THE USE OF SAGO RESIDUE FERMENTATION AGAINST PERFORMANS SHEEP

M T Siagian, M Tafsin, S Umar, E Mirwandhono, and AH Daulay

Animal Production Program, Faculty of Agriculture, University of Sumatera Utara, Medan 20155
E-mail : muhammad.taufik.siagian94@gmail.com

Abstract. This study objective was to examine the quality of sago residue fermented with Effective microorganism 4 (EM4) on merino sheep performance. This research was conducted in Kec. Binjai City of North Sumatra. This research has been conducted for 3 months starting from October until December 2016 using 20 sheep merino with initial weight of 18.30 ± 1.16 kg. The design used in this study was a complete randomized design (RAL) with 4 treatments and 5 replications. This treatment consists of P0 (non-fermented sago residue 40%); P1 (20% sago residue of fermented + 20% non fermented sago residue); P2 ("30% fermented sago residue + 10% non fermented sago residue) P3 (40% sago residue fermented). The results showed tht the dispersion of sago residue fermented EM4 give significant effect (P <0,05) to feed consumption, PBB and feed conversion. Added body weight and feed conversion. The mean respectively for feed consumption (g / head / day) in the treatment arrangement P0, P1, P2, P3 was 470.0; 539,7; 565.0; And 632.2. The average weight gain (g / head / day) was 59.6; 76.1; 99.2; 111.7 and the feed conversion rate was 11.6; 9,13; 6.65; And 5.78. The conclusion of this study is that the use of sago residue fermented EM4 to 40% level in the ration has a positive effect in increasing the body weight, feed consumption and decreasing the value of feed conversion to sheep.
Keywords : sago, residue, fermentation

1. Introduction

The potential of sheep is relatively quite encouraging, but in terms of productivity still needs to be improved. One of the obstacles faced by the sheep business is the inadequacy of nutritional needs, especially feed protein, this resulted in the growth of livestock flower is not in accordance with the expected. This situation demands the finding of new (alternative) feed ingredients that are capable of being the mainstay feed in the long term. Potential products as alternative feed ingredients are available in large quantities and are available throughout the year generally from agricultural waste processing industry, for example in the production of sago.

Merino sheep is a type of wool producer, many kept in four-seasons, dominant body color is white with adult weight about 40-50 kg of females and 60-70 kg of males, with the average number of children born 1.23, birth weight display and weaning weight respectively 3.2 ± 0.54 kg and 18.7 ± 1.1 kg.

The area of wild sago in Indonesia has an area of 1.6 million hectares, from that area in 2005 can be produced sago as much as 15 million tons because each stalk sago produce 200 kg sago (Prastowo 2007). Kertopermono (1996) reported that the spread of sago plants in Indonesia is; Irian Jaya

1,406,469 ha, Maluku 41,949 ha, Sulawesi 45,540 ha, Kalimantan 2,795 ha, West Java 292 ha and Sumatra 31,872 ha. Sago waste is obtained on the processing of sago flour, which according to Rumalatu (1981) in the processing of sago flour obtained sago flour and pulp with a ratio of 1: 6. Based on the proportion of sago waste produced as much as 245.000 ton / day.

The amount of waste that has so far not been utilized optimally, only allowed to accumulate in the location of sago flour processing so that it can cause environmental pollution. Sago waste / waste is quite potential to be used as ruminants feed ingredients including sheep.

The content of nutrients contained in sago waste such as; crude protein of 3.36%, NDF 67.40%, ADF 42.11 and crude energy of 3,738 Kcal / kg (Nurkurnia 1989; Trisnowati 1991), relatively comparable to grass nutrients. Sago waste is thought to only be able to meet basic life needs, so for growth, pregnancy and lactation required additional feed to meet protein and energy needs.

Utilization of sago pulp is an alternative to sheep feed. Although it is known that its use as a ration has constraints such as digestion and low nutrient levels due to high levels of crude fiber and low levels of protein. To overcome these obstacles one way to do fermentation, The nutrient content of sago pulp can be increased.

