



## Colostrum provision to calves



©INRAE / BOCHE Jennifer



### Biology and needs of calves

At birth, calves' immune system is not mature so their immunity relies on antibodies from the dam. The placenta of ruminants only allows 5–10% of the maternal antibodies to reach the foetus. The colostrum, synthesised during the last weeks of pregnancy, contains large amounts of antibodies, especially immunoglobulin G. Most of the maternal antibodies transferred to the newborn calf are provided by colostrum after birth. The calf intestine is very permeable for the first hours after birth, allowing the passage of the antibodies to the calf's blood. Thereafter permeability declines so that at 24 h after birth, antibodies cannot cross the intestine. Colostrum of good quality, that contains large amounts of antibodies, should be provided to calves soon after birth. Calves that do not receive appropriate amounts of colostrum during the right time period, or receive colostrum of poor quality, are very sensitive to microbial infections, with neonatal diarrhoea being the most common symptom, potentially leading to death. In addition, colostrum is rich in carbohydrates, fat and proteins, vitamins and iron essential for calf nutrition and vigour.



### Legal requirements

Council directive 2008/119/EC regulates the administration of colostrum to calves.

'Each calf must receive bovine colostrum as soon as possible after it is born and in any case within the first six hours of life.'  
(Annex 1, 15.)



### Principles for colostrum provision

Newborn calves must receive colostrum to be well protected against infectious diseases. The colostrum can come from their dam or another cow. Both the **timing** of the colostrum provision, the **quantity** of the colostrum ingested by the calves, and the **quality** of the colostrum are essential to ensure full vigour and protection of the calf during its first weeks of life. A deficit in colostrum provision has long term impacts on calf health and growth.

A checklist for the adequate provision of colostrum is provided in the **Indicator Factsheet 'Colostrum provision to calves'**.

## Key facts regarding the provision of colostrum to calves

### When is the colostrum provided?

To ensure adequate passive transfer of antibodies, all calves should consume colostrum within 2–3 h after birth. A rule of thumb is to feed 3 L of colostrum, within 2 h from a maximum of 1 cow. A second colostrum feeding should take place within 6–12 h after birth. Thereafter, calves should be given colostrum, transition milk or a mixture of milk and colostrum for at least 4 days.

If the calf is kept with its dam, the dam provides support for the calf by licking and encouraging its mobilisation which stimulates activity and colostrum intake in the first hours of life. It is important to check that the calf suckles its dam. If not, the calf should be helped to suckle, i.e., supported when standing and guided to the dam's teats.

It is not recommended to keep calves with their dam on farms where there are known risks from infectious diseases transmitted via suckling (e.g. Johne's disease).



Picture 1: Newborn calf suckling its dam

### What amount of colostrum is provided?

The total amount of colostrum consumed in the first 12 h of life should correspond to a minimum of 10% of the calf body weight (e.g., 5 L for a 50 kg calf). If the calf is suckling its dam, the quantity of colostrum ingested is not known. It is necessary to ensure the cow does not prevent the calf from accessing the teat, and that the udder is clean. Indirect signs may be used to check that the calf consumed enough colostrum (see below).

### What is the quality of the colostrum?

Cows providing colostrum must be healthy and have adequate quality and quantity of colostrum. Colostrum must have a viscous consistency and contain at least 50 g/L protein (including immunoglobulins, i.e., antibodies). The quality of the colostrum can be checked by measuring its density or refraction (e.g. with Brix meter, 50 g/L protein corresponds to Brix measurement 22%). When colostrum is stored for future use (refrigerated if used within 24 h, frozen if used later for a maximum of 1 year), it should contain a minimum of 100 g/L protein. Frozen colostrum should be thawed in a water bath (never microwave) at 38 to 40°C.

