
Correlations between Crude Protein/Total Digestible Nutrients Ratio and Commercial Cuts Weight and Percentage of Thin Tailed Lambs

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Correlations between Crude Protein/Total Digestible Nutrients Ratio and Commercial Cuts Weight and Percentage of Thin Tailed Lambs

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Abstract

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This study was conducted to study the relationship between crude protein and total digestible nutrients (CP/TDN) ratio and shoulder, leg, and loin weight and percentage of thin tailed lambs. Twenty four heads of three months old male thin tailed lambs with initial body weight (BW) 14.19 ± 0.17 kg were fattened by feda complete feed contained three levels of crude protein (CP; 12, 14 and 16%) and two levels of total digestible nutrients (TDN; 60, 70%) to give six ratios of CP/TDN. After 3 months fattening period, the lamb was slaughtered and commercially cut into 8 parts including shoulder, leg, and loin, and then weighed. The data was analyzed by correlation regression to determine the correlation between CP/TDN ratio and shoulder, leg, and loin weight and percentage of weaning lambs carcass. The results showed that the CP/TDN ratio in feed has a medium correlation value with the shoulder weight ($r=0.57$), shoulder percentage ($r = 0.42$), and leg weight ($r = 0.43$), while low correlation was found in loin weight ($r = 0.25$), and negatively low correlated with leg and loin percentage, being -0.28 and -0.15 , respectively. Based on the results of this study, it can be concluded that the weight and percentage of shoulder, and leg and loin weight could be influenced by CP/TDN ratio in feed, but has no effect on the percentage of leg and loin.

Keywords: thin tailed lamb, CP and TDN ratio, weight and percentage commercial cuts

Introduction

The effort to improve lambs production in Indonesia is taking by increasing nutrient content in the diet, mainly based on the content of crude protein (CP) and total digestible nutrients (TDN). These CP and TDN as well as CP/TDN ratios required for the muscle formation and growth rate. Purbowati *et al.* (2013) reported that the increasing protein levels up to 11.7% and TDN 58.6% could increase meat production of goat. The balance of CP/TDN ratio will effect to optimum the rumen fermentation efficiency as well as feed utilization (Ginting, 2005).

The big portion of meat in carcass is contained mainly in leg, shoulder, and loin which are different in their growth rate. The leg and shoulder are earlier developed than of the loin (Owens *et al.*, 1993). This different of growth rate of these carcass portions may lead to vary the amount of the leg, shoulder, and loin portions as well as in the percentage. Therefore, to evaluate the suitable level of CP and TDN as well as CP/TDN ratio in feed, this study was carried out.

Methodology

Experimental animals, feed, and equipments

Twenty four heads of male thin tailed lambs (± 3 months old) with initial body weight (BW) 14.17 ± 0.17 kg (CV = 2.41%) were used in this study. They were grouped into six, each consisted of 4 lambs and fed a complete feed contained three levels of crude protein (CP; 12, 14 and 16%) and two levels of total digestible nutrients (TDN; 60, 70%) to give six ratios of CP/TDN, i.e. 12/60; 12/70; 14/60; 14/70; 16/60 and 16/70, respectively. The complete feed was composed of rice bran, cassava meal, sugar cane top, cassava peel, soybean meal, fish meal, molasses and mineral and was given in pelleted form. All lambs were housed in individual pen and given freely access to feed and water throughout the experimental period.

Slaughter procedure

All lambs were slaughtered randomly after 3 months of feeding. Lambs were fasted for 6 hours before slaughtered. The slaughter method was done follow halal and standard slaughtering methods. The carcass was kept in a cold room at 18°C for 10 hours. Carcass were cut into 8 parts as described by Forrest *et al.* (1975) after removing the kidney fat. Each part of shoulder, leg, and loin were weighed.

Parameters

Parameters measured were CP/TDN ratio of feed given to the lamb and weight and percentage of shoulder, leg, and loin. The CP and TDN ratio was calculated by dividing percentage of CP and TDN of the feed given and was expressed in decimal.

Data analysis

The relationship between CP/TDN ratio with weight and percentage of shoulder, leg, and loin were analyzed by correlation regression analysis. The strength of correlation coefficient was evaluated by the value described by Sugiyono (2008), i.e. 0.00 - 0.19 (very low), 0.20 - 0.39 (low), 0.40 - 0.59 (medium), 0.60 - 0.79 (strong), and 0.80 - 1.00 (very strong).

Results and Discussions

The relationship between CP/TDN ratio on the weight and percentage of leg, shoulder, and loin

The correlation between CP/TDN ratio and weight and percentage of leg, shoulder and loin are shown in Figure 1 and 2. The correlation of CP/TDN ratio was found positive on weight of leg, shoulder and loin, but on percentage, there were weak and negative correlation found on leg and loin, but medium and positive was found on shoulder.

