CalfCare leaflet series

ANIMAL HEALTH IRELAND
Contributing to a profitable and sustainable farming and agri-food sector through improved animal health

Colostrum Management

For Irish Farmers, Advisors, Vets

CALF HEALTH PROGRAMME

CalfCare
Animal Health Ireland.ie

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What is colostrum?

Use colostrum from the first milking for the first feed

Colostrum (or "biestings") is the first milk that the cow produces. It is richer than normal milk in many aspects, but especially in its content of immunoglobulins (antibodies). Antibodies are proteins produced by the immune system in response to infectious diseases.

The quality of colostrum is defined by the concentration of antibodies. It can vary between cows.

The second and subsequent milkings of a dairy cow contain less antibodies and are considered to be 'transition milk' rather than colostrum. The milk from the first eight milkings is is classified as 'transition milk' and is not saleable. Colostrum **should not** be mixed with transition milk for feeding to newborn calves.

How to get good quality colostrum?

Milk the cow directly after calving for best quality colostrum

- In healthy beef cows the colostrum quality is usually good. Problems may arise if beef cows are undernourished before calving, e.g. if they are put on a straw only diet.
- In dairy cows the colostrum quality is lower in higher yielding cows. Holstein cows have the poorest quality colostrum within the dairy breeds.
- After calving, dairy cows immediately start to produce large amounts of milk, which means that the colostrum is of poorer quality with every hour that passes between calving and first milking.
- If the dry period is shorter than three weeks, then colostrum quality tends to be poor.
- If the cow leaks milk or the colostrum looks watery the quality will be poor.
- If the cow has mastitis or is treated with antibiotics the colostrum should not be used. This does not apply in the case of dry cow treatment unless the dry period was unusually short.
- Bacterial contamination reduces the availability of the antibodies (see *'What is the best way to collect and store colostrum?*').

Pooling of colostrum is not recommended:

- due to the risk of disease transmission e.g. Johne's Disease. For more information about Johne's Disease see *www.animalhealthireland.ie*
- because cows with poorer quality colostrum usually give higher volumes, thereby reducing the overall quality of pooled colostrum.

How soon should colostrum be fed?

The sooner, the better!

Give colostrum within two hours from the calf's birth

Antibodies are large proteins that can only enter the blood from the intestines of the calf in the first hours after the calf is born. This ability to absorb antibodies decreases a few hours after birth and has gone by 24 hours.

The calf is susceptible to infectious agents (bacteria and viruses) as soon as it has entered the birth canal, just prior to calving.

Colostrum 1 – 2 – 3 for dairy calves

1. Use colostrum from the **first** milking for the **first** feed
2. Give colostrum within **two** hours from the calf's birth
3. Give at least **three** litres

How much colostrum to feed?

It is recommended that 3 litres are fed at the first feed. This volume refers to Holstein-Friesian type dairy calves with a weight of 35 to 45 kg. For very small calves (e.g. Jerseys) 2 to 2.5 litres will be adequate.

When do you have to worry about colostrum in the suckler calf?

In the following situations, suckler calves should be hand fed 2 to 3 litres of colostrum by stomach tube (oesophageal feeder), nipple bucket or bottle:

1 the calf is too weak to suckle
2 the cow doesn't allow the calf to suckle
3 the calf had a difficult birth and is unlikely to suckle soon
4 there are other circumstances making it unlikely that the calf will suckle soon (bad weather, cow and calf disturbed while bonding, pendulous udders).

Why is colostrum important for the calf?

Antibodies cannot cross over from the cow to the calf during pregnancy and the calf is therefore born without any immunity.

If calves do not get enough antibodies through colostrum soon after they are born, they will have failure of passive transfer (FPT) of antibodies. Calves with FPT have a high chance of becoming ill and dying. Calves that survive have poorer growth rates than calves that received adequate colostrum.

Colostrum also has higher energy content than normal milk which is important since newborn calves do not have large reserves of fat.

By ensuring that both your heifer and bull calves (even if you intend to sell these early) get plenty of colostrum, you will help lower the infectious pressure across your whole herd and all calves will perform better.

