

Practical Colostrum Administration



Understand

What is Colostrum?

Colostrum is a wonderful and valuable source of nutrition as a calf's first feed after birth. Importantly it contains the essential ingredient, antibodies, that when transferred from mother to calf ensure the best start to a calf's life. Colostral benefits to the calf are maximized by consuming an appropriate amount of good quality colostrum, from its mother or supplemented, soon after being born. Although colostrum remains present in cow's milk for 4 days after birth, the strength and therefore benefits reduces considerably after first removal following a cow calving.

This booklet, and 'Colostrum: A Key to Calf Health' may be used in conjunction. Together these booklets have been created to help you develop a plan together with your veterinarian to ensure optimum colostrum management and transfer for your farm. A plan focused on your individual needs will assist in maximizing health outcomes for your calves, and through this, your profitability.

What is Failure of Passive Transfer (FPT)?

FPT describes when a calf has insufficient protective levels of antibodies entering their bloodstream from colostrum by 24 hours after birth.

Recent regional studies indicate that the success of colostrum management and transfer varies considerably across individual farms ¹. An achievable target of less than 20% FPT is not reached by over half of all dairy farms. Monitoring FPT levels within a group of calves to ensure target levels are reached is an important health indicator of calf rearing.

When calves receive adequate levels of colostrum the result is:

- Reduced risk of pre-weaning diarrhoea or respiratory disease
- Reduced costs of intervention and veterinary medications
- Reduced numbers of calves affected
- Reduced severity of disease when it occurs
- Improved competitiveness within the group to reach target weights

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The Risk of Leaving Things to Nature

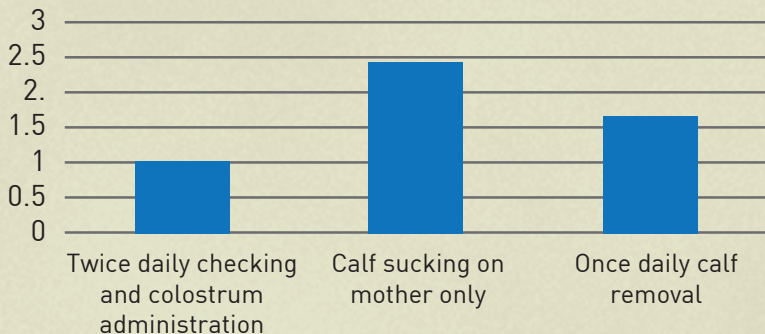
The process of colostrum transfer requires.

- A healthy mother who has created sufficient good quality colostrum for her calf
- A healthy calf sufficiently alert after birth to suckle or be fed
- The calf to drink from the mother or be supplemented sufficient volumes of this good quality colostrum early in life

FPT occurs when any of these steps is interrupted or not completed adequately.

On dairy farms, FPT has been shown to be 2.4 times more likely when calves are left to nursing their mothers naturally². Natural suckling removes control over the quality, volume and timing of the calf ingesting colostrum. As a consequence, poor quality, small volumes or delayed ingestion of colostrum increase the risk of FPT if they occur.

Figure 1: Relative risk of poor immune transfer when comparing different management procedures.



Other risk factors which similarly delay or limit colostrum ingestion include collecting calves from their mothers once daily or hand and teat feeding colostrum. Removal of calves from the calving area less than twice a day resulted in the likelihood of FPT 1.6 times compared to more frequent removal¹. Hand feeding colostrum by teat results in inadequate volumes of colostrum being consumed by the calf due to insufficient hunger.

Keys to colo

Colostrum Collection

These simple rules will help ensure the best outcome for collection and storage of colostrum

Ensure clean collection by cleaning the teats of a cow prior to collecting colostrum. Only collect into clean equipment and storage containers.

Contaminated colostrum reduces the passive antibody absorption in the calf's intestines which will contribute to FPT.

Collect colostrum from a cow as soon as possible after calving.

Immediately after calving colostrum is diluted naturally as lactation begins.

Monitor cows for leaking colostrum prior to calving. Consult with your veterinarian about collecting colostrum from cows before calving if leaking.

The process of creating colostrum occurs over the last 5 weeks of a cow's pregnancy. Leaked colostrum is not replaced and therefore the quality of that cow's colostrum is diminished.

Do not pool colostrum from cows together unless calf levels indicate your colostrum management is successful.

Pooling colostrum averages the quality. This results in greater volume requirements than if high quality colostrum was separated.

Never feed colostrum which contains blood or mastitis.

Colostrum which contains blood or mastitis may contribute to disease rather than protect calves.

Colostrum success

Colostrum Evaluation

The Brix refractometer provides a quick, simple and accurate method for measuring colostrum in calves.



