

Section 3

Milk Replacer Feeding



Introduction

Feeding milk replacer is common practice on many farms. There is a wide range of milk replacer powders available, each with their advantages and disadvantages on nutritional content and cost. Some milk powders are suited to specific rearing systems so it is important to match the powder to the system employed.

- ① Milk replacer v whole milk - is there a difference in calf performance?
- ② How much milk replacer should you feed?
- ③ How soon can milk replacer be fed?
- ④ Different milk replacer feeding schedules.
- ⑤ Can milk replacers be fed cold?
- ⑥ Cold weather MR feeding.
- ⑦ What is meant by 'skim powder'?
- ⑧ What is meant by 'whey-powder'?

Milk Replacer Feeding

① Milk replacer v whole milk - is there a difference in calf performance?

Provided the MR is formulated correctly from good-quality ingredients and fed according to the instructions, calves can grow equally well and their rumens can develop just as well as they would on a whole milk diet.

In the case of dairy heifers, studies have shown heifer calves will achieve the same weight gain and performance on good quality milk replacer (25% crude protein) as on whole milk.

Feeding a high quality whey-based milk replacer can actually improve calf performance above whole milk diets. In trials, calves that received MR of 27% protein and 16.6% fat on a dry matter basis up until weaning at 56 days were on average 6kg heavier than those fed whole milk from the tank. In addition, the weight differential continued to day 70, possibly due to the fact the calves consumed 33% more concentrate over the trial period.

Table 2. The effect of feeding whole milk versus milk replacer on calf weight gain. Source: Teagasc Moorepark research centre.

	Whole milk	Milk replacer
Average 56 day weaning weight (kg)	75.5	81.5
Average 70 day weaning weight (kg)	85.8	91.5
Average overall weight gain (kg)	47.7	55.4

Advantages of milk replacer	Disadvantages of milk replacer
<ul style="list-style-type: none"> • Flexibility - feeding anytime. • Feeding away from parlour. • John's control. • Consistent. • Regular system of feeding. • Don't have to divide calves. • Potentially less labour. 	<ul style="list-style-type: none"> • Perceived to be labour intensive. • Perceived poorer calf performance. • Huge variety of powder products. • Mixing of milk powder. • Have to pay for the milk powder. • Requires a plan.

② How much milk replacer should you feed?

As previously mentioned, the calf should receive at least 13-15% of its birthweight in good quality milk replacer. This is generally mixed at 125g/litre of water; however the recommendation will vary between MR manufacturers. Always adhere to the manufacturer's directions.

There is growing evidence that high growth rates in early life (0.6-0.8kg/d by feeding 750g to 900g MR per day) promote health in calves. However, feeding a high level of MR can decrease concentrate intake prior to weaning.

KEY POINT:



The amount of milk fed and concentrate intake determines calf growth rate in the period up to 12 weeks, with the target being to get the calf to grow from 40-45kg at birth to about 100kg. This can be achieved with inputs of about 25kg of milk replacer and 120kg of concentrates. If higher levels of milk replacer are given (50kg or more as in *ad lib* systems) the calf weight at 12 weeks will be 105-110kg. Concentrate intake per calf will be approximately 100kg.

③ How soon can milk replacer be fed?

Once calves have received 8.5% of their birth bodyweight in colostrum within two hours of birth there is no difference in their weight gain pre- or post-weaning compared to calves fed colostrum and four feeds of transition milk before moving on to milk replacer.

This suggests that in well managed systems, where the transfer of disease may be an issue, milk replacer can be offered immediately after colostrum feeding, but the colostrum 1,2,3 rule must be strictly adhered to.

④ Different milk replacer feeding schedules

Days	Milk Replacer (g/day)	MR (l/feed)	No. of feeds per day	Concentrates
1	Colostrum	3L within 2 hours	---	---
1-5	500	2	2	Handful from day 3
6-28	750	3	2	<i>Ad lib</i>
29-42	375	3	1	<i>Ad lib</i>

*42 day feeding period starting at seven days of age, 25kg of milk replacer fed over 42 day period

Days	Milk/MR per day per calf	Litres per feed	No. of feeds per day	Concentrates
1-2	Colostrum	3 litres first feed, 2 litres thereafter	2/3	---
3-6	Whole/transition milk	2	2	Handful
7-12	500g of milk replacer	2	2	<i>Ad lib</i>
13-35	750g of milk replacer	3	2	<i>Ad lib</i>
35-49	375g of milk replacer	3	1	<i>Ad lib</i>
50+	None	---	---	<i>Ad lib</i> up to 2kg/day

Milk replacer feeding schedule for bucket feeding, 49 day feeding period.

KEY TIPS:



Start baby and weak calves on 250 ml of milk, five times a day for the first 24-48 hours and work up to 2L twice a day.

⑤ Can milk replacers be fed cold?

