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## ***Calf Note #22 – Using the Colostrometer to Measure Colostrum Quality***

### **Introduction**

Congratulations! Your best cow has just given birth to a healthy newborn calf. You really want her to get off to a good start. You've done everything right - fresh, clean bedding in the maternity stall; proper dry cow management and vaccinations; and you've made sure the calf was delivered with a minimum of stress.

You've milked the cow and you have a clean bucket of colostrum. It looks good. But does it have enough antibodies to protect your newborn calf against the pathogens to which it will be exposed? How can you tell? Remember, you have to do this quickly so that you can feed the calf in the next few minutes!

One method of estimating colostrum quality is a device called a *colostrometer*. The colostrometer measures specific gravity of the colostrum and estimates total gamma globulin on the basis of a statistical relationship. The colostrometer has been widely used to estimate IgG concentration in colostrum. But how good is it at actually measuring IgG?

When Flenor and Stott published the research related to the colostrometer (Journal of Dairy Science, 1980, 63:973-977), they reported a very high statistical relationship between gamma-globulins and specific gravity, as you can see in the figure below:

This allowed users of the hydrometer to estimate, *with reasonable certainty*, the amount of globulin in colostrum. They then estimated the Ig in colostrum based on the assumption that most globulin is Ig. On the basis of their research with 29 colostrum samples, globulin content accounted for 69.9% of the variation in colostrum specific gravity (for you statistical types, that means that the  $r^2$  was 0.699).

*Does the colostrometer work?* Well, that's a good question. There are a number of concerns that have arisen from the use of the colostrometer from researchers across the U.S. While at Cornell University, Dr. Gerry Mechor published several research articles that noted problems with the colostrometer. The most common problem these researchers noted was associated with the temperature of the colostrum. They noted that a colostrum sample measured with a colostrometer might be considered high quality if measured at 5°C, but would be poor quality at 35 to 40°C. So, if you use a colostrometer, it is important to use it at a fixed temperature. The manufacturer recommends using the colostrometer at 22°C (72°F).



A second concern related to the composition of colostrum. The amounts of colostrum components such as fat and non-Ig proteins may affect specific gravity, thereby increasing the error associated with the colostrometer. In addition, colostrum from Jersey cows differs from that of Holsteins, and these differences might result in errors, also. Research done at Cornell, University of Tennessee and Washington State University has indicated that the relationship between specific gravity and total IgG in colostrum is not a simple linear relationship that was consistent for all animals. Pritchett and co-workers at Washington State University even indicated that the relationship between specific gravity and IgG was not linear, but curvilinear. This makes prediction of total IgG in colostrum even more difficult. In the table below are some of the equations reported to predict colostrum quality on the basis of specific gravity (**SG**):

| Equation                    | Source                                |
|-----------------------------|---------------------------------------|
| $Y^* = 254.7 * SG - 261.5$  | Fleenor and Stott, J. Dairy Sci. 1980 |
| $Y^{**} = 1180 * SG - 1172$ | Quigley et al., J. Dairy Sci. 1994    |
| $Y^{***} = 958 * SG - 969$  | Mechor et al., J. Dairy Sci. 1992     |

\*Measured total globulin; \*\*Measured total Ig at 37°C; \*\*\*Measured total IgG at 20°C.

*Recommendations.* With all of its misgivings, a colostrometer can be a handy tool, particularly to eliminate colostrum of poor quality. Use it as follows:

- Allow a sample of colostrum to cool to room temperature.
- Float the colostrometer in the colostrum.
- If the colostrometer indicates poor quality colostrum, **do not feed it** to calves during the first 24 hours. Save it for days 2 and 3.
- If the colostrometer indicates high quality colostrum, then use the 18 lb rule (if the cow makes more than 18 lb (8.5 kg) of colostrum, the odds are < 50% that it will contain sufficient colostrum).
- If the colostrum passes the colostrometer test and 18 lb rule, then feed it as soon as possible.

Well, there you have it. Use the colostrometer, along with your good sense to get that newborn calf fed as soon as possible. The proper amount of high quality colostrum as soon as you can feed it will go a long way to improving the health of your calves.

**NOTE:** A web page is available if you're interested in more information about the colostrometer. You can go to the [Colostrometer Home Page](#) to get the latest info on the colostrometer. When used in the context of a proper calf management program, the colostrometer IS a useful tool!

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