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**Animal Science Research Centre - Beef Unit Trial Results – 2010 (a)**

**Evaluation of skim and whey based milk replacers on the performance of  
artificially reared dairy-bred bull calves**

**Introduction:**

Many commercial calf rearers believe that when artificially reared calves are fed skim rather than whey based milk replacers that performance is improved with calves having a better coat bloom. Skim based powders however are usually more expensive than whey based milk replacers and typically cost some £150 more per tonne. As a result of this price differential the majority of milk powders on the feed market are whey based. The objective of this experiment was to investigate the effect of feeding either a skim or whey based milk replacer on the performance of artificially reared dairy-bred bull calves to 12 weeks of age.

**Animals & Treatments:**

40 September 2009 born purchased and home-bred Holstein and Continental x Holstein bull calves. The calves were randomized into the following treatments according to liveweight and breed and housed in individual pens:

Skim Calves fed warm skim based milk replacer ('Elite' supplied by 'The Calf Company' containing 300g/kg skim powder, 21.5% crude protein, 19% oil) mixed at 40°C at 125g per 850 ml of water fed twice per day at 4 litres/day. At 8 days of age the milk was increased to 5 litres/day. The calves were gradually weaned at 46 days (6½ weeks).

Whey Calves fed warm whey based milk replacer ('Premium Plus' supplied by 'The Calf Company' containing 21.5% crude protein, 17.5% oil) mixed at 40°C at 125g per 850ml of water fed twice per day at the feed rates detailed above for the skim powder.

Fresh water, 18% CP early weaning concentrates (Start 'n' Wean, Wynnstay Group Plc) and straw were offered *ad lib* from 7 days old to both treatment groups. The calves were moved into group pens at weaning.

**Results:**

Table 1: Daily live weight gains (kg)

	Skim	Whey	s.e.d	Sig
Start - 3 weeks	0.33	0.30	0.074	NS
Start - weaning	0.52	0.56	0.067	NS
Weaning - 12 weeks	1.02	1.07	0.083	NS
Start - 12 weeks	0.77	0.82	0.064	NS

NS = not significant.

Table 2: Live weights (kg) and coat bloom score at 12 weeks

	Skim	Whey	s.e.d	Sig
<b>Start</b>	50.9	51.1	2.07	NS
<b>Weaning</b>	72.9	74.8	3.92	NS
<b>12 weeks</b>	115.8	119.8	6.54	NS
<b>Coat bloom score*</b>	3.15	2.97	0.224	NS

\* Coat bloom score scale of 1 = dull, 3 = normal, 5 = shiny

There were no significant differences in faecal scores, wither height and girth measurements or incidence of health between the treatments.

Table 3: Feed intakes (kg) and Feed Conversion Ratio (FCR)

Feed intakes (kg/calf)	Skim	Whey	s.e.d	Sig
<b>Milk replacer</b>	25.1	25.1		
<b>Concs - start to wean</b>	20.1	21.7	3.48	NS
<b>Concs - wean to 12 weeks</b>	111.0	123.0		
<b>Concs - total</b>	131.1	144.7		
<b>FCR</b>	2.41	2.47		

Table 4: Feed costs per calf

	Skim	Whey
<b>Milk replacer<sup>1</sup> (£)</b>	35.77	32.25
<b>Concentrates @ £192/t (£)</b>	26.20	27.78
<b>Feed costs/calf (£)</b>	61.97	60.03
<b>Feed costs per kg gain (p)</b>	95.5	87.4

<sup>1</sup> Milk replacer costs: Skim @ £1,425/t; Whey @ £1,285/t

### Discussion and Conclusions:

- Calf performance was very good, both achieving and exceeding the recognised targets.
- There were no significant differences in DLWG for feeding calves on either a skim or whey based milk replacer. The calves reared on the whey based powder gained an extra 3.8kg in live weight to 12 weeks of age.
- Concentrate intakes from start to weaning were not significantly different. However the calves on the whey based milk replacer recorded higher intakes from weaning to 12 weeks and overall consumed an extra 13.6kg more concentrates per calf. The increased concentrate intake with the whey fed calves could be due to improved rumen development. The higher concentrate intake would explain the increased (+3.8kg) live weight gain to 12 weeks.
- The skim fed calves recorded a higher coat bloom score but this was not statistically different.
- The feed costs were reduced by £1.94 per calf with the whey based milk powder. Feed costs per kg gain were also reduced from 95.5 to 87.4p/kg based on the costs prevailing at the time of the study.

### Reference

Marsh, S.P. and Boyd, D.T. 2011. Evaluation of skim and whey based milk replacers on the performance of artificially reared dairy-bred bull calves. Proceedings of the British Society of Animal Science. Paper 154

### Acknowledgement:

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