Fermented feed is one way that can be done to process waste sago waste. The process of fermentation is intended to feed not easily damaged and rotten or to improve the digestibility of livestock. According to Susangka et al. (2005) Sago pulp waste has a crude fiber of 5-38%. . The coarse fiber is very high and can be derived by fermentation with EM4 (Effective Microorganism 4) and. EM4 is one of the microbes that can degrade the crude fiber content because it has the ability to produce enzymes laccases and Research purposes

Assessing the quality of sago pulp fermented with EM4 on sheep body weight gain.

2. Materials and Methods

2.1. Location and Time of Study

Research has been conducted in Kec. Binjai City of North Sumatra. This research has been conducted for 3 months starting from October to December 2016.

2.2. Materials and Tools

2.2.1. Material

The materials used are 20 merino lambs, feed ingredients consisting of field grass, sago pulp, EM4 as sago fermentor pulp, concentrate as reinforcing feed, medicines like Permentyhl 5% as a bloating, worm medicine (Kalbazen) , terramycin (eye ointment), vitamin B-complex is given to maintain the immune system of sheep, drinking water, disinfectant (Rodalon).

2.2.2. Tool

The tool used is individual cages as much as 20 plots with the size of 1 x 1.5 m, where the feed as much as 20 units and 20 drinking water spots, the scale to weigh the living weight of 150 kg with a sensitivity of 50 g, the scale of 2 kg with sensitivity 10 g for weighing feed, lighting, plastic jute, stationery, broom, spade to clean the cage, bucket, water, raffia rope, plastic drum as a fermentation place, thermometer to know the temperature condition of the cage.

2.3. Research Methods

The research method used was a complete randomized design (RAL) consisting of 4 treatments and 5 replications in which each replication consisted of 5 sheep. In the ration given the treatment as follows:

P0 = Non-fermented Sago Ampas 40% (Control)

P1 = Ampas Sago Fermentation 20% + Non fermented sago seagrass 20%

P2 = Ampas Sago Fermentation 30% + Non fermented sago fruits 10%

P3 = Sago Fermented Ampas 40%
The complete randomized design model used is
$Yij = \mu + \tau + \varepsilon$
Where:
Yij = The observation result on the ith repeat and the jth treatment
μ = Mean (mean) expectation τ = Effect of treatment factor
ε = Effect error (experimental error)

2.4. Data Analysis
The data that have been obtained is then analyzed variance (Anova), then if obtained by real result then tested continued using Multiple Range Test.
The observed variables

2.5. Feed Consumption
Feed consumption is obtained by calculating the difference between the amount of feed given and the daily feed residue and expressed by grams per head per day in dry matter. Feed consumption in can from:
Feed Consumption = Fresh feed given - Feed remaining

2.6. Daily Weight Growth (PBBH)
The weight gain is calculated by dividing the body weight difference (final weight - initial weight) by the length of the weighing day. Performed every period (14 days), expressed by grams per head per day.

$$\textbf{PBBH: } \frac{\textbf{Final weight – Start weight}}{\textbf{Long care (day)}}$$

2.7. Feed Conversion
Conversion of feed is calculated by dividing the average number of dry matter consumption per head per day with the average production rate per body weight per head per day.

2.8. Implementation of Research

2.8.1. Cage Preparation
The cage is prepared with individual cage type, then in fumigation with disinfectant. The enclosure and all used equipment such as feeding and drinking place are cleaned with disinfectant solution.
2.8.2. Sheep's Randomness
Sheep used in this study as many as 20 tail. Placement of sheep pen with a random system that does not distinguish body weight of sheep. Previously weighed sheep body weight.

2.8.3. Feeding and Drinking Water
The feed is feed in the form of non-forage powder where all feed ingredients used are made into concentrate-like form. Feed is given in the morning at 08.00 WIB and in the afternoon at 16.00 WIB. The remainder of the feed is weighed in the morning the next day just before the livestock is fed back to know the consumption of the livestock. Prior to conducting the research given the time to adapt for 2 weeks little by little. Provision of drinking water is given in ad libitum, the water is changed every day and the place is washed clean.

2.8.4. Drug Administration

The first sheep entered the cage given worm medicines during adaptation with adaptation with a dose of 1 cc / 5 kg body weight and vitamin B-complex injections. While other drugs are given based on the need when the cattle are sick.

