Carcass Commercial Cuts Percentage of Ram Raised Under Different EnergyProtein Ratio Feeding and Different Slaughtered Weight

by Endang Purbowati

17th AAAP Animal Science Congress

The 17th Asian-Australasian Association of Animal Production Societies Animal Science Congress

Proceedings

22-25 AUGUST 2016

CONGRESS VENUE: FUKUOKA JAPAN

FUKUOKA

Osaka

Nagoya

Tokyo

THE ASIAN-AUSTRALASIAN ASSOCIATION OF ANIMAL PRODUCTION SOCIETIES

JSAS

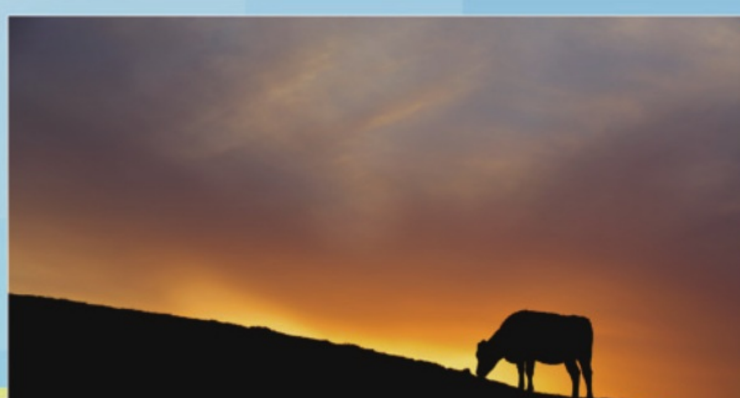

Photo by Shuichi Ito (Tokai University)

www.aaap2016.jp

Oral Session

Proceedings

PO-04-41

Carcass Commercial Cuts Percentage of Ram Raised Under Different Energy-Protein Ratio Feeding and Different Slaughtered Weight

Endang Purbowati, Rega Dianzha Yudha, Edy Rianto

DiponegoroUniversity, Faculty of Animal and Agricultural Sciences

ABSTRACT

A study was carried out to determine the effect of dietary energy-protein ratio on the carcass commercial cuts percentage (flank, leg, loin, rib, breast, shoulder-neck and shank) of rams at different slaughter weight. The study used 24 thin tail rams aged 3-5 months and weighed 8.7 to 15.5 kg (CV = 15.01%). A Generalized Randomized (Complete) Block Design was used in this study with 4 different feeding treatments, i.e. R1 = 14.48% crude protein (CP) and 50.46% *total digestible nutrients* (TDN), R2 = 17.35% CP and 52.61% TDN, R3 = 15.09% CP and 58.60% TDN, and R4 = 17.42% CP and 57.46% TDN. Rams were grouped based on the initial body weight, i.e. B1 = 10,73 + 1,37 kg (slaughtered at 15 kg), B2 = 12,76 + 0,54 kg (slaughtered at 20 kg) and B3 = 14,91 + 0,36 kg (slaughtered at 25 kg). The results showed that slaughter weight, cold carcass weight, cold carcass percentage, and carcass commercial cuts percentage (except flank) were not significantly different (P>0.05) among feeding treatments. In average, the animals had 20 kg slaughter weight, 8909.58 g cold carcass weight, 44.18% cold carcass percentage. Whilst, the average of percentage of shoulder-neck, leg, loin, rack, breast and shank were 32.05; 34.23; 9.32; 8.70; 9.14; and 4.05%, respectively. On the other hand, the highest percentage flank was found inR1 (2.70%), followed by R3 (2.56%), R2 (2.40%) and R4 (2.26%). Cold carcass percentage increased (P<0.05) with increasing slaughter weight. The percentage of leg and shank decreased (P<0.05) with increasing slaughter weight, while the percentage of other commercial cuts are not significantly different (P>0.05) among slaughter weights. The conclusion of this study is that energy-protein ratio of the feed does not affect the percentage of commercial cuts (except flank), while the slaughtered weight affects the percentage of carcass, leg, and shank.

