JurnalPeternakanIntegratif

Effect Of Fermented Rice Straw With Ecoenzymes On Digestibility of Dry Matter and Organic Matter In Local Sheep

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Abstrack. Rice straw with abundant availability becomes very potential to be used as local sheep feed. Fermentation needs to be done to improve the nutritional quality of rice straw which is quite low. The nutritional content needs to be considered in order to support the productivity of sheep. Local sheep is one of the livestock commodities that provide meat. This study aimed to determine the digestibility of dry matter and organic matter feed based on rice straw (oryza sativa) fermented with ecoenzymes in male local sheep. The research was carried out in Namorambe, Deli Serdang Regency, North Sumatra from January to March 2021 and at the Chemistry Postgraduate Laboratory, University of North Sumatra. The design used was a completely randomized design (CRD) with 5 treatments and 4 replications. The treatments consisted of P0 (100% odot grass without fermented rice straw), P1 (75% odot grass and 25% fermented rice straw), P2 (50% odot grass and 50% fermented rice straw), P3 (25% odot grass and 75% fermented rice straw), P4 (100% fermented rice straw without odot grass). The parameters observed were dry matter digestibility and organic matter digestibility. The results showed that the administration of fermented rice straw with ecoenzymes did not significantly affect the dry matter and organic matter digestibility of male local sheep. The conclusion of the study showed that the administration of fermented rice straw with ecoenzymes had the same dry matter and organic matter digestibility as odot grass.

Keywords: dry matter digestibility, fermentation, organic digestibility, rice straw, sheep

1. Introduction

Rice straw is an alternative that has the potential to become animal feed under certain conditions. The potential of rice straw is indicated by its abundant availability and most of it tends not to be utilized. Unfortunately, the disposal process that is often carried out is burning on agricultural land so that it will cause air pollution. Data from [1] shows that 37% of waste straw that is not utilized because it is burned and is used as compost from the bottom of the cage is 36%. Furthermore, only about 15% - 22% is used as a source of animal feed. Meanwhile, according to [2], the use of rice straw as feed has only reached 31-39%, other than for burning or returning to the ground 36-62%, and for industry 7-16%.

Judging from the low nutritional content of rice straw with dry matter 90.53%, crude protein 4.50%, crude fiber 35.00%, crude fat 1.55%, TDN 43.00% [3]. So it is necessary to process rice straw. One of them is by fermenting rice straw.

Ecoenzyme is a fermenter that can be used in rice straw fermentation. Ecoenzyme is a complex effort by utilizing organic waste such as waste from fruits and vegetables, sugar (molasses) and water which is fermented within three months.

Rice straw fermented with ecoenzymes for 21 days was able to improve the quality of rice straw waste to 14,2202 crude protein, 28.010 crude fiber. However, the provision of fermented rice straw waste with ecoenzymes has not fulfilled the nutritional needs of male local sheep so that other forages are needed, such as odot grass.

Odot grass is a superior type of grass that has high productivity and nutrient content. [4], explained that odot grass that was cut every 2 to 4 weeks produced a composition of 85.50% and 11.50% of crude protein and water content, and 3.20% and 29.3% of crude fat and crude fiber, respectively.

To determine the feasibility of a feed to be given to livestock, it is necessary to do a digestibility test. Digestion is a series of processes that occur in the digestive tract until absorption occurs. Digestibility of feed is very important to know because it can be used to determine the quality of the feed. The higher the digestibility of a feed ingredient can increase the efficiency of feed use. Several things that affect the digestibility of feed ingredients include chemical composition of feed ingredients, composition of rations, physical form of rations, level of feeding and internal factors of livestock [5]. Feed ingredients have high digestibility if they contain easily digestible nutrients [6].

Sheep is one of the livestock commodities that participate in the supply of meat in the country. The available meat is expected not only in sufficient quantity but also of better quality. One of the ways to achieve this is through better feeding management. Forage feed is the main source of feed that is often given to livestock. Forage in Indonesia generally has a low quality so that it is not able to support maximum livestock productivity due to insufficient supply of energy, protein and minerals. To meet the nutritional and feed needs continuously, fermented feed from waste is utilized.

Efforts to increase products from livestock, namely lamb meat can still be developed. One of the efforts made is through the use of organic waste as feed for sheep with the aim of saving costs and time. The use of fermented waste as animal feed provides an advantage by using useless materials to produce livestock products in the form of meat.

Based on this, the authors are interested in conducting research on the digestibility of dry matter and organic matter in male local sheep fed rice straw (oryza sativa) fermented with ecoenzymes.

2. Materials and Method

2.1. Materials

The material used was 20 male local sheep with a body weight range of ±14 kg with a standard deviation of ± 1.40 used as research objects. Materials in the form of eco enzymes, odot grass, molasses, minerals, medicines, namely worm medicine, antibiotics, drinking water, rhodalone as a disinfectant, water as an ingredient for making ecoenzymes and rice straw as an object of fermentation.

