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The Effect of Using Different Sources of Carbohydrates to Feed Efficiency on Indigenous Thin Tailed Male Lamb

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ABSTRACT: Differences in structure and bonding material feed sources of carbohydrates causes the difference fermentability and digestibility in the rumen and post-rumen. Thus, the utilization rate and feed efficiency were also different. The objective of this experiment was to study the feed efficiency of various sources of dietary carbohidrates on indigenous thin tailed male lamb. The experiment design was randomized block design 4x4. Sixteen thin tailed male lamb with average body weight 15+2.07 kg maintained for 12 week. The 4 treatment applies in ration (CP 13%, TDN 68%) namely, P1= complete feed containing rice bran 25% DM, P2= complete feed containing corn 25% DM, P3= complete feed containing cassava waste meal 25% DM, P4 = complete feed containing sorghum 25% DM. The result showed that the fed containing different sources of carbohydrates significantly effect on dry matter intake, average daily gain (ADG) and feed effisiency ($P<0.01$). Feed efficiency generated in this study were 15.75 (P1); 17.96 (P2); 15.55 (P3) dan 19.09% (P4). Based the result on this study, it could be concluded that the feed containing carbohydrates from grain (corn and sorghum) are more efficiency than carbohydrates sources from agriculture by product (rice brand and cassava waste meal), but still profitable use as a source of energy in the ration of sheep.

Keywords: Lamb, carbohydrates, daily gain, feed efficiency

INTRODUCTION

Feed efficient will provide great benefits in the farm. The better quality of the feed will generate a high body weight gain and more efficiently of feed (Tadeschi *et al.,* 2006). In addition to protein, the animal requires energy adequacy, because energy shortage led to an overhaul of protein so that the feed is not efficient. Feed ingredients such as maize and sorghum are often used as a source of energy in the ration of fattening (Theurer *et al.,* 1999; Ncube *et al.*, 2014). Although the energy needs can be supplied from ruminant livestock forage, but the provision of grain will be able to reduce the production of methane and improve feed efficiency (Gill, 2012). Unfortunately, the needs of feed ingredients such as grain today compete with humans, i.e. as food or biofuel (McNeil, 2012). Therefore, the use of industrial wastes such as rice bran and cassava waste meal should be increased to replace corn and sorghum. Ku Vera *et al* (2014) states that the energy efficiency of feed utilization influenced by differences in physical characteristics, digestibility and metabolism of each of the feed materials, as well as other components contained in the feed material, such as tannin (Rooney *et al,* 2005). Based on it, the different sources of energy in the diet is also likely to produce a different feed efficiency.

MATERIALS AND METHODS

Sixteen indigenous thin tailed male lamb 6-8 months old with an average body weight 15+2.07 kg maintained for 12 weeks. The experimental design used was completely randomized block design with 4 treatments and 4 block as replicates. Four treatment diets prepared with 4 different carbohydrate sources, namely:

P1 = complete feed containing rice bran 25 % dry matter
P2 = complete feed containing corn 25 % dry matter
P3 = complete feed containing cassava waste meal 25 % dry matter
P4 = complete feed containing sorghum 25 % dry matter

Several feed ingredients used to make the treatment ration were rice straw fermented, coffee hull, coconut meal, palm kernel meal, urea and lime. The composition of ingredients and nutrient of the ration are shown in Table 1.

Tabel 1. Composition of ingredian and nutrient of the ration

Feed ingredients	Treatment				Feed Prices IDR*
	Rice bran 25% DM	Corn 25% DM	Cassava waste 25% DM	Sorgum 25% DM	
	---------- % DM ----------				
Fermented rice straw	17.0	20.5	18.0	19.8	500
Coffee hull	16.0	20.3	16.5	17.0	700
Rice bran	25.0	-	-	-	3000
Corn	-	25.0	-	-	3200
Cassava waste	-	-	25.0	-	1700
Sorghum	-	-	-	25.0	3500
Palm kernel meal	20.6	16.0	19.0	16.0	1800
Coconut meal	20.0	16.0	19.5	21.0	3500
Urea	0.4	0.86	1.3	0.5	4000
$CaCO_3$	1.0	1.34	0.75	0.7	2000
Total digestible nutrients (%)	68.36	70.25	68.35	71.45	
Crude protein (%)	13.57	13.38	11.13	14.15	
Extract ether (%)	6.39	4.96	4.06	3.28	
Crude fiber (%)	33.92	31.02	33.24	28.52	
Nitrogen free extract (%)	21.89	29.58	28.41	31.11	
Ash (%)	12.71	9.37	11.31	10.34	

