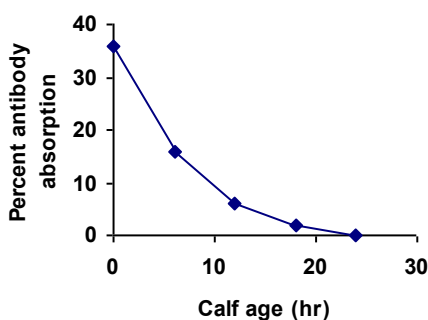


Colostrum and immunity

On-Farm
Research

Key Points

1. Calves need to get 4 litres of high quality colostrum within 24 hours of birth. The sooner the better.
2. Calves with inadequate immunity are more likely to die, have lower weight gains and poorer feed conversion efficiency than those getting enough early colostrum.
3. Up to 40% of day old calves in NZ herds have had insufficient colostrum.
4. Colostrum is obtained from the first milking of a cow. Subsequent milkings provide transition milk which has a lower concentration of immunoglobulins.
5. A calf should receive 4 litres of first milking colostrum within 24 hours of birth.



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Calf Rearing Fact Sheet 2.1

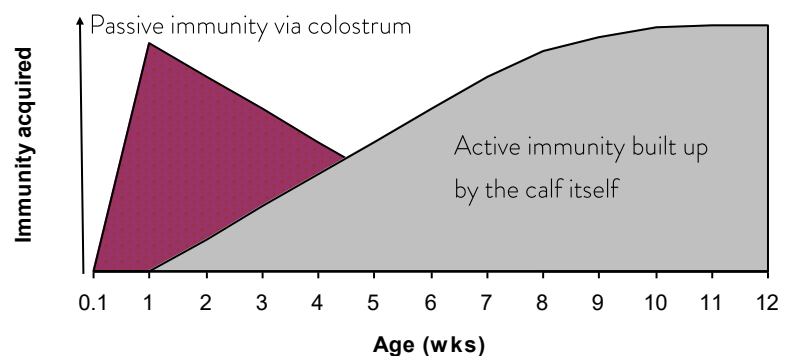
General

- Failure of calves to get sufficient colostrum and acquire early immunity is a world-wide problem. NZ studies have shown 25% of day old calves have had no colostrum and up to 40% have received inadequate colostrum.
- It is critical that a calf gets high quality colostrum within the first 24 hours and preferably within the first 12 hours.
- Calves with inadequate immunity are four times more likely to die and those that survive will have lower weight gains, poorer feed conversion efficiency and a higher incidence of scouring than calves with good levels of immunity gained by feeding colostrum in their first 24 hours.

Development of immunity

- Calves are born with a very immature immune system and immunity is transferred from cow to calf through immunoglobulins in colostrum. These immunoglobulins are large protein molecules which can only move through the calf's intestinal wall in the first 24 hours after birth. At this point the wall of the small intestine matures and these immunoglobulins can no longer pass. In addition, the secretion of digestive enzymes starts 12 hours after birth, meaning more and more immunoglobulins are digested and rendered useless.
- The young calf has no resistance to diseases like E. coli and Salmonella and its only protection in the first few days is from colostrum (this is called passive immunity). A calf with no immunity can get sick when challenged with just 500 Salmonella bacteria, whereas one that has received a good level of passive immunity can withstand 10 billion Salmonella bacteria. By the end of the first week the calf is building up its own immune system and is producing its own antibodies in response to being challenged by pathogens. Within a few weeks the calf is well on its way to being able to fight off disease.

Development of passive and active immunity in the calf



Why do calves miss out on colostrum from their mothers?

- Many calves do get colostrum from their mothers but a lot don't. The practice of removing calves from dairy cows for generations has undoubtedly reduced mothering instinct in cows. Dairy cows are apt to wander off soon after calving.
- Calves can go under hot wires and be separated from their mother.
- Selection for milk production means that udders are often low and difficult for calves to access.
- Around 25-30% of calves have not suckled 6 hours after birth and 20% have not suckled within 18 hours. Daily calf collection (if not twice daily collection) is the right thing to do - but it cannot be assumed that the calf has had enough colostrum from its mother. New arrivals at the calf shed need to be fed colostrum if there is any doubt as to whether they have had colostrum from their mother. Waiting until the next day when they will be "hungry" is too late. If necessary the calf should be tube fed although this reduces the efficiency of absorption of the antibodies.
- The amount of protection a calf obtains is determined by the amount ingested and the amount that is absorbed. The amount ingested is affected by the volume of colostrum consumed and the concentration of the antibodies in the colostrum.
- The calf should get 5-6% of its bodyweight as colostrum in the first six hours and the same amount 12 hours after birth to ensure that at least 100g of antibodies are consumed. This equates to about 2 litres of colostrum per feed for a 40 kg calf.

Factors affecting the quality of colostrum

- The level of antibodies are highest in the first milk produced after calving and then drop rapidly so colostrum fed to calves in the first 24 hours should be first milking colostrum only.
- Calves appear to be better protected if they are fed better quality colostrum than a larger volume of lower quality colostrum.
- Antibody concentration varies widely between cows. A Dairy NZ study showed an average of 48 g/litre with a range from 20 to 100 g/litre. Ideally a calf should be fed first milking colostrum from a mixed age range of cows—to give the calf a wider range of antibodies. Cows which have been vaccinated (e.g. against Rotavirus) will produce more antibodies. Cow breed and nutrition will also affect quality and volume of antibodies.
- Feeding energy deficient diets prior to calving reduces both production and quality of colostrum. Dairy breeds produce more total immunoglobulins than beef breeds but it is more concentrated in beef breeds.
- Older cows produce more immunoglobulins than heifers as they have been exposed to more diseases.

TAKE HOME MESSAGE -

Ensure new born calves get fresh colostrum as soon as possible.