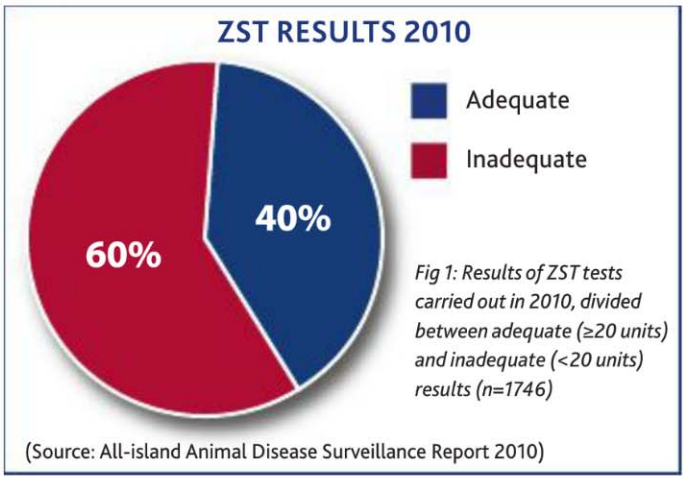


Fig 1: Results of ZST tests carried out in 2010, divided between adequate (≥20 units) and inadequate (<20 units) results (n=1746)

(Source: All-island Animal Disease Surveillance Report 2010)

The immunoglobulin status of young calves resulting from colostral antibody transfer as indicated by the Zinc Sulphate Turbidity Test (ZST) is shown in this chart.

These results from blood samples examined by the AFBI/DAFM Veterinary Laboratories show clearly that FPT is a serious problem in many of the calves that are investigated.*

* Note that these results refer mainly to samples sent in from sick calves or taken from carcasses during post mortem.

How should colostrum be fed?

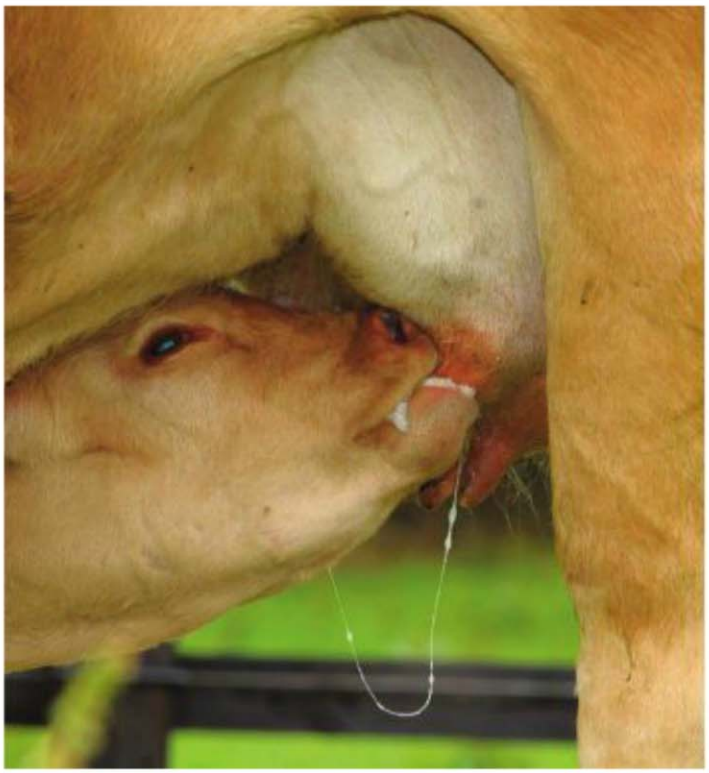
Suckler calves should suckle on their own, or with assistance, within two hours. If not, they should be fed with a nipple feeder or stomach tube.

Dairy calves should be removed from their dams immediately after birth and hand-fed colostrum for two reasons.

- The dairy calf is going to be separated from the cow anyway. Since the cow is the main source of potential infection for the newborn calf, early separation helps to prevent disease. However, disease prevention is only effective if the calf is housed in a clean individual pen afterwards.
- Dairy cows are not bred for their mothering abilites and since their colostrum quality is poorer the calves would have to drink high quantities of colostrum to prevent failure of passive transfer of antibodies. Therefore, leaving the calf with the cow is a very unreliable method of colostrum intake, successful in less than 50% of cases. It is also impossible to assess the volume the calf has drunk, even if suckling is observed.

Colostrum can be hand-fed using a nipple bottle or bucket, or a stomach tube:

- feeding by nipple is more natural and the absorption of antibodies is slightly better
- it can be difficult to get the calf to drink the volume necessary.



Suckler Calf suckling dam

Stomach tubing of colostrum where necessary can be done safely with proper technique

Stomach Tubing

- Feeding by stomach tube is quick and, if done properly, safe.
- If unsure about how to stomach tube, get advice from your local vet.
- The efficiency of absorption is slightly decreased. However, it is better to stomach tube adequate volume than nipple feed inadequate volume. The liquid given by stomach tube will flow into the rumen and not the abomasum as it would if the calf had suckled. However, since the newborn calf's rumen is very small, it will flow on into the abomasum quickly.

