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The Effect of Fermented Rice Straw with Eco Enzyme on Percentage Non Carcas of Local Sheep

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Abstract. Most sheep are kept in the countryside as it is easy to maintain and have high economic value. This study aims to determine the effect of feeding fermented rice straw combine with odot grass (*Pennisetum purpureum cv*) on the percentage of non-carcass of local sheep. Rice straw was fermented by eco enzyme. The research method used was a completely randomized design experiment (CRD) with five treatments and four replications while the treatments were given as P0 = 0% fermented rice straw, P1 = 25% fermented rice straw, P2 = 50% fermented rice straw, P3 = 75% fermented rice straw and P4= 100% fermented rice straw. Parameters observed were head weight percentage without skin, leg weight percentage without skin, skin weight percentage, tail weight percentage without skin, trachea and lungs weight percentage, liver weight percentage, heart weight percentage, blood weight percentage, intestine weight percentage, compound belly weight percentage. The results showed that the administration of 25% fermented rice straw combine with odot grass caused better non-carcass percentage, such as the percentage of skin, the percentage of the head without skin, the percentage of the leg without skin, the percentage of liver, the percentage of the heart, the percentage of the trachea and lungs, the percentage of the stomach compound and blood percentage. Based on the results of the study, it is known that the use of 25% fermented rice straw combine with odot grass on male local sheep give the best result on non-carcass and can be an alternative feed for sheep.

Keywords: fermentation, local sheep, non-carcass, odot grass, rice straw

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1. Introduction

Sheep are livestock that are easy to maintain and have high economic value. Market demand continues to increase for lamb meat for public consumption. Apart from meeting the needs during Eid al-Adha, lamb meat is also supplied for aqiqah, restaurants and street food stalls.The sheep population in Indonesia based on statistical data in 2018 reached 17,611,392 heads and increased in 2019 to reach 17,794,344heads [1]. The development of the sheep farming business is carried out as one of the livestock sub-sector commodity developments. There are two types of sheep that have been kept, namely fat tail sheep and thin tail sheep or local sheep. The existence of this sheep is a business capital for breeders who cultivate, so that the existence of sheep can not only create jobs and business fields but can also provide income for business actors [2].

Feed is one of the limiting factors in livestock development. Feed plays an important role in livestock business so that it determines the profit and loss of a business. Utilization of agricultural/plantation

waste rice straw, corn straw, midrib and oil palm leaves is one way to find alternative feed sources for livestock, especially the use of rice straw waste which is fermented.

Overall, the rice harvested area in Indonesia is around 11,377,934 ha, the production per hectare of rice can reach 54,604,033 tons of rice each time, depending on the location and variety. Meanwhile, in North Sumatra, rice production in 2019 reached 413,141 hectares, while the total rice production produced was 2,078,902 tons per hectare [3]. Utilization of rice straw is still around 38% of the total production, so that the amount of rice straw that has not been utilized is 62% of the available amount [4]. Rice straw as crop agricultural waste contains crude protein (PK) 3.6%, crude fat (LK) 1.3%, BETN 41.6%, ash 16.4%, lignin 14.9%, crude fiber (SK) 32.0%, silica 13.5%, calcium (CA) 0.24%, potassium (K) 1.20%, magnesium (Mg) 0.11%, and phosphorus (P) 0.10%.

In this study, rice straw was fermented with eco-enzyme which is a fermenter derived from fruit waste. Eco enzymes can be made by farmers themselves, thereby reducing the costs of farmers' expenses [5]. After fermentation the crude protein quality of fermented rice straw has increased compared to unfermented rice straw, and is followed by a decrease in crude fiber content after fermentation [6]. Non carcass is the result of slaughtering livestock consisting of head, skin and fur, blood, internal organs, lower legs of the carpal joints for the forelegs and tarsal joints for the hind legs. Feed can affect the weight gain of non-carcass components. Based on this, the authors are interested in conducting research related to the effect of fermenting rice straw fermented with ecoenzymes on the percentage of non-carcass male local sheep.

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 (fruit waste : papaya, banana and pineapple, molase and non chlorine water), odot grass, molasses, minerals, medicines, namely worm medicine, antibiotics, drinking water, rhodalone as a disinfectant.

2.2. Methods

The study was carried out experimentally using a completely randomized design (CRD) with 5 treatments and 4 replications. The treatment given is as follows:

P0 : 100% odot grass + 0 % fermented rice straw

P1 : 75% odot grass + 25% fermented rice straw

P2 : 50% odot grass + 50% fermented rice straw

P3 : 25% odot grass + 75% fermented rice straw

P4 : 0 % odot grass + 100 % fermented rice straw

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. Percentage of Head Weight Without Skin (%)

Table 1. Effect of fermented rice straw by eco enzymes and odot grass on percentage of head weight without skin (HWWS) on local sheep