INTRODUCTION

The carcass is the main yield expected from the sheep. The carcass yield measurements, both relative and actual weights are important as these are the criteria used to evaluate animal productivity. The carcass is the result of a biological process affected by genetic, environmental and management factors (Cardoso et al., 2013).
Carcass weight of sheep is affected by slaughter weight, which in turn is affected by feed intake. Protein and energy are the main nutrients required by the animal. Protein is found in all living cells, where they are intimately with all phases of activity that constitute the life of cell. Dietary energy is used for production after satisfying the requirement of maintenance. A young growing animal stores protein in new tissues, while an adult stores relatively more energy in fat (McDonald et al., 1991). Energy and protein interact because dietary protein is a source of dietary energy, because dietary energy is needed for protein turnover and deposition and because deposited protein represents part of the body's energy store (Boorman, 1980).
Carcass traits are greatly modified by slaughter weight (Galvani et al., 2008). Hot carcass weight of Barki lambs increased significantly (P<0.01) with increasing slaughter weight from 20 to 60 kg (Shehata, 2013).Similiar results were reported by Galvani et al. (2008), that dressing percentage of Texel x Ile de France crossbred feedlot lambs increased linearly with increased slaughter weight (P<0.01).
The proportions of the carcass cuts are an important index for the commercial evaluation of the carcass and have different economic value. Factors such as genetics, diet, slaughter weight, sex among others, are responsible for differences in cuts between carcasses (Cardoso et al., 2013). This study was carried out to determine the effect of feed energy-protein ratio of complete feed on the carcass commercial cuts percentage (flank, leg, loin, rib, breast, shoulder-neck and shank) of ram at different slaughtered weight.

MATERIALS AND METHODS

This study used 24 thin-tailed rams, aged 3-5 months and weighed 8.7 to 15.5 kg (CV = 15.01%). The rams were kept in individual pens and fed a diet composed of rice straw (25%), and a concentrate mix 75% (fish meal, soybean meal, *Leucaena leucocepala* leaf meal, rice bran, cassava meal, mollasess, and mineral), and formulated according to treatments.

A Generalized Randomized (Complete) Block Design was used in this experiment with 4 different feeding treatments, i.e. R1 = 90.73% dry matter (DM), 14.48% crude protein (CP) and 50.46% *total digestible nutrients* (TDN), R2 = 90.82% DM, 17.35% CP and 52.61% TDN, R3 = 89.01% DM, 15.09% CP and 58.60% TDN, and R4 = 90.11% DM, 17.42% CP and 57.46% TDN. Rams were grouped based on the initial body weight, i.e. B1 = 10,73 + 1,37 kg (slaughtered at 15 kg), B2 = 12,76 + 0,54 kg (slaughtered at 20 kg) and B3 = 14,91 + 0,36 kg (slaughtered at 25 kg). Dry matter intake (DMI), CP intake, and TDN intake were recorded.

The rams were slaughtered after a 24 hour fasting period. Before being slaughtered, the animals was weighed individually. The animals were killed by cutting their jugular vena, throat and esophagus removing . The carcass was obtained after removal of the head, feet, skin, digestive tract and internal organs, except kidneys and kidney fat. The carcass was weighed (hot weight), then two hours later the carcass was reweighed (cold weight). The carcass was then halved longitudinally by a band saw, after the removal of tail, kidneys and kidney fat. Right carcass half was then cut into seven joints: flank, leg, loin, rack, breast, shoulder with neck, and shank (Figure 1). The percentage of each cut was calculate. Analysis of variance and Duncan's Multiple Range Test were used to analyze the data (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The main characteristics of sheep carcasses from different energy-protein ratio feeding are presented in Table 1. The results showed that slaughter weight, cold carcass weight, cold carcass percentage, and carcass commercial cuts percentage (except flank) were not significantly different ($P>0.05$) among treatments.

The non-significant difference in carcass percentage and carcass commercial cuts percentage in this study occurred because of the fact that the slaughter weight and cold carcass weight no significant differences ($P>0.05$). This was in accordance with the opinion of Soeparno (2005), that the weight of carcass weight affects carcass commercial cuts. Slaughter weights, carcass weights and dressing percentages in this study were not significantly different ($P>0.05$) among the treatments, because the energy intake was not significantly different ($P>0.05$) either. According to Blakely and Bade (1985), the main nutrients needed for fattening animals is energy. Rianto et al. (2006) stated that an increase in dietary energy intake will be followed by an increase in energy deposition in the body, increasing energy deposition will be used to accelerate the rate of metabolism and establish fat deposition. The dietary energy intake of sheep in this study were similar, so that the energy deposited was also relatively the same.

The percentage of flank of R4 was the lowest ($P <0.05$), followed by R2, R3 and R1. This was so because the weights of flank in R4was the lowest, but the carcass weight was the highest. Hasnudi (2004) reported that while the empty body weight increased, the flank weight was relatively stable, so the flank percentage was getting lower as the body weight increased.

