

# Calf Notes.com

## *Calf Note #44 – Fat levels in milk replacers*

### **Introduction**

Milk replacer is an excellent feed for preweaned calves. Properly formulated, commercial milk replacers are less expensive than whole milk, yet do not carry the same biosecurity risks of waste milk. However, commercial milk replacers do not provide the same nutrient content of whole milk. Instead, they are formulated to provide adequate nutrient content for acceptable growth, to promote aggressive intake of starter (to allow early weaning), coupled with shelf stability and excellent handling characteristics and mixability.

Milk replacers provide adequate protein, energy (carbohydrates and fats), vitamins and minerals. They are usually formulated to contain 10%, 15% or 20% fat. Historically, most milk replacers offered in the marketplace contained 10% fat. However, over the past 10 to 15 years, 20% fat formulations have come to dominate the market, and fewer 10% and 15% fat milk replacer formulations are produced. An important question is "What is the optimal amount of fat for my calves?". This Calf Note is designed to provide some insight to allow producers to answer this question.

As the amount of fat in a milk replacer formulation increases, the amount of other ingredients must decline to allow space in the formula for additional fat. Typically, the amount of high protein ingredients (whey protein concentrate, or WPC) increases and the amount of whey in a product declines. An example of the differences in milk replacer formulation, using simplified formulas is below. All formulas provide similar amounts of protein (20%) and have the same vitamin/mineral supplementation. The formulas are in table 1.

Table 1. Example formulas of milk replacers with different levels of fat.

Ingredient	10% fat	15% fat	20% fat
Whey	36	24	13
WPC (34%)	45	48	50
Fat (7/60)	16	25	33
Additives	3	3	4
TOTAL	100%	100%	100%

### **The benefits of higher fat**

There are several benefits of increasing fat in milk replacers. These include:

- Additional energy intake. For each 5% increase in the fat content of milk replacers will increase the energy density of a milk replacer by approximately 6%. Most milk replacers that contain 20% fat provide metabolizable energy to support approximately 250 grams (½ lb) of body weight gain daily in addition to providing metabolizable energy for maintenance. This is especially important in cold weather, when a calf's energy requirement increases (to maintain a stable body temperature).
- Reduced scours. Research suggests that higher fat in milk replacer reduces the incidence and severity of scours. The reasons for lower scours incidence and severity is not completely clear; however, the lower concentration of lactose may contribute to reduced scours.

- Reduced stress. Calves exposed to pathogenic organisms prior to weaning may have an increased energy requirement if they develop scours or other disease. Because calves do not have significant body energy stores, they need a continuous intake of energy to meet their needs. Lower fat (< 15%) milk replacers may contain insufficient energy for maintenance when calves scour or are otherwise stressed. This can lead to considerable body weight loss, and possibly, death. Conversely, higher fat milk replacers (containing additional energy) provide more energy which can support the animal's maintenance requirement during these periods of stress.

### The risks of higher fat

Intake of calf starter is negatively correlated with energy intake from milk replacer. In other words, if calves consume more energy from milk replacer, they need less energy from calf starter. As a result, calves fed higher energy milk replacers tend to begin consuming calf starter at a later age than calves consuming a lower energy milk replacer. This may delay rumen development and weaning, which can slow long term growth.

However, some data indicate little effect of milk replacer fat level on intake of calf starter. Researchers at Minnesota (J. of Dairy Science, 1994, 77:2621-2629) reported that calves fed 15% fat in the milk replacer grew at rates similar to those fed 20% fat in the replacer. Furthermore, these researchers reported that higher fat milk replacer depressed dry matter intake before and after weaning (calves were weaned at 42 days of age). In addition, prior to weaning, calves gained more body weight when they were fed 15% fat compared to 20% fat. It should be noted, however, that calves in this study were exposed to a very high level of management and results may be different on farms with lesser management levels.

The amount of fat in milk replacers that is best for a particular farm depends in large part on the level of management. Typically, commercial milk replacers containing 20% fat provide the best combination of animal growth, control of scours, and starter intake. While some producers have great success with 15% fat, most producers have moved away from 10% fat formulations. Some companies offer milk replacers with intermediate amounts of fat - 18% is a common formulation. Typically, an 18% fat milk replacer provides 2 to 3% less energy than a 20% fat milk replacer and about 3% more energy than a 15% fat milk replacer.

Table 2 has a general guide to milk replacer selection. Factors in the table include outside temperature, "stress level" on the farm and days of age at weaning. Calves in colder temperatures require more energy and higher fat; farms with a higher "stress level" (which is associated with poorer management, shipment of calves onto the farm, frequent incidence of disease or extensive exposure to pathogens) will require more energy, and calves weaned early will generally need a lower energy milk replacer to stimulate early calf starter intake. Please note that the table below is just a *general* guide. The advice of your veterinarian and feed professional can be very helpful in selecting the optimal milk replacer formulation for your farm.

Fat in milk replacer	Ambient temperature			Stress level on the farm			Days of age at weaning		
	> 50 F	30-50 F	< 30 F	Low	Med.	High	<30	30-40	>40
10%	X			X			X	X	X
15%	X	X		X	X			X	X
20%	X	X	X	X	X	X			X

For more information on use of milk replacers, see:

- [Manitoba Agricultural Web Publication on calf milk replacers](#)
- [Florida Agricultural Information Retrieval System - Milk replacers](#)
- [Penn State Dairy Calf Nutrition Teleconference Site](#)

Written by Dr. Jim Quigley (22 September 1997).  
©2001 by Dr. Jim Quigley  
Calf Notes.com (<http://www.calfnotes.com>)