Treatments	HWWS (%)		Total	Average± sd
	I	II		
P0	6,28	5,85	12,13	$6,06^{BC}$±0,30
P1	7,41	7,57	14,98	$7,49^{A}$±0,11
P2	7,12	6,98	14,10	$7,05^{A}$±0,09
P3	6,24	6,62	12,86	$6,43^{B}$±0,26
P4	5,94	5,66	11,60	$5,80^{C}$±0,19

Note: Different superscripts in the same column show significant differences very significant ($P<0.01$);

Based on the results of the study that 25% and 50% fermented rice straw caused a good effect on head weight as non-carcass head organ obtained was larger and heavier. This is in accordance with the statement of [7] that animal feed with good nutrition will effect the development of body parts such HWWS become relatively heavier. Odot grass has more influence on HWWS but fermented rice straw also has an effect. It is proven that after the addition of fermented rice straw HWWS is better.

3.2. Percentage of Leg Weight Without Skin (%)

Table 2. Effect of rice straw fermented with eco enzymes on percentage of leg weight without skin (LWWS)

Treatments	LWWS (%)		Total	Average ±sd
	I	II		
P0	3,54	3,17	6,71	$3,35^{B}$±0,26
P1	4,09	4,26	8,35	$4,17^{A}$±0,12
P2	2,86	2,76	5,62	$2,81^{C}$±0,07
P3	3,15	2,84	5,99	$2,99^{BC}$±0,21
P4	2,80	2,91	5,71	$2,85^{C}$±0,07

Note: Different superscripts in the same column show significant differences very significant ($P<0.01$);

Based on the results of the study showed that the administration of odot grass combine with fermented rice straw gave a very significant difference on LWWS. This is because nutritions in odot grass combined with fermented rice straw support sheep growth include. This is in accordance with the statement of [6] that with animal growth caused a changed in the development of body parts such as LWWS which relatively heavier.

3.3. Skin Weight Percentage (%)

Table 3. The effect of giving rice straw fermented with eco enzymes on percentage of skin weight (SW)

Treatments	SW (%)		Total	Average ±sd
	I	II		
P0	8,10	7,24	15,34	$7,67^{c}$±0,60
P1	9,64	8,94	18,58	$9,29^{a}$±0,49
P2	8,82	8,89	17,71	$8,85^{ab}$±0,04
P3	7,76	8,36	16,12	$8,06^{bc}$±0,42
P4	7,92	8,01	15,93	$7,96^{bc}$±0,06

Description: Different superscripts in the same column showsignificant difference ($P<0.05$);

Based on the results of this study, it showed that rice straw fermentation gave a significant difference to the weight of SW. This is because the greater the cutting weight will result in wider skin. In accordance with the statement of [7] showed that SK in sheep were proportional to the slaughter weight.

3.4. Tail Weight Percentage Without Skin

Table 4. Effect of rice straw fermented with eco enzymes on percentage of tail weight without skin (TWWS)

Treatments	TWWS (%)		Total	Average±sd
	I	II		
P0	0,18	0,20	0,38	$0,19^{tn}$±0,014
P1	0,22	0,23	0,45	$0,22^{tn}$±0,007
P2	0,22	0,21	0,43	$0,21^{tn}$±0,007
P3	0,19	0,16	0,35	$0,17^{tn}$±0,021
P4	0,21	0,20	0,41	$0,20^{tn}$±0,007

Description: tn= shows no significant difference (P>0.05);

Based on the results of this study, it was shown that rice straw fermentation gave no significant difference to the percentage of tails. This is because the position of fat in local sheep is not in the tail but in another part. This is in accordance with the statement of [7], which states that fat deposition in local sheep is not located in the tail, but is found in other parts such as the viscera and under the skin.

3.5. Weight Percentage of Trachea and Lungs

Table 5. Effect of rice straw fermented with eco enzymes on percentage weight of trachea and lungs (WTL)

Treatmennt	WTL		Total	Average±sd
	I	II		
P0	1,24	1,16	2,40	$1,20^{C}$±0,056
P1	1,97	1,79	3,76	$1,88^{A}$±0,127
P2	1,78	1,77	3,55	$1,77^{AB}$±0,007
P3	1,67	1,72	3,39	$1,69^{AB}$±0,035
P4	1,71	1,60	3,31	$1,65^{B}$±0,077

Note: Different superscripts in the same column show significant differencesvery significant (P<0.01);

Based on the results of the study showed that rice straw fermentation gave a very significant difference on WTL (%). This is because the feed given to livestock greatly affects the non-carcass weight. This is in accordance with the statement of [8] sheep that consume feed with high energy content have heavier heart, lungs and kidneys than sheep that consume feed with low energy content.