Milk replacers can be fed cold by bucket feeding or *ad lib*. For cold *ad lib* feeding, no direct running water or power supply is required. Acidified milk replacer is used as it reduces scouring and the issue of fat rising to the top. The milk replacer is mixed in a container and calves drink from a teat via a plastic tube. This system is cheaper than warm *ad lib*, but it requires extra labour due to the mixing and washing up.

Milk Replacer Feeding



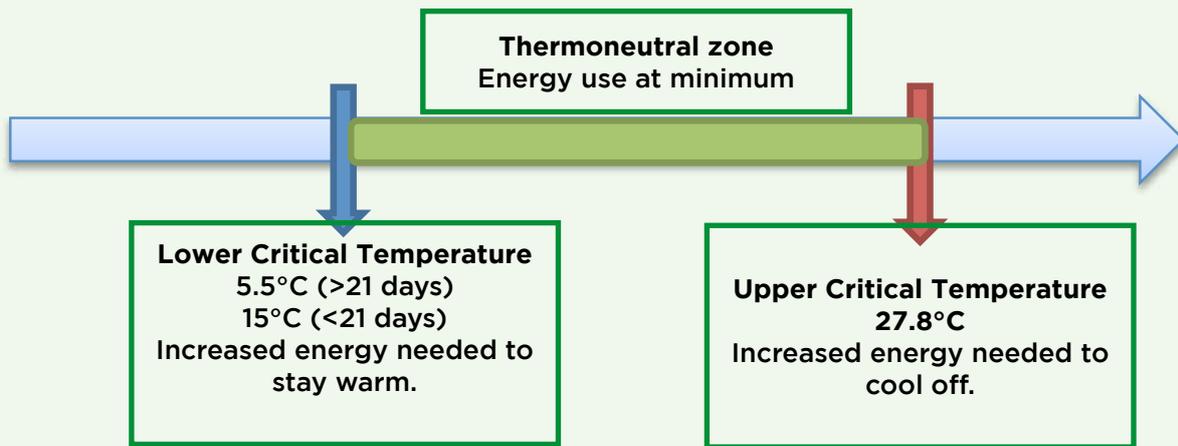
Milk replacer can be fed cold without reducing animal performance.

6 Cold weather MR feeding.

Cold weather is stressful for calves and those that are exposed to the cold are predisposed to pneumonia. When calves are not fed adequately in cold temperatures they don't grow as quickly since they are using their energy to keep warm instead. If calves are shivering after feeding it is a sign that they are cold and not being fed adequately.

KEY TIPS:

A good rule of thumb is to increase the amount of milk replacer by 2% for every degree the temperature falls below 10°C.



Temperature	50kg calf, <3 weeks	50kg calf, >3 weeks	75kg calf
	*Additional milk replacer (L)		
20 °C	0	0	0
10 °C	0.9	0	0
20 °	1.8	0.9	1.4
-10 °C	2.7	1.8	2.7

*20% protein, 20% fat milk replacer mixed at 125g/L. Provided the calves are dry, well-bedded and kept out of draughts.



7 What is meant by ‘skim powder’?

The term skim refers to a dairy protein which contains approximately 80% casein and 20% whey proteins. Skim powder is derived from butter-making. When the powder is reconstituted in the manufacture of milk replacers, vegetable oils replace the butter fat.

Traditionally, skim based milk replacers contain a defined skim content but today the levels can vary from 20 to 60%. Skim based powders tend to be more expensive

Pros	Cons
<ul style="list-style-type: none"> • If processed correctly, skim milk proteins can be highly digestible and deliver good calf performance. 	<ul style="list-style-type: none"> • At low levels of inclusion in milk replacer, the casein in skim will not form a firm clot which can have an adverse effect on animal health and performance. • If skim milk proteins have been subjected to high heat treatment they may be poorly digested by the calf.

8 What is meant by ‘whey-powder’?

Whey-based powders are derived from cheese making. When made into a milk replacer, vegetable proteins are used to replace the milk proteins extracted to make the cheese.

Whey proteins contain a higher level of essential amino acids than skim proteins. In addition, at low processing temperatures whey proteins can also contain high levels of the immunoglobulins found naturally in milk and colostrum.

Pros	Cons
<ul style="list-style-type: none"> • Result in calf growth rates as good as those achieved with high quality skim based milk replacers. • Whey protein contains higher levels of the first limiting amino acids than skim. 	<ul style="list-style-type: none"> • If processed at high temperatures, both digestibility and the activity of whey proteins can be reduced.

KEY POINT:

Although some farmers believe that artificially-reared calves should be fed skim-based replacers, studies have shown that calves fed whey-based milk replacer perform at least as well as those on skim-milk based replacer in terms of daily live weight gain.

HOW TO:

Choose the correct milk replacer

Deciding which milk replacer to use can be challenging. There is significant variation in quality. The following factors should be considered:

- The age of the calf you are feeding. Calves less than three weeks of age cannot digest the same ingredients as older animals.
- How the milk replacer is manufactured.
- How much hot water you have available.
- The ingredients - the milk replacer label will have the list of ingredients on the tag listed in order from highest to lowest.