Technique

- Allow colostrum to settle after clean collection
- Place one to two drops of colostrum on the Brix refractometer
- Look through and visualise the scale (see above)

BRIX RESULT	QUALITY
< 22	Poor quality colostrum for passive transfer but remains an excellent source of nutrition
22-26	Good quality equivalent to 50mg/l antibodies. Brix level 22 is equivalent to 50mg/ml. The range 22-26 is good quality colostrum
> 26	Excellent colostrum which will require reduced volumes of colostrum to be fed to achieve passive transfer

Keys to Colos

Colostrum Storage

Fresh colostrum should be used immediately if there is a requirement. Storage of good quality colostrum, when in excess, needs to be:

- Hygienically collected
- Marked with date and quality of the collection
- Collected in containers which are the volume for one calf feed to minimise handling
- Stored immediately following collection

Short term storage

- Store up to 2 days in the fridge (2-4°C) without a preservative
- Store up to 7 days in the fridge where a preservative is added immediately after collection. Contact your veterinarians to discuss the use of preservatives.

Long term storage

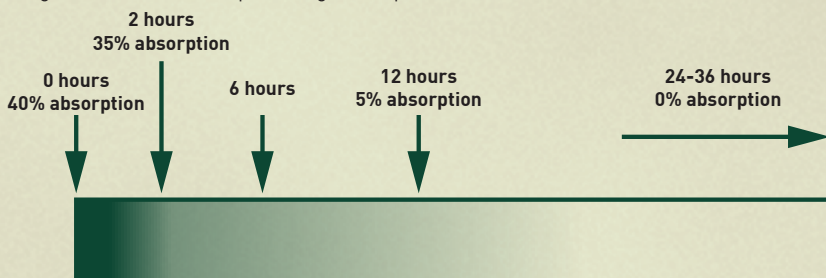
- Deep freeze. Importantly do not thaw higher than 49°C
- Pasteurisation. Discuss with your veterinarian about any options available

Timing of Administration

The passive transfer of antibodies within colostrum across the intestine is most efficient in the first 8 hours of a calf's life. Only a percentage of antibodies given to a calf are passively absorbed into the blood stream and this reduces from birth. At 2 hours after birth a calf will absorb 35% of the antibodies in colostrum. The intestine's ability to absorb these antibodies further decreases by 30-50% within 6 hours of birth. At 12 hours after birth, this further reduces to 5% of the consumed antibodies being absorbed. By 36 hours after birth this ability has completely stopped and the opportunity to provide this protection is lost.

Figure 2:

Showing the effect of time on percentage absorption of antibodies from the calf's stomach after birth.



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Volume of Administration

The required volume is dependent on both the quality and the timing after birth of colostrum administration. Discuss with your veterinarian the effect on the required volume when these factors are altered. Colostrum absorption is limited and only reduces with time, a good estimate is 10% of bodyweight or 4 litres of colostrum, of quality Brix measurement 22 or above, given as two feeds of two litres soon after birth.

For a 35kg calf

Quality/Timing	Birth	6 hours	12 hours
Good Brix = 22	1.8	2.2	3.3
Great Brix = 26	1.5	1.8	2.5
Excellent Brix >30	1.0	1.5	2

- Avoid feeding greater than 5% of the calf's bodyweight in one feed. Allow at least 2 hours between substantial feeds
- Teat feeding provides more successful placement of colostrum into the calf's intestinal tract. If the volume required is substantial then a calf's hunger may not adequately provide the required amount and stomach tube feeding is necessary.
- Stomach tube feeding is less successful in passive transfer than teat or suckle feeding. Therefore when used as the method to deliver colostrum the total volume of colostrum fed should be increased by 10-15% of the equivalent amount using the teat method.
- One of the main cause of FPT in the calves was low volume of ingested colostrum³. Increasing the volume of colostrum fed to calves reduces the risk of FPT no matter the quality.

Measuring the Success of Colostrum Administration

Critical to the success of any program on your farm is the evaluation of its ongoing success. Fortunately, for antibody transfer, your vet can measure the success of the plan by completing a simple blood test in healthy calves during the first 10 days of their life.





Grow Well

Grow Well aims to develop tools for veterinarians and their clients which may be used in practical situations.

Your veterinarian is the trusted professional with local knowledge to best meet your farm's needs. Combining science with practical considerations, your veterinarian can tailor a preventative health plan to fit your situation, aiding you in optimizing your farm's productivity through management of colostrum and calves. We trust that the information contained within this leaflet will help you work with your vet to produce healthy calves on your farm.

Review

Does your colostrum management plan consider:

- Hygienic Colostrum Collection
- Colostrum Quality Evaluation and Storage
- Method and Timing of Colostrum Administration
- Monitoring Success of your Colostrum Plan

REFERENCES

1. Vogels et al. Failure of transfer of passive immunity and agammaglobulinaemia in calves in south-west Victorian dairy herds: prevalence and risk factors *AVJ* (2013) 91:150-158
2. Beam et al. Prevalence of failure of passive transfer of immunity in newborn heifer calves and associated management practices on US dairy operations. *J. Dairy Sci.* (2009) 92:3973-3980
3. Furman-Fratczak et al. The influence of colostral immunoglobulin concentration in heifer calves' serum on their health and growth. *J. Dairy Sci.* (2011) 94:5536-5543

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