



**Animal Science Research Centre - Beef Unit Trial Results – 2008 (a)**

**Effect of crude protein level on the performance of cereal fed Holstein bulls**

**Introduction:**

The standard nutritional advice for intensive cereal beef systems has been to feed a 14% 'as fed' crude protein (CP) ration to bulls up to 6-7 months old then reduce it to 12% to slaughter. Some consultants now advocate a rearing diet of 16%CP to 250kg live weight, dropping to 14% from 250kg to slaughter. Currently the majority of compound feed manufacturers' market rations containing 14-15%CP for intensively fed bulls. However the majority of intensively fed beef cattle are fed home mix rations based on rolled barley with a protein concentrate or 'protein rich' straights such as rapeseed meal and soya bean meal. In this latter situation higher protein rations will have increased ration costs. The objective of this experiment was therefore to determine the effect of feeding barley based rations containing either 12%, 14% or 16% CP (as fed) on the performance of 7 month old cereal fed Holstein bulls through to slaughter at Harper Adams University.

**Stock:**

48 Sept-Oct 2006 born Holstein bulls @ 7 months old. Slaughtered Nov-Dec 2007. Fed *ad lib* barley based rations containing 12%, 14% or 16% CP with soyabean meal, rapeseed meal, beet pulp, molasses and minerals.

**Results:**

Table 1. Animal Performance

Ration CP (% as fed)	12%	14%	16%	Sig
Start wt (kg)	284	281	270	NS
Slaughter wt (kg)	557	549	542	NS
Days on trial	206	205	206	NS
DLWG (kg)	1.33	1.31	1.32	NS
Carcase wt (kg)	284	280	278	NS
Carcase daily gain (kg)	0.74	0.73	0.74	NS
Kill out (%)	51.0	51.0	51.3	NS
Conformation class*	2.0 (-O)	2.1 (-O)	2.0 (-O)	NS
Fat class*	3.2	3.1	3.2	NS
Carcase price (£/kg) - Nov 2007	1.76	1.78	1.76	NS
Carcase value (£) - Nov 2007	504	497	490	NS

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

Straw was offered *ad lib* from racks. The 12, 14 and 16% CP rations cost £107, £110 and £112/t respectively. Costing were based on the following feed prices at the time of the study in 2007: rolled barley @ £95/t, beet pulp @ £105/t, soyabean meal @ £165/t, rapeseed meal @ £105/t, molasses @ £95/t, minerals @ £250/t.

Table 2. Feed use (kg), Feed Conversion Ratio (FCR) and Feed Cost per kg Gain

Ration CP (% as fed)	12%	14%	16%
Daily feed intake (kg)	9.22	8.90	8.89
Total feed intake (kg)	1,895	1,825	1,834
FCR (kg feed: kg LWG)	6.94	6.80	6.75
FCR (kg feed: kg Carcase gain)	12.57	12.31	12.17
Feed cost (p/kg LWG)	74.5	74.7	75.8
Feed cost (p/kg Carcase gain)	134.5	135.2	136.7

The FCR's appear to be relatively poor at 6.75-6.94. It must be noted that the trial did not include the period of growth from 120kg to 280kg. During this rearing phase Holstein bulls at Harper Adams University typically record a DLWG of 1.55kg with an FCR of 3.4:1.

Table 3. Gross Margin (£/bull – November 2007)

Gross Margin (£/bull)	12%	14%	16%
<b>OUTPUT</b>			
Sale of carcase	504.7	497.4	489.8
<b>Variable &amp; Stock Costs</b>			
Stock purchase @ 65p/kg	184.4	182.4	175.4
Concentrates	203.3	200.6	206.0
Vet, Bedding & other costs	33	33	33
Total variable costs	420.7	416	414.4
<b>Gross Margin</b>	<b>83.0</b>	<b>81.4</b>	<b>75.4</b>

### Results & Conclusions:

- Overall the bulls recorded performance that either achieved or exceeded recognised targets for cereal beef production, recording DLWG's of 1.31-1.33kg to carcase weights of 278-284kg at 13.4-13.8 months old
- There were no significant differences in DLWG, carcase daily gain, slaughter weight or carcase weight between the treatments. It is noted that the highest slaughter and carcase weights were achieved by the bulls fed the 12%CP ration however this was not statistically significant.
- The bulls reared on the 12%CP diet recorded the highest margin over feed costs and highest gross margin per bull. Reducing the protein content of the ration from 16% to 12% increased the gross margin per bull by 10.2% (£7.60).
- From the experiment it can be concluded that increasing the protein content of the ration above 12% for 280kg Holstein bulls does not improve physical or financial performance.

### Reference:

Marsh, S.P., Briggs, P. and Ferguson, D.M.R. 2009. Effect of dietary crude protein level on the performance of cereal fed Holstein bulls. *Proceedings of the British Society of Animal Science*. Paper 147

**Acknowledgement:** Financial support from EBLEX is gratefully acknowledged.

**Simon P. Marsh, Senior Lecturer, Harper Adams University**

**August 2008**