2.8.5. Weight Weighting

Weighing the body weight of sheep is done at the beginning of the study and retrieval of weight gain data once a week.

3. Results and Discussion

3.1. Feed Consumption

Feed consumption is the ability of livestock to spend a certain amount of feed given ad libitum. Feed consumption can be calculated by reducing the amount of feed given to the remaining feed. The average feed intake treatment can be seen in Table 1 (g / head / day)

Table 1. The average feed intake (g / head / day)

Treatment	Repeat					Average ± SD
	I	II	III	IV	V	
P_0	487,3	456,4	448,3	497,1	460,9	$472,8^{c}$ ± 21,0
P_1	520,9	573,6	528,6	528,9	546,6	$539,7^{b}$ ± 21,1
P_2	593,2	531,0	520,6	588,8	591,3	$565,0^{b}$ ± 36,0
P_3	632,4	646,2	666,4	619,2	597,0	$632,2^{a}$ ± 26,3

Description: The different superscripts in the columns show significantly different results

Table 1 above shows that the highest consumption of sheep feed is found in P3 treatment of 632.2 ± 4.9 g / head / day and the lowest feed intake is found in P0 treatment of 472.8 ± 21.0 g / /day. The result of the variance analysis in Appendix 1 shows that the use of fermented sago pulp to dry sheep feed consumption gave a significant effect (P <0,05).

Duncan's further test results showed that P0 treatment was significantly different from P1, P2 and P3. But the treatment of P1 and P2 is not significantly different. This shows that 20% fermented sago pulp + 20% non fermented sago pulp with 30% fermented sago pulp + 10% non fermented sago pulp are not significantly different. This shows the best feed intake by using 40% fermentation sago dregs compared to 40% non-fermented sago pulp (control).

Factors that affect feed consumption are palatability. In this study EM4 was administered by mixing with sago pulp as a sheep ration formula. Increased consumption is thought to be due to the influence of the addition of microorganisms present in EM4, into the growing stomach of sheep. So that the activity of digestion work also increase. EM4 containing Lactobacilli Sp that can help improve the microbial state in the gastrointestinal tract as a natural mocroorganism, thus providing a beneficial effect

through the production of organic acids and can inhibit the work of pathogenic bacteria. This is appropriate [1], which states that the amount of feed ingredients consumed is influenced by several variables including the amount of available feed and chemical composition and quality of feed ingredients. The level of consumption difference is also influenced by body weight, age, feed digestibility, quality, and palatability.

3.2. Increase of Body Weight

Intake of weight gain data is done by weighing every 2 weeks. PBB is calculated based on final body

weight minus initial body weight in g / head / day. The result of weight gain of sheep body during the study as in Table 2.

Table 2. Average weight gain of sheep during the study (g / head / day).

Treatment	Repeat					Average ± SD
	I	II	III	IV	V	
P_0	64,3		56,162,0	57,656,8		$59,6^{d}$ ± 3,4
P_1	77,7		77,470,3	76,278,9		$76,1^{c}$ ± 3,3
P_2	100,7		95,297,7	104,1	98,5	$96,2^{b}$ ± 3,3
P_3	114,7		108,6114	105,1	116,3	$111,7^{a}$± 4,7

Description: The different superscripts in the columns show significantly different results (P<0,05)

Table 2 shows that the highest body weight gain was P3 treatment of 111.7 ± 4.71 g / head / day, whereas the lowest body weight gain was P0 which was 59.6 ± 3.48 g / head / day.

The result of variance analysis in Appendix 2 shows that the use of fermented sago pulp on sheep performance gives a real effect (P <0,05) on sheep growth. It is assumed that each treatment gives a real response to the growth of sheep, especially to P3 treatment which has better palatability and digestibility so that feed can be digested optimally.

Further Duncan test results showed that the treatment using sago pulp fermented with EM4 has a significant effect on body weight growth of sheep. This suggests that all treatments differed significantly from sheep body weight gain. This is also consistent with the statement based on Amir et al. (2012) research using the fermented sago pulp fed to boer goats as much as 40% of the total feed can result in daily weight gain of 78.75 g / head / day. This shows the best weight gain by using 40% fermentation sago dregs compared to 40% non fermented sago pulp.