WARNING: If milk is repeatedly given by stomach tube it will lead to the build-up of acids in the rumen and damage the ruminal wall. It is not recommended as a method of feeding milk to calves that are not drinking due to ill health. It can, however, be used quite safely as a means of feeding electrolyte fluids.

See AHI Leaflet - *'Early Nutrition and Weaning of the Dairy Calf'* for more information on feeding calves.

Can I check if my calves are getting enough colostrum?

Make sure you give at least three litres

AHI advises farmers who suspect that their calves (home bred or purchased) are suffering from failure of passive transfer (FPT) of colostral immunity to contact their vet, who can take blood samples and arrange to have them tested for FPT. These tests can be carried out at the Department of Agriculture's Regional Veterinary Laboratories (RVLs) or at a number of private laboratories. It is suggested that at least 5 blood samples be taken from calves less than 14 days old to ensure a representative sample.

VETERINARY TECHNICAL NOTE:

A number of different tests may be used to estimate serum immunoglobulin (Ig) levels. Serum (clotted samples) is used rather than plasma as distorted results may be obtained if the plasma fibrinogen is elevated. The RVL routinely uses the zinc sulphate turbidity test (ZST) on serum to detect FPT.

Your local vet can take blood samples for checking on your colostrum management

Although this test is considered crude, examining a number of samples will give a good indicator of the effectiveness of colostrum management in the herd. This test cannot be carried out on haemolysed samples as haemolysis (samples where the red blood cells are disintegrated and haemoglobin is released) gives distorted (falsely elevated) results.

Another suggested test for FPT, serum total protein (TP), is also offered. This test is considered useful for monitoring colostrum management in healthy calves but is not suitable for sick, dehydrated or dying calves. Vets may choose to test samples in-practice rather than sending them to a lab. Serum total protein can be measured using in-house biochemistry or a refractometer. Kits for directly measuring serum Ig levels using enzyme linked immunosorbent assay (ELISA) or single radial immunodiffusion (sRID) are also available.

If TP or ZST are used for screening, 80% of samples should show values above 55g/L or 20 units, respectively.

You should check that the various management practices in this leaflet are being followed before questioning the quality of the cows' colostrum.

Colostrometers

Devices known as colostrometers,which are available on the market can give you an idea of the quality of the colostrum you are feeding, but are not totally reliable.

What is the best way to collect and store colostrum?

Bacterial contamination of colostrum is dangerous since it can transfer diseases to the calf, and also because the bacteria decrease the amount of antibodies that the calf can absorb. Cleanliness while harvesting and feeding colostrum is therefore very important.

Fridge stored colostrum should be used within 24 hours.

Bacteria can multiply very quickly if colostrum is kept in the shed at room temperature. If you want to store colostrum for later use, refrigerate or freeze it immediately in plastic bags. Bacteria can grow even in the fridge, so refrigerated colostrum should preferably be used within one day. Frozen colostrum can be stored at -18°C to -25°C for up to a year without changing its quality.

Slow thawing in a water bath at temperatures below 50°C is recommended. If colostrum is heated above this point the proteins are destroyed. Using a microwave for thawing or heating colostrum can be risky, as it can lead to overheating and destruction of immunglobulins.

Colostrum stored in a freezer has a shelf life of up to 12 months

Can I use colostrum replacement products?

Colostrum from cows on your farm is specifically adapted to the infectious agents (bacteria and viruses) that are on your farm and therefore, is the best source of antibodies for your calves. Where colostrum from the cow is not available, you should have frozen surplus colostrum (preferably from older cows) on hand as an emergency supply. Colostrum replacement products are available for use if maternal colostrum is not available. However, the efficacy and quality of these products is variable. If, for any reason, you do not want to use your own cows' colostrum, you should ask your vet for advice.

Points to Remember

- Use colostrum from the first milking for the first feed
- Milk the cow directly after calving for best quality colostrum
- Give colostrum within two hours from the calf's birth
- Make sure you give at least three litres

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The contents of this leaflet are based on the following peer-reviewed review article compiled by the AHI TWG on Calf Health:
Ingrid Lorenz, John F. Mee, Bernadette Earley, Simon J. More (2011): **Calf health from birth to weaning.** I. General aspects of disease prevention. Irish Veterinary Journal. 64:10. http://www.irishvetjournal.org/content/64/1/10

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