Calving Ease

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Mixing Milk Replacer

- **Goal: High quality consistent milk replacer every feeding, every day.**
- **The manufacturer knows best – follow these mixing instructions.**
- **Make mixing easy for consistent results.**

Let us start out our conversation about this topic by reminding ourselves that calves thrive on consistency. One element of this consistent care is their milk replacer. How do we arrange our work to produce high quality consistent milk replacer every feeding, every day?

Follow the manufacturer's instructions

Each manufacturer has options for both ingredients and processes when making milk replacer. Depending on the manufacturer's choices, an individual milk replacer will have relatively unique mixing requirements to achieve the best quality reconstituted product.

The most important of these recommendations is the **mixing temperature** for the powder. Recommendations may be as low as 110° and as high as 150°. Using excessively cold water may result in uneven dispersion of nutrients. This is due to incomplete mixing. Using excessively hot water may result in uneven mixing of the fat. At extremely high temperatures, the denaturing of whey protein could affect digestibility of the product. Avoid mixing at 170° and adding cold water to cool down to feeding temperature (105°).

Manufacturers also give mixing instructions. For example, one excellent set of directions says, "Sprinkle appropriate amount of powder into warm water (110°F) and bring to final volume after mixing." Unfortunately, other manufacturers have confusing mixing instructions about how much water and powder to use.

The incorrect directions tell you to add the powder to the final volume of water. For example for one calf, add 8 ounces of powder to 2 quarts of water. Alternatively, for bulk mixing add 5 pounds of powder to 5 gallons of water. With these two examples, using the "add powder to full volume of water" method you end up with an 11.6 percent solids mix rather than the intended 12.5 percent.

If you are mixing milk replacer for one calf at a time, the mixing method does not change the amount of powder consumed since the calf drinks the entire batch anyway. However, if you are mixing in bulk, using incorrect instructions and then feeding by volume (e.g., a fixed number of quarts per feeding) the calves get less powder that was the intended amount

The recommended mixing method is (1) fill container partly with correct temperature water, (2) add desired volume of powder, (3) blend enough to achieve even mix (not over-blending and ending up with uneven fat dispersion), (4) add enough water to desired volume.

Make Mixing Easy

1. **Have a written recipe.** This is simple and easy. For "X" number of calves, use so much powder and fill container to a given level. Many folks have a dry-erase board where the mixing amounts for the next feeding are marked down at the end of each feeding. Often calf care persons add to the same board the ID numbers of the calves that did not eat right and need special attention.

2. **Use scales to measure milk replacer powder**. I am guilty of not using scales many years ago. However, the past two decades of farm visits has convinced me that there is no easier way to measure the correct amount of milk replacer powder than with a scale.

3. **Calibrate containers rather than guessing at water volume.** If you use a tank, take time one day to fill it with water in graduated known quantities – mark the tank at each step. Choose steps that experience shows make sense on your operation.

   If you use large garbage pails, find a piece of 1.5-2.0 inch PVC pipe that is about one foot longer than the pail is tall. Glue a cap on each end. Put it into the garbage pail. Now, add water in graduated known quantities – mark the pipe at each step (for example, in two-gallon steps). In order to get a permanent mark use a file to roughen the PVC pipe surface slightly so that an ear-tag pen will make a permanent black line. Now, if you have a 20-gallon pail but only need 12 gallons of mix you can (1) mix your powder-water slurry and (2) fill to the 12-gallon line on your homemade calibration stick. Remember to wash the stick after each use.

   I often had to make up small batches of milk replacer for sick calves and such. I made a calibrated PVC stick from 1-inch pipe for a 5-gallon pail calibrated by 1- gallon steps. Even if I was not the person doing the job I knew that anyone could run water into a pail up to the desired level on the stick without too much guessing.

- **Use a thermometer to get the right temperature mix**. If you have a temperature gauge on your mixer faucet that is great. If you do not have one and you use a garden or milker hose to transfer water from your mixer faucet, try inserting a rapid read thermometer into this line at a 30-degree angle. This will allow you start with the right temperature water. Click HERE for pictures of on-farm ideas.
  Especially in cold weather, try to avoid using your hands to estimate temperature – they are notoriously inaccurate due to the environmental chill factor. An inexpensive rapid-read thermometer is a good investment.

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