



Milk Replacer Research Fat and fatty acid sources

Milk replacers (MR) used in the US are typically manufactured using mostly animal fat sources. Until the last couple years this was true for most of the world until Europe switched from animal fat to palm oil because of the BSE scare. Fats are composed of various fatty acids, similar to the way proteins are composed of various amino acids. Animal fat (lard, tallow, choice white grease) and palm oil contain predominately long chain fatty acids that are identified by their number of carbon atoms (C) and the number of double bonds in their structure. For example, the predominate long chain fatty acids in animal fats and palm oil are palmitic (C16:0; 16 carbons and no double bonds), stearic (C18:0), and oleic (C18:1). These fats contain very little medium chain fatty acids (fatty acids between 6 and 16 carbons) relative to milk fat. Milk fat is removed from milk because of its high value in human foods, leaving the relatively inexpensive co-products used in MR (whey, whey protein, milk protein) containing typically less than 3% fat. These milk co-products contain lactose and protein and are combined with relatively inexpensive animal fats to make calf MR.

The medium chain fatty acids are among the most highly digestible and metabolizable fatty acids, plus they have antimicrobial properties. Another grouping of fatty acids are the polyunsaturated or Omega fatty acids (C18:2, C18:3) which can potentiate immune responses and be synergistic with *Lactobacillus* species (the “good” bacteria in the gut).

Over the last few years Akey has conducted several trials looking at the value of various fatty acid sources for calf MR. Figures 1 and 2 show the results of a trial conducted to determine the benefits and interaction of feeding medium chain and Omega fatty acids. Gains and intakes were increased the most when a combination of medium and Omega fatty acids were added (Figure 1). Similarly, the reduction in scour days was best with the combination of fatty acids (Figure 2).

The results of all our trials have been consistent and conclusive. The effect of including a medium and Omega fatty acid blend in a MR with all animal fat are shown in Figures 3, 4, and 5. Improvements in gain were observed in all 3 trials (Figure 3). Starter intake was improved in 2 of the 3 trials (Figure 4). Scour days were reduced in all 3 trials (Figure 5).

We also conducted a research trial where we added this fatty acid blend to whole, unpasteurized saleable milk (not discarded milk). Feeding the fatty acid blend improved calf gain (Figure 6), and reduced days scouring by 20%.

This systematic approach to research has shown the benefits of specific fatty acids on calf performance. Calves raised from birth in hutches or nurseries and fed milk or MR have many challenges such as insufficient colostral antibodies, intestinal and respiratory pathogens, and environmental stresses. Akey MR programs can be used to overcome some of these challenges and promote faster rates of gain.

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