Calving Ease

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Mixing Milk Replacer:
Are You Using Best Management Practices?

- **Amount of powder is measured by weight.**
- **Amount of water is measured in a calibrated container.**
- **Temperature of mixing water is the same as manufacturer's directions.**
- **Blending is adequate to achieve solution of ingredients but not excessive.**
- **Final mixing concentration is checked regularly.**

Overall feeding consistency includes factors like the amount fed, temperature fed, time of feeding, feeding procedures, and a consistent product. A consistent milk replacer product has the same proportions of fat and protein at every feeding.

Why measure powder by weight rather than volume?

Why is volume-based measurement for milk replacer powder notoriously inaccurate? The first reason is that the volume-to-weight ratio is not consistent. It will vary from product to product. It will vary from bag to bag. It will vary within a bag.

The second reason volume-based measurement is inaccurate is the variability in filling one's "scoop." Let me share an example from baking. One way to get a cup of flour (it should weigh 4.5 ounces) is the "dunk and sweep" method. Dunk the cup into the flour container overfilling it and sweeping off the excess. This method will give you amounts varying from 4 to 6 ounces – it can be more than thirty-three percent excess in some cases.

The recommended method of measuring flour is to (1) aerate with a fork, (2) spoon flour into the measuring cup overfilling it, and (3) sweeping off the excess. You get 4.5 ounces every time (plus or minus 0.1 oz.).

So, if we use a milk replacer powder measuring container that we can overfill by dunking into the powder and sweeping off the excess there is a pretty good chance we will over-measure by some unknown amount.

Even worse, if we use a container where we have to partially fill it the potential for under and over estimating goes up significantly. When more than one person is involved in mixing the chances of unwanted variation go up a lot when using the partially-filled container method.

Further, accuracy can be improved by mixing large batches of milk replacer that require the minimum number of measurements. The least accurate method is to mix many small batches that repeatedly use many partially filled containers.

Amount of water is measured in a calibrated container.

Many larger tanks are manufactured with marks built right into the side. Lacking these marks it is a best management practice to take time to fill the tank step-by-step marking off selected volume levels.

A common error is mixing in 5-gallon buckets when the amount of powder added is for 5 gallons and the bucket is only filled to 4.5 gallons (who wants to have it spill down your leg?). This results in an 11 percent increase in dry matter – potentially causing scours in young calves.

Temperature of mixing water

Always use water temperature as directed by the manufacturer. The most common error is using hot water for mixing and adding cold water to bring the mix down to feeding temperature. For those milk replacers with enhanced mixing characteristic such as encapsulated fat this hot water destroys the encapsulation resulting in uneven distribution of the fat when feeding.

Blending is adequate to achieve solution of ingredients but not excessive.

Blending can be made easy by filling the container partially full with the appropriate temperature water, adding powder and stirring. The most common error is excessive mixing. Take a paint mixer, add a drill, squeeze trigger and ZOOM! This violent mixing can undo the encapsulation of fat and result in uneven distribution of the fat when feeding.

Final mixing concentration is checked regularly.

Using a Brix refractometer it is a quick step to estimate the dry matter concentration in the mix. If our goal is to feed about a 15 percent mix to provide about 2 pounds of powder in 6 quarts fed daily we can easily underfeed (thin calves) or overfeed (scouring calves). Just add a drop of milk replacer to the refractometer, estimate the value and add 2 to get the correct solids concentration.

Thanks to Merck Animal Health for their support of Calving Ease.

Remember to search for "Calves with Sam" blog for profit tips for calf rearing.