Note : *feed prices in 2015

The parameters measured in this experiment were dry matter intake (DMI), average daily gain (ADG), feed efficiency and income over feed cost (IOFC). Feed offered and refused was measured and recorded daily during to calculate feed intake. Orts (10% daily refused) composite than were dried at 55°C and ground. Dried samples of feed and orts were analyzed for DM (AOAC, 2000). The lambs were weighed at 2 week intervals berofe feeding. Data were analyzed using Analyzed of Variance (ANOVA) with F test to determine the treatment effect and continued with Duncan New Multiple Range Test (DMRT) (Steel and Torie, 1984).

RESULTS AND DISCUSSION

Dry Matter Intake and Feed Efficiency

The average of dry matter intake, daily weight gain and feed efficiency calculation to the lambs experiment is presented in Table 2. Dry matter intake (DMI), average daily gain (ADG) and feed efficiency overall was affected by the treatment ($P < 0.05$). Dry matter intake of corn and rice bran ration were higher than cassava and sorghum ration, because rice bran and corn have higher digestibility than cassava and sorghum, so will experience rate of passage in the rumen faster. As a result, the stomach will quickly empty and encourage the lamb to eat more. A bulky physical forms of cassava and tannin content in sorghum is also thought to be because a low digestibility and palatability (Ncube *et al.*, 2014). Based on the percent of live weight (LW), DMI of the treatment lamb 3.28 to 3.63%, included low. According Ranjhan (1981), fattened lamb should consume between 4.5 to 5% LW. The low consumption is due to the physical form of the dry and dusty feed (mash). Although consumption of sorghum ration DM was lower than the rice bran ration, but able to generate average daily gain (ADG) is higher. Brouk (2010) state in generating energy sorghum can be compared with corn. The content of tannins in sorghum also does not cause negative effects. White sorghum used in this study only contains tannin of 17.2 g/kg DM, according to Waghorn (1990) contains tannins below 40 g/kg DM has no effect on animal performance.

Table 2. Dry matter intake, daily gain and feed efficiency in treatment lambs

Parameters	Treatment			
	Rice bran 25% DM	Corn 25% DM	Cassava waste 25% DM	Sorgum 25% DM
Dry matter intake (g/day)	680.54[a]	673.08[a]	592.70b	560.05[b]
Dry matter intake (% LW)	3.63[a]	3.48[b]	3.28[c]	3.28[c]
Daily weight gain (g/day)	106.75[ab]	120.24[a]	91.37[b]	105.11[b]
Feed convertion	6.38[a]	5.60[b]	6.49[a]	5.33[c]
Feed efficiency (%)	15.75[bc]	17.96[ab]	15.55[c]	19.09[a]

Note : Same row with different superscript a, b or c are significant ($P<0.05$)

Feed conversion and feed efficiency in this study is quite good that each ranging from 5.33 to 6:49 and 15.55 to 19.09%. According to Gatenby (1986) sheep feed conversion in the tropics ranges from 7 to 15, but Purbowati et al. (2009) to get sheep feed conversion were given a complete form of pellets ranging from 5.47 to 6.51, it was equal to the results of research of N cube (2014) namely 4.64 to 6.29. The research of Mayulu (2012) resulted feed efficiency of sheep were given complete feed palm kernel meal in the range 19.10 to 20.14%, means the complete feed made from rice straw treatments have almost the same quality. Conversion and efficiency of feed grains (sorghum and maize) is better than industrial waste (bran and cassava waste), this is due to high crude fiber content so it is more difficult to digest. Even so its use could be considered by looking at the economic aspect because they were cheaper.

Economic efficiency

Calculation of feed costs and income over feed cost is presented in Table 3. The result of calculation shows that the feed cost of rations made from cassava waste meal occupies the lowest feed cost is IDR 1287 per head per day, but the highest IOFC owned by feed made from corn that was IDR 5855 per head per day. Four source of carbohydrate was profitable to use as a source of energy in the ration of sheep. Figures IOFC can be used to predict the rate of profit and the amount of minimum lamb that must be maintained. From these results it appears that the maintenance of 10 lambs will produce IOFC 44.23 to 58.55 thousand, so it is not efficient when it must issue labor costs of approximately 50 thousand per day.