If an alternative source of colostrum is required, it should be sourced from another cow from the herd (fresh or thawed) because it contains antibodies specific to the environment on the farm. Pooling colostrum from a number of cows should be avoided to reduce the risk of disease transmission and potential dilution of antibodies. In case of limited availability of colostrum, colostrum replacer may be used. However, colostrum replacer does not contain farm-specific antibodies. The use of milk replacer should be avoided as far as possible as it does not contain antibodies and may result in compromised calf immunity.

Vaccination of cows before calving against specific pathogens present on the farm increases the content of antibodies in the colostrum directed to these pathogens, helping calves build immunity to these pathogens.

## Key facts regarding the provision of colostrum to calves

### How is the colostrum provided?

If the calf does not suckle enough colostrum from its dam, the dam's colostrum is of poor quality, or the dam and calf are separated immediately after birth, colostrum can be given from a teat bottle.

If the newborn calf does not suckle colostrum from the cow or bottle (i.e., weak, ill/injured calves or with a low motivation for suckling), a clean oesophageal/stomach tube can be inserted to facilitate direct feeding. This option should not be used unless necessary due to the stress involved for the calf and the risks from incorrect positioning.



Picture 2: calf fed with a teat bottle

Feeding equipment (teats, bottles, buckets, stomach tubes) should be cleaned and disinfected after each use and always between calves.

### How to check that colostrum provision was adequate?

The quantity of milk or colostrum intake should be checked by palpating the calf's belly and checking their sucking reflex. Special attention should be paid to weak calves or calves with low birthweight. These calves may need additional time with the dam and physical assistance.

Several blood tests are available as a screen to check for the successful passive transfer of immunity in calves. Such a measurement can be performed by an external laboratory service, in consultation with the veterinarian monitoring the herd.

More information in the **Indicator Factsheet 'Colostrum provision to calves'**.

### Is there a written protocol in place?

A written protocol helps to ensure that newborn calves receive colostrum adequately. The protocol should mention:

1. The time the calf is left with its dam
2. How to provide colostrum when the dam does not accept the calf for suckling or suckling is not possible because of specific health issues on the farm
3. How the quality of the colostrum is checked
4. How the amount of colostrum ingested by the calf is managed
5. How the ingestion of colostrum and the vitality of calves is checked
6. When necessary, how colostrum is collected, frozen and defrosted before use
7. How the equipment is disinfected

## Legal requirements

**Council directive 2008/119/EC of 18 December 2008 laying down minimum standards for the protection of calves**

'All calves must be provided with an appropriate diet adapted to their age, weight and behavioural and physiological needs, to promote good health and welfare. (...)'

(Annex 1, 11.)

'Each calf must receive bovine colostrum as soon as possible after it is born and in any case within the first six hours of life.'

(Annex 1, 15.)



### References

- CARE4DAIRY project. (2024). Calving care - calf. [https://care4dairy.eu/knowledge\\_base/calf-calving-care/](https://care4dairy.eu/knowledge_base/calf-calving-care/), consulted on 15 april 2024
- Godden, S. M., Lombard, J. E., & Woolums, A. R. (2019). Colostrum Management for Dairy Calves. *Vet Clin North Am Food Anim Pract*, 35(3), 535-556. doi:10.1016/j.cvfa.2019.07.005
- Lopez, A. J., & Heinrichs, A. J. (2022). The importance of colostrum in the newborn dairy calf. *Journal of Dairy Science*, 105(4), 2733-2749. doi:10.3168/jds.2020-20114
- Lora, I., Barberio, A., Contiero, B., Paparella, P., Bonfanti, L., Brscic, M., . . . Gottardo, F. (2018). Factors associated with passive immunity transfer in dairy calves: combined effect of delivery time, amount and quality of the first colostrum meal. *Animal*, 12(5), 1041-1049. doi:10.1017/S1751731117002579
- Umaña Sedó, S. G., Winder, C. B., & Renaud, D. L. (2023). Graduate Student Literature Review: The problem of calf mortality on dairy farms. *Journal of Dairy Science*, 106(10), 7164-7176. doi:<https://doi.org/10.3168/jds.2022-22795>



Designated by  
the EU Commission

