

Evaluation of crude protein ratios for bulls

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Protein is considered to be the most expensive nutrient in beef rations. Traditionally, the recommendation for the crude protein (CP) content of cereal-based rations for young bulls from three to seven months old has been 14% CP. This can be reduced to 12% through to slaughter for Holstein bulls. However, genetic improvement and sire selection for higher productivity and lean tissue deposition may have substantially increased the protein requirement with Continental-bred cattle. In response to this, Harper Adams University aimed to evaluate different protein levels for intensively finished Continental x Holstein-bulls.



Animals and rations

Thirty six autumn-born, British Blue x Holstein bulls weighing approximately 320kg at seven months old were fed one of two diets with different CP levels (see Table 1).

Table 1: Diets fed to British Blue x Holstein-bulls

Ration composition (fresh weight)	Ration A - 12% CP (in fresh) (fed ad libitum)	Ration B - 14% CP (in fresh) (fed ad libitum)
Rolled barley (%)	75	70
Soyabean meal (%)	7.5	12.5
Molassed sugar beet feed (%)	10	10
Molasses (%)	5	5
Minerals (%)	2.5	2.5
Straw	<i>Ad libitum</i>	<i>Ad libitum</i>



Results

The results showed that increasing protein from 12% CP to 14% CP increased daily liveweight gain (DLWG) from 1.33kg/day to 1.42kg/day, with an increased carcass weight of 7.5kg (Table 2). The bulls fed the 14% CP ration had reduced feed intakes compared to the 12% CP fed bulls and, with an increase in DLWG, this resulted in an improved feed conversion ratio (kg feed fresh weight: kg liveweight gain) from 6.24 to 5.82.

Table 2: Animal performance

	12% CP diet	14% CP diet
Daily liveweight gain (kg)	1.33	1.42
Age at slaughter (days)	418	413
Carcass weight (kg)	320.7	328.2
Carcass daily gain (kg)	0.85	0.92
Conformation (1-7)*	4.19	4.29
Fat class (1-7) *	3.06	3.23

*EUROP carcass classification: P+=1 and E=7, Fat class 1=1 and 5H=7.

Based on costs at the time of the study (2015), increasing the CP of the ration to 14% with Continental x dairy-bred bulls increased the carcass value by £43 due to the higher carcass weight (320.7 v 328.2kg) within this group.

Overall the 12% and 14% CP fed bulls returned a gross margin of £296 and £335 per head respectively when calculated from rearing from calves through to slaughter. Increasing protein in the beef ration increased feed costs by £13/tonne. However, due to the higher carcass value and better feed conversion ratio of the 14% CP fed bulls, this group still produced the most profit.

For further information on beef rationing see the Better Returns Programme manual [Feeding Growing and Finishing Cattle for Better Returns](#)