Tabel 3. Income over feed cost

Feed ingredient	Treatment			
	Rice bran 25% DM	Corn 25% DM	Cassava waste 25% DM	Sorgum 25% DM
Feed prices (IDR/kg Asfed)	2307.64	2195.28	1932.87	2415.73
Intake asfed (g/day)	764.65	756.27	665.96	629.27
Feed Cost (IDR/head/day)	1765	1660	1287	1520
Daily weight gain (g/day)	106.75	120.24	91.37	105.11
Income (IDR/head/day)	6672	7515	5711	6569
IOFC (IDR/head/day)	4907	5855	4423	5049

Note : IOFC= Income Over Feed Cost ;
*feed prices in 2015; the price of live weight: IDR 62500 per kg

CONCLUSIONS

The conclusion of this study was the feed containing carbohydrates from grain (corn and sorghum) are more efficiency than carbohydrates sources from agriculture by-product (brand rice and cassava waste). However, according to the economic aspect, rice brand and cassava waste is still profitable to use as a source of energy in the ration of sheep.

REFERENCES

AOAC. 2000. Official Methods of Analysis. 17th ed. Association of Official Analitycal Chemists, Washington, DC, USA.

Brook, M.J. 2010. Sorghum in Beef Production Feeding Guide. Kansas State University, Manhattan, Kansas, USA.

Gatenby,R.M. 1986. Sheep Production in the Tropics and Sub-Tropics. Longman Singapure Publisher Ltd. Singapure.

Gill, M. 2012. Converting feed into human food : the multiple dimensions of efficiency. In : FAO Symposium Bangkok, Thailand : Optimization of feed use efficiency in ruminant production systems. Published by : FAO-AAAP, Rome, 2013.

Ku Vera, J.C., E.G. Bricefio, A. Ruiz, R. Mayo, A.J. Ayala, C.F. Aguilar, F.J. Solorio and L. Ramirez. 2014. Manipulation of the energy metabolism of ruminants in the tropics : options for improving meat and milk production and quality. Cuban Journal of Agricultural

Science, Vol : 48 (1).

Mayulu, H. 2012. Optimization of Ruminant Feed Resource Based Agroecosystems Palm Oil Through Complete Feed Technology. Disertation. Diponegoro University. Semarang. (in Bahasa Indonesia)

McNeill, D.M. 2012. Forages for Ruminants, cereals for human food and fuel. In : FAO Symposium Bangkok, Thailand: Optimization of feed use efficiency in ruminant roduction systems. Published by: FAO-AAAP, Rome, 2013.

Neube, S., L.R. Ndlovu, B. Tavirimirwa, G. Tambo, R. Mwembe and G.B. Nyamushamba. 2014. Growth perfomance of ruminants fed different proportions of maize and sorghum grain. Livestock Research for Rural Development 26 (9).

Purbowati, E., C.I. Sutrisno, E. Baliarti, S.P.S. Budhi, W. Lestariana. 2007. Effect of complete feed with protein and energy levels are different in male local sheep fattening in feedlots to feed conversion. Proceedings of the National Seminar on Animal Husbandry and Veterinary Technology. Livestock Research and Development Center, Agency for Agricultural Research and Development , Department of Agriculture, Bogor . Pages: 394-401. (in Bahasa Indonesia)

Ranjhan, S.K. 1981. Animal Nutrition in Tropics. Secon Revised Edition. Vikas Publishing House PVT Ltd. New Delhi.

Rooney, L., W. McDonough C and L. Dykes. 2005. Ten myths about tannins in sorghums. International Sorghum and Millets Newsletter 46, 3-5.

Tedeschi, L.O.,D.G. Fox, M.J. Baker and D.P. Kirschten. 2006. Identifying differences in feed efficiency among group fed cattle. J. Anim. Sci. 84 : 767-776.

Theurer, C.B., O. Lozano, A. Alio, A. Delgado-Elorduy, M. Sadik, J.T. Huber and R.A. Zinn. 1999. Steam-processed corn and sorghum grain flaked atdifferent densities alter ruminal, small-intestinal, and total tract digestibility of strach by steers. J. Anim. Sci. 77 : 2824-2831.

Waghorn, G.C. 1990. Effect of condensed tannins on protein digestion and nutritive value of fress herbage. Proceedings of the Australian Society of Animal Production, Biotecnology Division, DSIR, Palmerston North, New Zealand. Pp. 137-145.

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