

## Evaluation of feeding elevated levels of milk replacer on the performance of artificially reared beef calves

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Pre-weaning nutrition can have significant impacts on calf health, growth and lifetime productivity. Current advice for most situations is to feed five to six litres of milk (13 – 15% of calf birth weight) at a concentration of 125g of milk replacer per litre, totalling 625 – 750g of milk replacer per day.

A recent study conducted by Harper Adams University aimed to investigate the effect of feeding very high (900g) or high (750g) levels of milk replacer to artificially reared Continental x Holstein bull calves on their performance and health to 12 weeks of age.



The study included 40 dairy crossbred calves, (34 British Blue x Holstein and 6 Holstein bull calves) which were sourced from the Harper Adams dairy unit and local dairy farms with a high herd health status, at around 15 days old. The calves were fed warm whey and hydrolysed wheat protein-based milk replacer, which had a nutritional content of 23% crude protein and 20% oil. The milk powder was mixed with 40 – 45°C water and fed at 39°C via a teat. The two milk feeding rates are shown in the tables below.

### Milk feeding rates

Table 1: Very high milk replacer rate (900g)

Days	Calf milk replacer per litre milk (g)	Litres of milk per day (l)	Feeds/day	Milk replacer consumed per day (g)
1-35	180	5	2	900
36-39	180	2.5	1	450
40-42	180	1.25	1	225

Table 2: High milk replacer rate (750g)

Days	Calf milk replacer per litre milk (g)	Litres of milk per day (l)	Feeds/day	Milk replacer consumed per day (g)
1-35	150	5	2	750
36-39	150	2.5	1	375
40-42	150	1.25	1	187

The calves were also offered an 18% crude protein starter pellet, fresh water and straw *ad-libitum*. They were moved into group pens at weaning until 12 weeks of age.

The results of the trial showed a positive performance response to feeding the higher level of milk replacer. Calves fed 900g of milk replacer per day achieved 0.18kg/day faster liveweight gain from the start of the trial to weaning compared to those fed 750g/day. However, there were no differences in growth rate between the two groups once they had been weaned (Table 3).

Table 3: Daily liveweight gains of calves fed either 750g or 900g calf milk replacer per day

Treatment	750g/day calf milk replacer	900g/day calf milk replacer	Significant
Start-weaning	0.73	0.91	Yes
Wean – 12 weeks	1.21	1.16	No
Start – 12 weeks	0.97	1.04	No

The quantity of milk replacer fed also impacted on health, with the calves fed the 900g/day diet being less likely to be treated for pneumonia and scours.

The calves fed 900g/day of milk replacer gained an extra 5.6kg in live weight to 12 weeks. Since there were no differences in daily liveweight gain from weaning to 12 weeks, it demonstrated that the calves on the 750g level of milk replacer did not exhibit compensatory growth from weaning to 12 weeks.

## Costs

When taking into consideration feed costs and health treatments, the total costs of rearing a calf to weaning were increased by £3.36 by feeding 900g/day of calf milk replacer compared to feeding 750g, but due to the improvement in daily liveweight gain, feed costs per kilogram gain were reduced by 24p/kg. These calculations were based on the feed costs at the time of the trial (Table 4).

Table 4: Pre-weaning cost analysis including feed and health treatments of calves fed either 750g or 900g of calf milk replacer per day

Treatment	750g	900g
Feed costs/calf to weaning (£)	46.15	52.55
Cost of pre-weaning morbidity (£)	4.59	1.55
Total pre-weaning costs (£)	50.74	54.10
Cost per kg daily liveweight gain (£)	1.66	1.42

AHDB Dairy has produced a series of information sheets and associated short films to provide guidance on how to optimise calf performance. These are available on the [AHDB Dairy website](http://ahdbdairy.org.uk)