Data in Table 2 show that carcass weight and percentage increased with slaughter weight. These findings were in agreement with the statement of Cardoso et al. (2013), that animal carcass production is influenced by slaughter weight, which in turn is affected by the feed intake. An increase in feed intake will result in higher slaughter weight.

The percentage of leg and shank were significantly different ($P <0.05$) among slaughter weights. The percentage of leg and shank of B3 were the lowest, followed by B2 and B1. These findings indicated that leg and shank were early mature compared with other parts of the body. This was in agreement with the statement of Tillman et al. (1991), that head and leg bones reach maturity faster than bones of shoulder, pin bones and muscles. Thus while the other parts of the grow, leg and shank stop growing at certain stage of growth, so that the percentage of leg and shank are lower than the other parts of carcass. This results is also confirmed by the results obtained by Tobing et al. (2004), that the weight of head, feet and viscera decline their growth rate at the beginning of life, while the other parts still continue to grow. Consequently, the weight of leg and shank did not increase with the increasing slaughter weight, resulting in low percentage of leg and shank in higher slaughter weight as occurred in animals of B3.

CONCLUSIONS

The conclusion of this study is that dietary energy-protein ratio does not affect the percentage of commercial cuts (except flank) of rams, while rams slaughter at higher body weight had higher carcass percentage, but lower leg and shank percentage.

Keywords: Sheep, dietary energy-protein ratio, slaughter weight, carcass commercial cuts

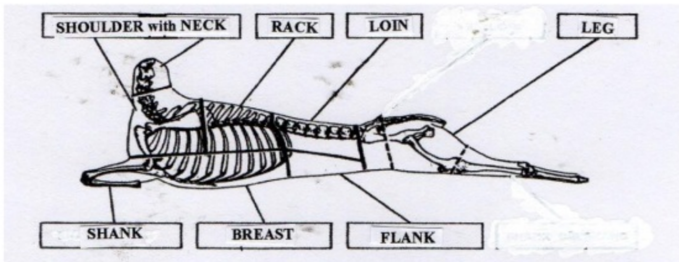

Figure 1. Carcass commercial cuts (Soeparno, 2005)

Table1. Slaughter weight, cold carcass weight, dressing percentage, carcass commercial cuts percentage, and dry matter intake, crude protein intake, and TDN intake of ram raised under different dietary energy-protein ratio

Variables	R1	R2	R3	R4
Slaughter weight (kg)	20.42[a]	19.58[a]	20.05[a]	19.97[a]
Cold carcass weight (g)	8,966[a]	8,631[a]	8,898[a]	9,142[a]
Dressing percentage (%)	43.91[a]	44.08[a]	44.38[a]	45.78[a]
Percentage of carcass commercial cuts (%)				
- Shoulder with neck	33.09[a]	31.90[a]	31.24[a]	32.46[a]
- Leg	33.83[a]	34.12[a]	34.72[a]	34.03[a]
- Loin	9.30[a]	9.22[a]	9.08[a]	9.80[a]
- Rack	8.31[a]	8.71[a]	8.73[a]	9.22[a]
- Breast	8.80[a]	9.62[a]	9.63[a]	8.37[a]
- Flank	2.70[c]	2.40[ab]	2.56[bc]	2.26[a]
- Shank	4.00[a]	4.05[a]	4.05[a]	3.87[a]
DMI (g/day)	956.35[b]	966.94[b]	827.94[a]	850.55[a]
CP intake (g/day)	138.51[b]	140.04[b]	119.91[a]	123.18[a]
TDN intake (g/day)	480.24[a]	535.09[a]	499.99[a]	345.48[a]

[a, b, c] Different letters in the same raw are significantly different (P<0,05), using Duncan test

Table2. Slaughter weight, cold carcass weight, dressing percentage, carcass commercial cuts percentage, and dry matter intake, crude protein intake, and TDN intake of ram at different slaughter weight

