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Animal Science Research Centre - Beef Unit Trial Results – 2014 (a)

**Evaluation of early weaning concentrate quality on the performance and health
of artificially reared beef calves to 12 weeks**

Introduction:

Successful calf rearing combines an early and high intake of colostrum with good nutrition, health and careful management of the calf. Some calf rearers have attempted to cut rearing costs by buying cheaper concentrates. The nutritional value of these concentrates is often reduced by using poorer quality sources of essential nutrients such as replacing cereals and soya bean meal with soya hulls and rapeseed meal.

The objective of this experiment was to investigate the effect of early weaning concentrate quality on the performance and health of artificially reared dairy-bred beef calves to 12 weeks. A standard good quality concentrate containing high levels of starch (from cereals) with soya bean meal was evaluated against a concentrate with a high fibre content formulated from feedstuffs such as soya hulls with protein supplied primarily from maize gluten, distillers grains and rapeseed meal i.e. an evaluation of 'good quality' versus 'medium quality' starter pellet.

Materials & Method:

38 Sept/Oct 2013 born Continental x Holstein bull calves purchased at a mean age of 18.9 days. This would therefore be similar to purchasing calves from markets. The calves were randomized according to age and weight to the following treatments and housed in individual pens:

Starch Calves fed warm whey, skim and buttermilk based milk replacer (Shine [20% CP, 17% Oil] Bonanza Calf Nutrition) mixed at 37°C at 175g per 825ml of water and fed at 1.7 litres per feed twice per day i.e. 600g/h/d of milk replacer. Calves were offered *ad lib* starch based 18%CP early weaning concentrates (based on cereals with soyabean meal) and gradually weaned. When calves were recorded to be eating 1.0kg/d of concentrates for 3 consecutive days the milk replacer feed rate was reduced to 0.85 litres per feed (i.e. half rate) for 3 days when the calf was weaned.

Fibre Calves fed the same milk replacer at an identical feed rate to the starch treatment. Calves offered *ad lib* 18%CP fibre based early weaning concentrates (low starch and no soyabean meal) and gradually weaned 'as per' the starch treatment.

The starch based concentrates were formulated from (in descending order of inclusion): maize grain, wheat, hi-pro soya, soya hulls, maize gluten, pollard pellets, molasses, distillers grains, rapeseed meal and minerals. It was analysed to contain 20.4% CP, 7.4% Crude Fibre, 29.9% starch and 12.9 ME (MJ/kg DM).

The fibre based concentrates were formulated from: maize gluten, soya hulls, distillers grains, rapeseed meal, pollard pellets, maize grain, molasses, and minerals. It was analysed to contain 20.7% CP, 11.0% Crude Fibre, 12.8% starch and 12.6 ME (MJ/kg DM)

The calves were offered *ad lib* fresh water and straw. They were moved into group pens at weaning until 12 weeks.

Results:

Table 1: Live weights (kg)

Treatment	Starch	Fibre	Sig
Start	55.2	54.6	NS
3 weeks	69.0	67.9	NS
Weaning	86.7	85.5	NS
12 weeks	139.1	136.1	NS
Increase in livewt	83.9	81.5	

NS = not significant

The calves fed the starch based concentrates gained an extra 2.4kg in weight from start to 12 weeks. There were no differences in last rib girth or wither height measurements.

Table 2: Daily live weight gains (kg)

Treatment	Starch	Fibre	Sig
Start - 3 weeks	0.66	0.63	NS
Start - weaning	0.73	0.72	NS
Wean - 12 weeks	1.28	1.19	NS
Start -12 weeks	1.00	0.97	NS

The calves fed the starch based concentrates recorded higher DLWGs especially from weaning to 12 weeks; however they were not statistically different.

There were no differences in faecal scores, or incidence of health (hydration score, cough score, nasal discharge, ear score and eye discharge score) between the treatments. There was however a trend ($P=0.09$) for the calves on the starch based treatment to record an improved coat bloom score.

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

Treatment	Starch	Fibre	Sig
Milk replacer	25.3	25.4	NS
Concs - start to wean	20.2	19.7	NS
Concs - wean to 12 weeks	144.2	149.7	
Concs - total	164.4	169.4	
FCR - start to weaning	1.44	1.46	NS
FCR - start to 12 weeks	2.26	2.39	

The calves fed the starch based concentrates recorded improved FCRs.

Table 4: Financial performance – feed costs per calf and per kg gain (£)

Feed costs (£/calf)	Starch	Fibre
CMR @ £1,950/t	49.33	49.53
Starch Concs @ £304/t	49.98	
Fibre Concs @ £296/t		50.14
Feed costs/calf (£)	99.31	99.67
Feed cost per kg gain (£)	1.18	1.22

Total feed costs per calf were similar but reduced by 4p/kg gain with the starch based concentrates. Subsequent performance to slaughter will be evaluated.

Discussion & Conclusions:

- Overall performance of the calves was very good significantly exceeding the targets for rearing calves to 15 weeks of 122kg. This excellent performance is likely to be partially due to the standard of stockmanship and feeding a high quality milk replacer. There was zero calf mortality in the study.
- There were no statistically significant difference in calf growth rates with feeding either a standard good quality concentrate containing high levels of starch with soyabean meal compared to a concentrate formulated with a high fibre content from soya hulls with protein supplied primarily from maize gluten distillers grains and rapeseed meal. However there was a numerical improvement in DLWG and live weight and by 12 weeks the starch fed calves had gained an extra 2.4kg.
- There were no significant differences in calf health however there was a trend (P=0.09) for an improvement in coat bloom with the starch fed calves which would influence their value if sold as a weaned calf in a market.
- The fibre fed calves recorded higher concentrate feed intakes and due to the calves poorer performance this resulted in a deterioration in the FCR.
- Total feed costs per calf were similar but costs per kg gain were lower with the starch based concentrates despite the fibre based concentrates being £8/t cheaper.

It can be concluded calf rearers should offer their calves a good quality starter concentrate based on cereals with the inclusion of some soyabean meal.

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