2.2. Methods

The study was carried out experimentally using a completely randomized design (CRD) with 5 treatments and 4 replications by giving 10% of body weight. The treatment given is as follows:

P0 : 100% Odot Grass + 0 % Rice Straw Fermented with ecoenzyms

P1 : 75% Odot Grass + 25% Rice Straw Fermented with ecoenzyms

P2 : 50% Odot Grass + 50% Rice Straw Fermented with ecoenzyms

P3 : 25% Odot Grass + 75% Rice Straw Fermented with ecoenzyms

P4 : 0 % Odot Grass + 100 % Rice Straw Fermented with ecoenzyms

The replication is obtained by the following formula:

$t (n-1) \geq 15$

$5 (n-1) \geq 15$

$5n-5 \geq 15$

$5n \geq 20$

$n \geq 20/5$

$n \geq 4$

3. Results and Discussion

3.1. Dry Material Consumption

Table 1. Consumption of dry matter for local male sheep (g/week).

Treatments	Replication				Total	Mean
	U1	U2	U3	U4		
P0	2922,34	2923,50	2928,47	2920,88	11.695,19	2923,80[a]
P1	2751,44	2737,09	2695,14	2693,76	10.877,43	2719,36[b]
P2	2492,67	2497,99	2458,95	2468,08	9.917,69	2479,42[c]
P3	2220,63	2143,68	2118,26	2104,96	8.587,53	2146,88[d]
P4	1895,82	1889,02	1892,75	1883,09	7.560,68	1890,17[e]

Note: Different superscripts in the same column indicate a significant effect (P<0.05).

Based on the results of the study in "Table 1", it is known that the highest dry matter consumption was found in treatment P0 of 2923.80 g/week and the lowest was found in P4 which was 1890.17 g/week. The results of Duncan's further test showed that there was a significant effect of giving straw on fermentation to the dry matter consumption of local male sheep (P<0.05).

The level of dry matter consumption of fermented rice straw which had a significant effect showed that feed consumption and feed palatability were almost the same. In accordance with the statement [7] which states that the level of palatability which is almost the same will provide the same level of dry matter consumption in local male sheep.

3.2. Consumption of Organic Ingredients

Table 2. Consumption of organic matter for local male sheep (g/week).

Treatments	Replication				Mean
	U1	U2	U3	U4	
P0	1935,30	1936,07	1939,36	1934,33	1936,26[a]
P1	1825,52	1816,00	1788,17	1787,25	1804,24[b]
P2	1759,47	1763,23	1735,67	1742,11	1750,12[c]
P3	1659,16	1601,66	1582,68	1572,74	1604,06[d]
P4	1510,18	1504,76	1507,73	1500,04	1505,68[e]

Note: Different superscripts in the same column indicate a significant effect (P<0.05).

Based on the results of the study in "Table 2", it is known that the highest organic matter consumption was found in treatment P0 of 1936.26 g/week and the lowest was found in P4 which was 1505.68 g/week. The results of Duncan's further test showed that there was no significant effect of fermented rice straw on the consumption of organic matter for local male sheep.

The consumption of organic matter which had a significant effect was supported by the consumption of dry matter which also had a significant effect. This is in accordance with

statement [8] which states that if the consumption of dry matter is not significantly different, it is very possible that the value of consumption of organic matter also has an insignificant effect. Consumption of organic matter is influenced by consumption of total dry matter [9].

3.3. Dry Matter Digestibility

Table 3. Dry matter digestibility of treated feed.

Treatments	Replication				Mean
	U1	U2	U3	U4	
P0	64,38	74,50	76,99	75,64	72,88[a]
P1	68,14	58,78	55,25	70,62	63,20[ab]
P2	61,40	45,82	63,91	63,65	58,70[b]
P3	55,35	55,23	61,48	50,29	55,59[b]
P4	42,96	40,51	39,01	31,75	38,56[c]

Note: Different superscripts in the same column indicate a significant effect (P<0.05).

Dry matter digestibility which had a significant effect was influenced by dry matter consumption which also had a significant effect. This is in accordance with statement [8] which states that if the consumption of dry matter is not significantly different, then the dry matter digestibility is also not significantly different. This is also supported by the statement [10] which states that the value of ration consumption has an effect on digestibility, so that the consumption that is not significantly different between treatments results in the digestibility value which is also not significantly different.

3.4. Digestibility of Organic Ingredients

Table 4. Digestibility of treated feed organic matter

Treatments	Replication				Mean
	U1	U2	U3	U4	
P0	58,05	70,50	72,38	72,78	68,42[a]
P1	62,78	50,61	47,72	65,02	56,53[a]
P2	62,81	43,48	60,12	61,38	56,95[a]
P3	57,18	57,15	62,11	50,43	56,72[a]
P4	41,64	42,13	34,10	36,49	38,59[b]

Note: Different superscripts in the same column indicate a significant effect (P<0.05).

The results showed that the highest organic matter digestibility of fermented rice straw and odot grass was found at P0 which was 68.42 and the lowest was at P4 which was 38.59. The significant effect shown by the results of the study on the digestibility of organic matter was due to differences in the crude fiber content of the treated feed. Fermentation carried out on fermented rice straw does not make the organic matter content resembling odot grass. This is in accordance with the statement [11] which states that the digestibility of organic matter in sheep fed a feed

with a higher organic matter content will also be higher than that of a feed containing a lower organic matter.

4. Conclusion

The provision of eco-fermented rice straw with odot grass substitution enzymes gave a good effect on dry matter digestibility and organic matter digestibility of male local sheep.

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