

Calving Ease

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Testing for Passive Transfer of Immunity

What is “passive transfer?”

After we feed colostrum to a newborn calf the maternal antibodies in it are absorbed across her small intestine in the first twenty-four hours of life. That’s passive transfer.

Why is passive transfer of immunity important?

Calves are born with a functioning immune system but few immune resources. Think of this like a gun without ammunition. Feeding plenty of clean antibody-rich colostrum as soon as possible after birth gives a calf a chance to absorb antibodies directly into her blood. Those provide temporary immunity until the calf develops her own antibodies.

By four weeks of age, calves receiving proper colostrum feeding cost the producer less than did ones that have not received adequate colostrum. Death losses are 10-12 percent less. Health treatments average about \$4 less per calf. In addition, weight gains as well as feed conversion rates are better. Depending on the replacement value for calves, these differences per calf come to: @\$200 = \$35, @\$300 = \$47, @\$400 = \$59.

How do we test for the rate of passive transfer of immunity?

Draw a blood sample from the calf. Separate the blood into serum and red blood cells. Using a specially calibrated refractometer estimate the total blood serum protein (BSTP). The BSTP levels show how well the colostrum management program is working.

Sampling at the proper time and age for reliability.

- Blood from a fully hydrated calf is a more reliable estimate of BSTP than one that is partially dehydrated. Avoid drawing blood on scouring calves. Also, delay blood collection on calves that did not drink their most recent feeding. In order to get optimum hydration take blood samples about sixty to ninety minutes after a feeding. If you do not already know how to take these samples ask your vet to show you how to do it.
- Hydration levels vary quite a lot during twenty-four hours for calves. If you must collect blood longer than ninety minutes after a feeding, each time you do sampling try to do it at the same hour of the day. That way, even if your BSTP levels are artificially high (due to partial dehydration) they will be consistently biased the same amount.
- Wait until the calf is at least one day old to draw blood. Blood IgG levels are at near-maximum levels at twenty-four hours post-colostrum feeding. Recent data suggests that peak values may not occur until forty-eight hours post-colostrum feeding.

- Blood samples from older calves (up to seven days) may be used reliably to identify passive transfer failures.

What do the BSTP values mean?

- Higher than 6. This may mean that the calf absorbed an unusually large volume of antibodies. She is well protected against most infections. Or, it may mean the calf was partially dehydrated when the blood sample was taken. It's good to check on these calves just in case it is a matter of undetected scours.
- Between 5.5 and 6. These calves are well protected against infections unless they have experienced a heavy pathogen exposure.
- Between 5.0 and 5.4. These calves are moderately protected against infections when they have experienced only an average pathogen exposure.
- Between 4.5 and 4.9. These calves have minimal protection against infections.
- Below 4.5. Very high risk calves.

What passive transfer goals should a farm have?

- On the average, I recommend that 80 percent of the BSTP values are above 5.0 and 50 percent of the values are above 5.5.
- The best goal is to improve. Determine the current situation. Set a goal to have an achievable percentage improvement for the coming month, quarter or year.

FYI on the Internet:

At www.calfnotes.com find Calf Note #39: Using a Refractometer and Calf Note #62: Calf Age, Total Protein and FPT in Calves. Also at this site, click on Calving Ease for the May 1999 issue entitled, "Blood Serum Total Protein." At www.atticacows.com click on Calf Facts and scroll to the resource "Testing for Passive Transfer of Immunity."

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