The results showed that daily weight gain of sheep gave a significant effect (P <0.05). This means that the provision of sago pulp fermented with EM4 up to 40% level significantly affect the daily weight gain sheep.

The addition of EM4 in which it contains lignocellulosic microbes will help break the lignocellulosic bond, so that lignin and cellulose will be released from the bond. Proteolytic microbes produce protease enzymes that will break down proteins into polypeptides, then become simple and last peptides to amino acids.

EM4 containing cellulosic decomposers can break hydrogen bonds, besides EM4, there is lactic acid bacteria that serves to break down glucose and fructose to produce energy of 2 pyrup, lactate, ethanol and CO2. This is in accordance with the opinion of Surung (2008) which states that EM4 as a useful probiotics manipulate gastrointestinal microbes for the purpose of improving the health conditions of the digestive tract, so that the digestibility activity of the feed ingredients better.

According to Tilman et al (2002), which states the growth rate of a livestock is controlled by the amount of ration consumption, especially the energy obtained. Energy is a pioneer in livestock production and it happens naturally. To get the maximum UN so it is necessary to note the state of quality and quantity of rations. These rations should contain nutrients in a sufficient and balanced state so as to support maximum growth.

3.3. Feed Conversion

Feed conversion is calculated based on the ratio of feed consumption with the added weight of body produced with the same unit. The mean of sheep feed conversion is shown in Table 3.

Table 3. Mean conversion of sheep feed during the study

Treatment	Repeat I	II	III	IV	V	Mean ± SD
P_0	12,3	12,8	12,5	12,4	12,3	$12,7^{a}$± 0,08
P_1	11,2	11,1	11,2	11,0	11,6	$11,34^{b}$ ±0,51
P_2	8,7	8,8	8,9	8,7	8,9	$8,93^{c}$ ± 0,02
P_3	8,6	8,5	8,6	8,5	8,7	$8,62^{c}$ ± 0,23

Description: The different superscripts in the columns show significantly different results (P<0,

Duncan's further test results showed that P0 treatment was significantly different from P1, P2 and P3. But the treatment of P2 and P3 is not significantly different. This shows that all fermented sago pulp treatment 30% + non fermentation sago pulp 10% with 40% fermentation sago pulp to feed conversion.

The result of the analysis showed that the feeding of sago pulp fermented with EM4 in the ration had a very significant effect (P <0.05) on the feed conversion. This means that the sago fermented sago with EM4 up to 40% level can increase the feed conversion significantly. The addition of EM4 to 40% level is expected to increase the degree of fermentation of high quality organic food material so that sufficient available energy is sufficient. This proves that the fermented sago pulp with EM4 gives good results, especially in fiber breaking, raising the level of digestibility, protein, texture, aroma and feed fat that helps the effort to improve the efficiency of feed utilization. According Anggorodi [2], feed conversion is one indicator to describe the level of efficiency of the use of rations, the lower the conversion rate of rations means the better the efficiency of the use of feed. Generally it can be seen that the sago pulp fermented with EM4 up to 40% level has the conversion rate of terenda feed that is equal to 8,62. However, based on the results of variance analysis showed the results are real, so that the use of sago pulp fermented with EM4 to 40% affect the conversion of feed.

In the opinion of Rasyaf [3], whether or not the quality of the ration is determined by the balancedness of nutrients in the ration. In addition, the feed must have good palability of texture and aroma. Rations that lack one of the nutritional elements will result in livestock will consume excessive feed to meet the lack of substances needed by his body. Livestock that obtain food is just enough to meet basic life, the weight of the livestock body will have difficulty to rise. According to Haryanto [4], the use of probiotic EM4 which is a mixture of various species of microorganisms, especially microorganisms that are able to break down the fiber component (cellulolytic microorganism) through feed can increase the productivity of livestock

4. Conclusions

The use of the fermented sago pulp EM4 to 40% in the ration has a positive effect in increasing the body weight, feed consumption and decrease the conversion value of feed to the sheep.

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