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Calf Note #33 – Some Measures of Milk Replacer Quality

Introduction. Composition of milk replacers will influence the performance of calves prior to weaning. Important factors include source and amount of protein and energy, vitamin and mineral supplementation, and inclusion of critical nutritional additives such as emulsifiers. Unfortunately, methods traditionally used to determine milk replacer quality may not be useful with modern replacers used by calf raisers today.

Rennet coagulation. One test for estimating milk replacer quality is rennet coagulation. Years ago, this test was used to determine if milk replacers contained dried skim milk or casein. When a small amount rennet was added to a sample of reconstituted milk replacer, the rennet caused casein in the milk replacer to form a clot. The firmer the clot, the more casein the milk replacer contained. **This test is no longer accurate**. Few modern milk replacers contain casein or skim milk, so few will form a rennet clot. This does not mean that all replacers are poor quality. Research has shown clearly that whey, red cell and plasma proteins can support rates of calf growth as well as casein protein.

Crude fiber. Another method of estimating protein quality is crude fiber content. Crude fiber is related to the amount of vegetable protein added to a milk replacer. Soybean, wheat and other vegetable proteins contain varying amounts of fiber. The crude fiber content of a milk replacer will indicate the relative amount of these vegetable protein added to a milk replacer; however, it will not tell you if that protein is digestible. Usually, milk replacers can be categorized into three categories:

- 0.15% crude fiber or less - no vegetable proteins
- 0.15 to 0.50% crude fiber - low to moderate amounts of vegetable proteins
- above 0.5% crude fiber - high levels of vegetable proteins

However, some vegetable protein sources (e.g., soy protein concentration and soy isolate) contain very little or no crude fiber, and thus, measuring crude fiber will not necessarily indicate the presence of vegetable protein. It is important to check the feed tag to determine if vegetale proteins are included in the milk replacer formula.

Soy-containing milk replacers can contain anti-nutritional factors such as glycinin, ß-conglycinin, and trypsin inhibitors. These proteins in soybean products depress digestibility and reduce animal performance. Some milk replacers use soy proteins that have been chemically modified to increase digestibility and reduce the antigenicity of these proteins. Generally, these milk replacers provide energy and protein to support approximately 90% of the growth of milk replacers containing animal proteins. These milk replacers are available at a lower price than all-milk replacers, but are similar in price or more expensive than milk replacers containing animal proteins such as red blood cells and plasma.

Determining milk replacer quality is best determined by animal performance. Some factors that are related to performance include

- a reputable manufacturer
- analysis of replacer (protein and fat)
- ingredients used
- level of medication
- other characteristics such as mixability, absence of off-colored materials and its ability to stay in solution.

There are many high quality milk replacers available to dairy producers today. Newer technologies, using high quality animal proteins provide a highly digestible source of protein and energy at an excellent price. Older technologies, such as alcohol treated soy protein, provide fewer nutrients at a similar price.