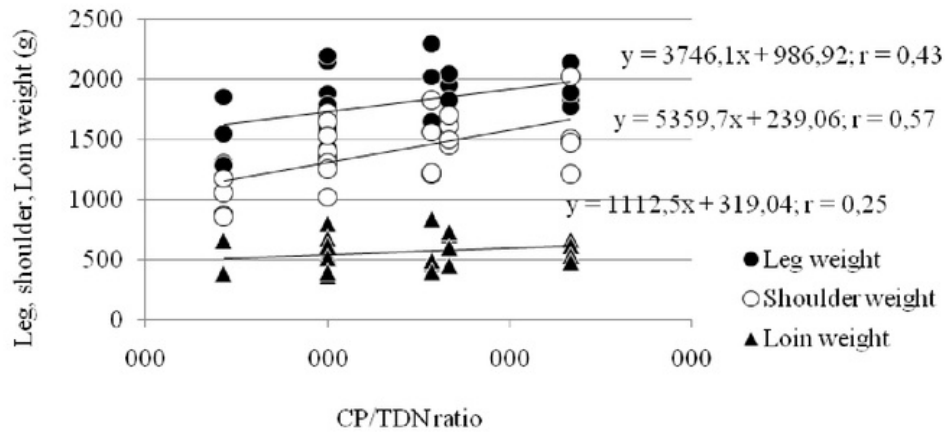


Figure 1. The relations between CP/TDN ratio on weight of leg, shoulder and loin

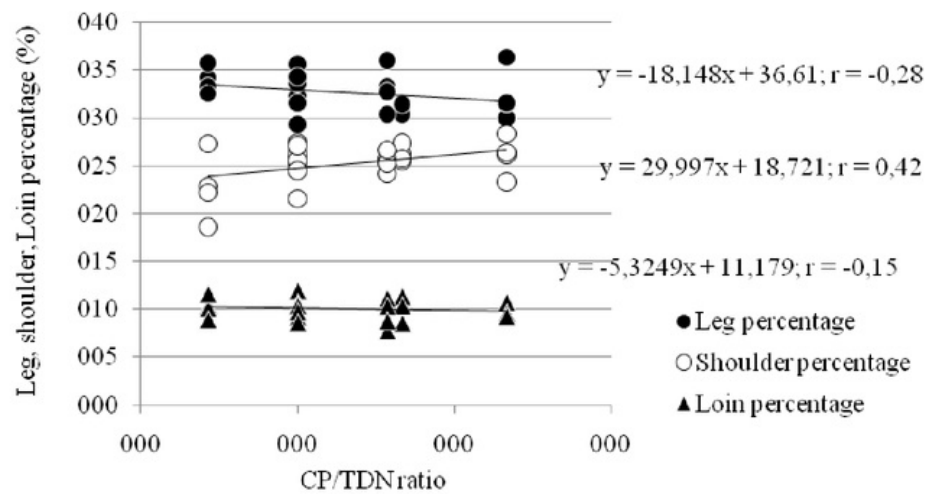


Figure 2. The correlations between CP/TDN ratio on percentage of leg, shoulder and loin

Correlation value between CP/TDN ratio to the weight of leg, shoulder and loin was 0.43, 0.57, and 0.25, while to the percentage of leg, and loin was

negative (-0.28 and -0.15, respectively) while for shoulder 0.42. These results indicated the CP/TDN ratio is able to accelerate the growth of muscle tissues in lambs, but at this stage the acceleration only reach shoulder as the earlier develop than leg and loin agreed to body components growth rate described by Owens *et al.* (1993) that ingeneral muscle development start from head and backward to tail and from extremities to the core towards the loin. The higher CP/TDN ratio resulted a considerable increasing in the amount of weight and percentage of shoulder. Shoulder is one of the moving parts, it has faster growth rate than other part does. The amount of deposition of protein and energy intake will speed up the tissues growth, and leg grows after the shoulder. According to Mawati *et al.* (2004) legs needed to walk and move, so it has fast growth rate in life and loin is more extensive later in life. Therefore, the correlation between loin and CP and TDN ratio is lower than the other. Forrest *et al.* (1975) reported that rack and loin have slow growth rate and late maturity.

There is a negative correlation between the percentages of leg and loin with CP and TDN ratio. Protein in the diet has a corresponding formation of lamb's tissues, so that the higher protein levels can increase the carcass weight. According to Rianto *et al.* (2006) the amount of protein deposition will be used for growth that will improve the carcass weight. Energy also has a function in the synthesis of fat, so the higher energy in feed, the more fat is formed. This is confirmed the results of study by Prakoso *et al.* (2009), that the higher TDN levels of feeding deposited more fat in carcass production. Therefore, the balance of protein and energy should be appropriated to produce optimal growth.

Conclusion

It can be inferred that there is a strong relations between the ratio of CP and TDN with the weight and percentage of leg, shoulder, and loin. CP and TDN ratio in the feed is able to optimize the growth rate of animals.

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