

Feeding your replacement heifer calves in the first 30 days to optimise future fertility and production



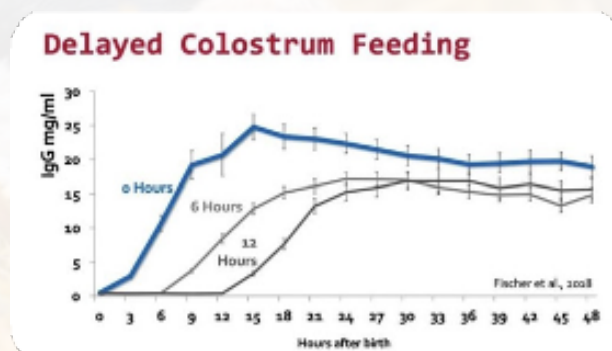
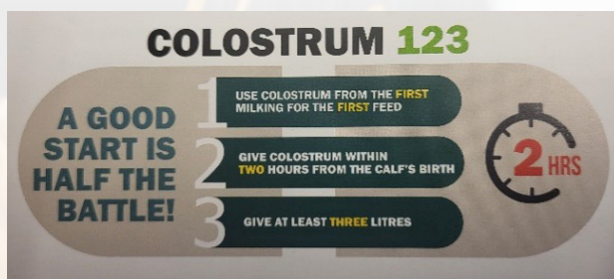
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A huge effort goes into breeding replacements on dairy farms. The goal is to breed from high EBI, profitable, healthy cows using high EBI AI sires to maximise genetic gain and maximise the genetic potential of the next generation. Having gone to the expense and effort of breeding these animals, we want to make sure they stay healthy, grow well and meet their target weights to ensure they cycle early, conceive on time and calve at 22 to 24 months, in February if possible for their first lactation.

Early life programming – There is growing interest in the area of epigenetics and early life programming. Research has shown that if you can accelerate growth in calves in early life, it will lead to increased lifetime performance. Essentially, if you can grow our heifer calves fast in the early pre weaning phase, we are programming them to excel in their first lactation and beyond. If the management and environment is right, they will fulfil and even outperform their genetic potential as dairy cows.

Calving and colostrum management – The goal here is to ensure calves are born in a clean environment, are moved as quickly as possible out of the calving area to a clean, warm neonatal area, and are fed at least 3litres (or 8.5% of birth weight) of fresh high quality clean colostrum as soon as possible after birth. Follow Animal Health Ireland's 123 rule for colostrum management. frozen and submitted to the laboratory later.

Colostrum is highly nutritious and also contains the vital antibodies from the dam, that will provide immunity to the calf in early life until its own immune system starts to develop at 3-4 weeks of age. The calf's gut can absorb these antibodies best immediately after birth. The ability to absorb the antibodies decreases with time and is virtually gone at 24 hours. Delayed colostrum feeding results in lower blood concentrations of IgG (antibodies) see diagram 1.



Failed passive transfer (FPT) – This happens if the calf does not absorb sufficient antibodies after birth. This can happen if the quality of the colostrum is poor, the volume consumed is inadequate, it is fed too late or if hygiene is poor and the bacterial count is high. Bacteria bind to the antibodies and decrease their absorption. A bacterial load will also lead to harmful bacteria entering the gut cells leading to destruction of the microvilli (the microscopic folds in the gut) and poor subsequent performance and feed efficiency. This is why hygiene is so important when harvesting colostrum. Clean cows will lead to clean colostrum being collected. Any utensils like bottles and stomach tubes should be thoroughly cleaned and disinfected. FPT can be measured by blood sampling a sample of calves. As well as increasing the chance of calves succumbing to diseases like scour, pneumonia, and navel ill, calves with FPT can have:

- Delayed age to first calving.
- Decreased average daily gain to 6 months.
- Decreased milk solid production.



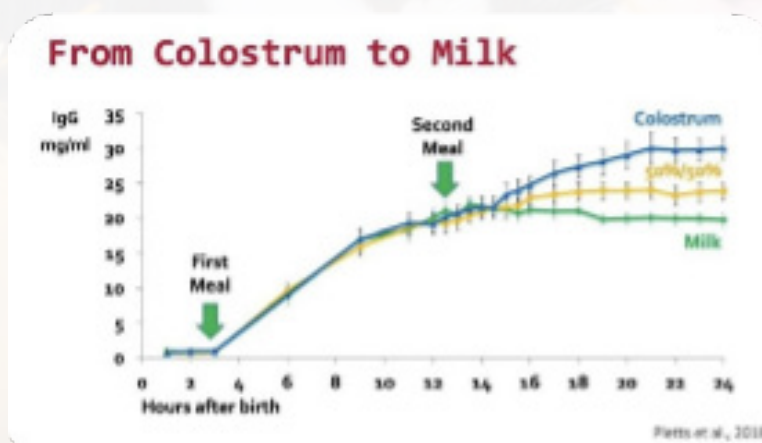
Testing colostrum quality – Colostrum can be easily tested on farm using a Brix refractometer. Any reading over 22 is considered good quality. It is also an indirect method of accessing pre-calving nutrition. If too many cows are testing low, it is an indication all is not right with the pre-calving diet.



