the research results that have been done on the organic materials digestibility, it could be obtained from the observation data of Aceh cattle as follows:

Table 9. The average of organic material digestibility value in Aceh cattle

Period	Aceh				T ot al	The Avera ge
	1	2	3	4		
Po	58.90	55.95	60.27	59.3	234.4	58.61^{B}
P_I	60.09	70.15	60.32	62.3	252.8	63.22^{A}
P2	59.13	58.16	51.75	60.0	229.1	57.28^{8}
P_3	62.92	63.76	60.11	61.4	248.2	63.05^{A}

The high content of lignin on oil palm fronds leads to an increase in the number of microbial populations and increased the activity in the digestion of fibrous feed. As Yokoyama dan Johnson (1988) stated that mikrobials plays a important role in the digestion and fermentation of fibrous feed comsumed by ruminants, so its activity and population determine the digestibility of feed microorganisms in the digestive tract. This reinforces the notion that lignin is the main factor causing the decrease[4].

3.4. The Rekapitulation of Research Results

From the results of the overall research conducted can be described in the following the the table.

Table 10. The Rekapitulation of research results of Utilization of Oil Palm Fronds Processed By Ammoniation and Fermentation on dry material comsumption, organic material comsumption, dry materis digistibility, organic material digistibility of feed Aceh cattle.

Treatment	Dry Material Comsumpti	Organic Material Com	Coefficient of Dry Mate	Coefficient of Organic (%)
PO	4.11$^{t°}$	3.74th	51.54^{B}	58.61^{B}
P1	4.09^{1fl}	3.72th	56.65`	63.22^{A}
P2	3.99tn	3.65th	51.48^{E}	57.28^{E}
P3	4.07tn	3.70th	55.34^{A}	63.05^{A}

Table 10 showed that the feed treatment using oil palm fronds processed by ammoniation and fermentation as Aceh cattle feed gave no significant effect on dry matter consumption and organic matter consumption (P> 0.05), however, it was significantly different to the coefficient of dry material digestibility and the coefficient of organic material digestibility (P<0.05) to Aceh cows during the research of organic material digestibility.

4. Conclusions

The research results can be concluded that he feed treatment using oil palm fronds processed by ammoniation and fermentation as the feed can increase dry material digestibility value and coefficient of organic material in Aceh cattle during research.

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