Variables	B1	B2	B3
Slaughter weight (kg)	15.09[a]	19.86[b]	25.06[c]
Cold carcass weight (g)	6,266.75[a]	8,918.75[b]	11,543.25[c]
Dressing percentage (%)	41.52[a]	44.93[b]	46.07[b]
Percentage of carcass commercial cuts(%)			
- Shoulder with neck	31.92[a]	31.98[a]	32.62[a]
- Leg	34.94[b]	34.25[ab]	33.33[a]
- Loin	9.11[a]	9.52[a]	9.42[a]
- Rack	8.76[a]	8.63[a]	8.84[a]
- Breast	8.34[a]	9.37[a]	9.60[a]
- Flank	2.45[a]	2.45[a]	2.54[a]
- Shank	4.49[b]	3.83[ab]	3.65[a]
DMI (g/day)	711.91[a]	913.87[b]	1,075.56[c]
CP intake (g/day)	103.10[a]	132.36[b]	155.77[c]
TDNintake (g/day)	381.95[a]	396.94[a]	616.71[a]

[a, b, c] Different letters in the same raw are significantly different (P<0,05), using Duncan test

REFERENCES

Blakely, J. and D.H. Bade, 1985. The Science of Animal Husbandry.4th Edition. Englewood Cliffts, New Jersey

Boorman, K.N. 1980. Dietary constraints on nitrogen retention.In: P.J. Buttery and D.B. Lindsay. Protein Deposition in Animals. Butterworths, London. Page: 147-166

Cardoso, M.T.M., A.V. Landim, H. Louvandini, and C. McManus. 2013. Performance and carcass quality in three genetic groups of sheep in Brazil. R. Bras. Zootec. 42 (10) : 734 – 742.

Galvani, D.B., C.C. Pires, T.P. Wommer, F. deOliveira, A.M.S. Bolzan, and P. Francios. 2008. Carcass traits of feedlot crossbreed lamb slaughtered at different live weight. Ciencia Rural, Santa Maria. 38 (6) : 1711 – 1717.

Hasnudi, 2004.The relative growth of the commercial carcass cutting of SungeiPutih and Local Sumatera sheep feed on palm oil by-product. Journal of the Indonesian Tropical Animal Agricultural. 29 (3) : 115-120.

Mc.Donald, R.A. Edward, and J.F.D. Greenhalgh. 1991. Animal Nutrition. 4th Ed. John Wiley and Sons, Inc., New York.

Rianto E., E. Lindasari and E. Purbowati. 2006. Growth and physical components of thin tailed ram carcass raised under different rice bran feeding.Animal Production 56 (8) : 28-33

Shehata, M.F. 2013. Carcass Characteristics of Barki Lambs Slaughtered at Different Live Weights. Journal of American Sci. 9 (6) : 656 – 664

Soeparno. 2005. Meat Science and Technology. GadjahMada University Press, Yogyakarta.

Steel, R. G. D. and J. H. Torrie. 1980. Principles and Procedures of Statistics..McGraw-Hill, Inc., New York

Tillman, A. D., H. Hartadi, S. Reksohadiprojo, S. Prawirakusuma and S.Ledbosukotjo. 1991. Livestock Food Science Basis. GadjahMada University Press, Yogyakarta.

Tobing, M. M., C. M. S. Lestari and S. Dartosukarno. 2004. The proportion of carcass and non carcass local male sheep using elephant grass feed with varying levels of tofu by-product. Journal of the Indonesian Tropical Animal. Special Ed. Oct 2004 : 90-97.

Carcass Commercial Cuts Percentage of Ram Raised Under Different EnergyProtein Ratio Feeding and Different Slaughtered Weight

ORIGINALITY REPORT

13%	11%	7%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.scielo.br Internet Source	3%
2	dspace.stir.ac.uk Internet Source	2%
3	www.damanhour.edu.eg Internet Source	2%
4	Webb, E.C.. "Genetic differences in fatty acid composition of subcutaneous adipose tissue in Dorper and SA Mutton Merino wethers at different live weights", Small Ruminant Research, 199509 Publication	1%
5	hdl.handle.net Internet Source	1%
6	revistas.bvs-vet.org.br Internet Source	1%
7	Abdullah Y. Abdullah, Rasha I. Qudsieh.	

	"Carcass characteristics of Awassi ram lambs slaughtered at different weights", Livestock Science, 2008 Publication	1%
8	worldwidescience.org Internet Source	1%
9	archive.org Internet Source	<1%
10	pdacrsp.oregonstate.edu Internet Source	<1%
11	www.ojafr.ir Internet Source	<1%
12	sumsel.litbang.pertanian.go.id Internet Source	<1%
13	Diego Barcelos Galvani, Cleber Cassol Pires, Tatiana Pfüller Wommer, Franciele de Oliveira et al. "Carcass traits of feedlot crossbred lambs slaughtered at different live weights", Ciência Rural, 2008 Publication	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		