3.6. Liver Weight Percentage

Table 6. Effect of rice straw fermented with eco enzymes on percentage of liver weight (LW)

Treatments	LW (%)		Total	Average±sd
	I	II		
P0	1,51	1,47	2,98	$1,49^{C}$±0,02
P1	2,18	2,23	4,41	$2,20^{A}$±0,03
P2	1,97	1,87	3,84	$1,92^{B}$±0,07
P3	1,81	1,88	3,69	$1,84^{B}$±0,04
P4	1,84	1,82	3,66	$1,83^{B}$±0,01

Note: Different superscripts in the same column show differencesvery significant (P<0.01);

Based on the results of the study showed that rice straw fermentation had a very significant effect on the percentage of liver weight. This is because high nutrient consumption can increase liver weight. This is in accordance with [9] statement that high nutritional consumption increases liver weight and total digestive tract weight, but reduces head, leg and spleen weights.

3.7. Heart Weight Percentage

Table 7. Effect of rice straw fermented with eco enzymes on percentage of heart weight (HW)

Treatments	HW		Total	Average±sd
	I	II		
P0	0,63	0,58	1,21	$0,60^{C}$±0,03
P1	0,88	0,83	1,71	$0,85^{A}$±0,03
P2	0,82	0,79	1,61	$0,80^{A}$±0,02
P3	0,68	0,69	1,37	$0,68^{B}$±0,01
P4	0,66	0,63	1,29	$0,64^{BC}$±0,02

Note: Different superscripts in the same column show significant differencesvery significant (P<0.01);

Based on the results of the study showed that rice straw fermentation gave a very significant difference on HW. This is because in this study the use of fatty acids did not contain toxins and anti-nutritional substances so that they did not cause excessive contraction of the heart muscle. This is in accordance with the statement of [10] which states that the heart is very susceptible to toxins and anti-nutritional substances, enlargement of the heart can occur due to the accumulation of toxins in the heart muscle.

3.8. Blood Weight Percentage

Table 8. Effect of rice straw fermented with eco enzymes on percentage of blood weight (BW)

Treatments	BW (%)		Total	Average ±sd
	I	II		
P0	2,40	2,39	4,79	$2,39^{BC}$±0,01
P1	3,34	3,67	7,01	$3,50^{A}$±0,23
P2	2,63	2,86	5,49	$2,74^{B}$±0,16
P3	2,49	2,54	5,03	$2,51^{BC}$±0,03
P4	2,43	2,28	4,71	$2,35^{C}$±0,10

Description: Different superscripts in the same column indicate significant differencesvery significant (P<0.01);

Based on the results of the study showed that rice straw fermentation gave a very significant difference on BW (%). This is because the greater the slaughter weight will produce more blood volume. This is in accordance with the statement of [7] showing that blood volume in sheep is proportional to the weight of the slaughter.

3.9. Intestinal Weight Percentage

Table 9. Effect of rice straw fermented with eco enzymes on percentage of intestine weight (IW)

Treatments	IW (%)		Total	Average±sd
	I	II		
P0	5,58	5,94	11,52	$5,76^{tn}$±0,25
P1	6,65	7,12	13,77	$6,88^{tn}$±0,33
P2	6,61	6,45	13,06	$6,53^{tn}$±0,11
P3	6,10	5,97	12,07	$6,03^{tn}$±0,09
P4	6,07	5,16	11,23	$5,61^{tn}$±0,64

Description: tn= shows no significant difference (P>0.05);

Based on the results of the study showed that rice straw fermentation gave no significant difference on IW (%). This is because body weight gain is in line with the growth of intestinal weight. And it is assumed that the growth of body weight is very influential on the non-carcass weight. This is in accordance with the statement of Berg and Butterfield (1976) cited by [12], the growth rate of several non-carcass components is almost the same as the body's growth rate, for example the abomasum and large intestine reach maturity almost simultaneously with the body.

3.10. Percentage of Compound Stomach

Table 10. Effect of rice straw fermented with eco enzymes on percentage of compound stomach weight (CSW)

Treatments	CSW (%)		Total	Average±sd
	I	II		
P0	4,1	4,07	8,17	$4,08^{D}$±0,02
P1	6,69	6,11	12,8	$6,40^{A}$±0,41
P2	5,38	5,27	10,65	$5,32^{B}$±0,07
P3	5,04	4,7	9,74	$4,87^{BC}$±0,24
P4	4,68	4,76	9,44	$4,72^{C}$±0,05

Description: Different superscripts in the same column indicate differencesvery significant (P<0.01);

Based on the results of the study showed that rice straw fermentation gave a very significant difference on CSW (%). This is because the nutritional content of the feed given to male local sheep affects the total digestive apparatus. This is in accordance with the statement of [9] that high nutrient consumption increases the weight of the liver, rumen, omasum, large intestine, small intestine and total digestive tract, but on the contrary for the weight of the head and legs of treatment and nutrition as well as pastoral and food species in sheep does not affect the weight of the head, feet and skin at the same body weight.

4. Conclusion

Giving odot grass combined with fermented rice straw 25% to male local sheep caused better percentage of non-carcass, such as the percentage of skin, percentage of head without skin, percentage of legs without skin, percentage of liver, percentage of heart, percentage of trachea and lungs, compound stomach percentage and blood percentage. Meanwhile, treatments caused no effect on the percentage of tail without skin and the percentage of intestine.

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