Teat or Stomach tube? – Research has demonstrated that there is no difference in passive transfer or in the passage rate through the gut whether feeding new-born calves colostrum with a stomach tube or a teat. The stomach tube is quick and convenient, and you are guaranteed the calf will get the full feed. Feeding with a bottle and teat is more natural but more time consuming, however it may be easier to get calves to drink the second feed of colostrum.

Take control of colostrum management – You cannot depend on new-born calves to stand and drink enough colostrum. By removing the calf you are taking control of its environment and by milking the cow and feeding the calf you are taking control of the colostrum management.

A second feed of colostrum? – A second feed of colostrum should always be fed. Even though the absorption of antibodies in the gut decreases rapidly after 6 hours, some absorption still takes place which will boost IgG levels further as can be seen from diagram 2. IgG levels plateaued with transition milk (50%/50%) and reduced slightly with normal milk.



Should I feed transition milk or move straight to milk replacer?

The answer here depends on the disease status of the herd. Transition milk is defined as the milk from the second to the sixth milking from the cow. Johne's disease and Mycoplasma Bovis can both be transferred to calves in colostrum, transition milk or whole milk. Feeding calves colostrum from their own dams will limit any disease transmission to that feed. Testing your herd for Johne's disease will build up a picture of the herd status and the status of individual cows. It is impractical to avoid pooling milk when feeding transition milk. Consult with your vet the merits of moving straight to milk replacer after the second feed of colostrum depending on disease risk.



Benefits of transition milk - There are however significant benefits of feeding transition milk during the first week of life. As can be seen from Diagram 3, transition milk still contains many of the properties of colostrum albeit at diminishing levels. It also contains higher levels of antibodies than whole milk or milk replacer or whole milk, which cannot be absorbed but will act locally in the against disease causing bugs like rotavirus. This is especially important if you are vaccinating your cows against scour. Colostrum and transition milk is also high in oligosaccharides which is a powerful prebiotic and promotes the colonisation of the sterile gut with a healthy bacteria population. Studies have also shown an association between feeding transition milk and improved development of the lining of the intestine. A healthy microbiome will promote gut health and improve performance.

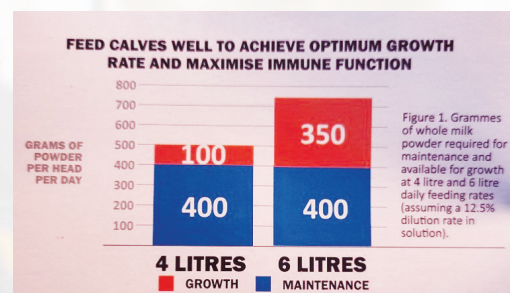
From Colostrum to Milk

	Unit	Colostrum Milking					Mature Milk
		1	2	3	4	5	
Dry Matter	%	24.5	19	16	15.5	15.3	12.2
Fat	%	6.4	5.6	4.6	5	5	3.9
Protein	%	13.3	8.5	6.2	5.4	4.8	3.2
Essential Amino Acids	mM	390	230	190	140	115	
Lactoferrin	g/L	1.84	0.86	0.46	0.36		
Insulin	µg/L	65	35	16	8	7	1
Growth Hormone	µg/L	1.5	0.5				
Insulin-like growth factor I	µg/L	310	195	105	62	49	

Improved health status in calves fed transition milk

How much milk should be fed?

The calf is completely dependent on milk as a source of nutrition until at least 4 weeks of age. This is because it takes this length of time for the rumen to develop and become functional. Traditionally small quantities of milk were fed (2L twice daily), which were only enough for maintenance and minimal growth. Calves were essentially kept semi-hungry, which accelerated their intake of concentrates. This system left little surplus energy for growth and immunity. Animal Health Ireland now recommend feeding 13-15% of body weight of whole milk or milk replacer (12.5% solids). This equates to 3litres twice daily for a 40kg calf. This is a good compromise between achieving good growth and immunity and encouraging rumen development. The quantity of milk fed to calves should be gradually increased over the first week of life to ensure they are drinking 6 litres per day by 6 days old. There is an opportunity to feed more and achieve higher daily gains and possible programme these calves to be higher achievers as cows. However, this will curtail concentrate intake and lead to longer time to weaning.



Concentrates, fibre, and water – A good quality calf starter should be fed from 1 week old at the latest. Fresh clean water should be available from the same time. While milk is directed to the abomasum (fourth stomach), calf starter goes to the rumen. Water is required to start the fermentation process. It is the fatty acids that are produced that are responsible for the development of the papillae that line the rumen and allow it to function. Keep small quantities of fresh creep in front of calves to encourage intakes. Clean straw is an ideal source of long fibre. Long fibre at this stage is of no nutritional value to the calf. It helps to build strength in the muscles of the rumen and create the fibrous raft that will occupy the rumen as it matures.

Whatever system that you employ to rear your replacement heifers, remember that the success of the system can have a far-reaching impact on the lifetime performance of the animal which is becoming ever more important for sustainability both economic and environmental.