



Comparison Of a 25-15 and a 28-25 Intensive Milk Replacer Feeding Program For Jersey Calves

Rob Costello, Dairy Technical Specialist

Birth weight differences between Jersey and Holstein calves leads calf raisers to question how well a single milk replacer formula meets the needs of both animals. The total energy and protein required for maintenance of a 55 lb calf is obviously less than that of an 85 lb calf. If both calves are fed the same amount of the same milk replacer formula, the smaller calf will meet its maintenance requirement sooner than its larger counterpart, and still have a lot more energy and protein to spare. This is evident in both conventional and intensive feeding situations.

With intensive milk replacer feeding, the question becomes, "What is the best balance of energy and protein in a milk replacer to assure efficient growth of Jersey calves?" The amount of muscle and frame growth resulting from any calf feeding program is due to the relative amounts of dietary protein and energy that the calf consumes. If the energy in the diet is too high, the calf deposits the additional energy as fat. If the diet has too much protein, excess dietary protein is broken down and utilized as energy, making it a rather expensive and inefficient energy source.

Feeding a cost-effective and growth-effective milk replacer means that protein and energy must be properly balanced in the formula as well as properly balanced with the feeding rate. The following discussion clearly shows that a 25-15 formula provides a better balance between protein and energy and results in more efficient growth of Jersey calves than a 28-25 formula.

Energy and Protein

With its higher fat percentage, a 28-25 formula appears to provide much more energy than a 25-15 formula. The true difference, however, is minor and young Jersey calves consume excess energy on both programs. Table 1 illustrates the relationships between the energy and protein content of each intensive milk replacer formula and calf body weight. In each case, calves receive

1.5 lbs per day (12 oz twice daily) of milk replacer in water. A negative value indicates a deficiency in protein relative to fat. For example, calves weighing 55 lbs would need an additional 53 grams of protein to convert all of the feed energy to lean tissue gain (i.e. muscle) when fed the 25-15 formula. As a result of the higher energy level, the calf deposits more body fat. This excess energy is even greater when calves are fed the 28-25 formula.

Table 1.

Body Weight (lb)	Protein Balance (g) ¹			
	55	65	75	85
Formula*:				
25-15	-53	-33	-17	-3
28-25	-62	-42	-25	-10
* fed at 1.5 lb/calf/day				

¹ based on 2001 National Research Council (NRC) Nutrient Requirements Of Dairy Cattle simulation

As body weight increases, the amount of excess energy consumed decreases. By the time the calf weighs 85 lbs, the protein and energy provided by the 25-15 formula are almost balanced, and virtually all the energy is converted to lean gain. This zero balance is the principle behind most intensive feeding programs for Holstein calves.

The 28-25 formula results in more excess energy than the 25-15 at all body weights. From a practical standpoint, a Jersey calf should be consuming a significant amount of starter feed in addition to milk replacer by the time it reaches 85 lbs.

Energy and Fat

The total energy consumed by a calf is a combination of the energy in the formulation and the amount of that formulation that is actually fed. This point is illustrated in Table 2. The energy and fat intake of a calf on traditional feeding of a 20-20 milk replacer is compared to that of a calf

receiving 1.5 lb per day of a 25-15 or a 28-25 milk replacer. The two high protein milk replacers are fed at 1½ times the rate of the 20-20 and provide about 1½ times the energy.

From an energy intake standpoint, it is reasonable to expect calves on the high protein milk replacer programs to grow faster than calves on the traditional program. Based on 2001 NRC values, calves on the high protein milk replacers should grow about twice as fast as calves on the 20-20 program.

Table 2.

Milk Replacer Formula Feeding rate	20/20 1.0 lb/day	25/15 1.5 lb/day	28/25 1.5 lb/day
Daily Energy Intake	2.15 Mcal	3.12 Mcal	3.48 Mcal
Daily Fat Intake	3.2 oz	3.6 oz	6.0 oz

¹ based on 2001 National Research Council (NRC) Nutrient Requirements Of Dairy Cattle simulation

It is interesting to note that although calves on the 28-25 program consume about 75% more fat than calves on the 25-15 program, they consume only about 10% more energy. How can such a large increase in fat level lead to such a modest increase in total energy intake? The reason is lactose, the major milk sugar and important energy source. To make room for the additional fat and protein in the 28-25 formula, lactose is reduced. The net effect is a slight change in total energy intake.

Swapping energy sources by increasing the fat content can lead to starter intake differences between the two intensive feeding programs. Starter intake is perhaps the major determinant of overall calf growth rate, and milk replacer fat level is linked to slower starter intake patterns with certain high fat intensive feeding programs.

Table 3 shows the relationship between protein and energy intake when starter feed consumption is included. Starter consumption estimates are based on intake data from previous research on intensive feeding of low and high fat milk replacer formulations.

Table 3.

Body Weight (lb)	Protein Balance (g) ¹			
	55	65	75	85
Formula*:				
25-15	-53	-46	-51	-56
28-25	-62	-48	-42	-40

* fed at 1.5 lb/calf/day

¹ based on 2001 National Research Council (NRC) Nutrient Requirements Of Dairy Cattle simulation

When starter intakes are included, the amount of excess energy relative to protein remains much more constant between different body weights and between the two formulations than when starter intake is omitted. The consistent numbers suggest calves try to consume a specific amount of energy.

Calf performance in cold weather is often a concern. Table 4 shows the same scenario as Table 3 but the effect of cold temperature (35°F) has been included in the simulation.

Table 4.

Body Weight (lb)	Protein Balance (g) ¹			
	55	65	75	85
Formula*:				
25-15	-14	-4	-5	-13
28-25	-25	-8	2	8

* fed at 1.5 lb/calf/day

¹ based on 2001 National Research Council (NRC) Nutrient Requirements Of Dairy Cattle simulation

Summary

Both the 25-15 and 28-25 intensive milk replacer feeding programs for Jersey calves result in consumption of excess dietary energy, with the greatest excess coming from the high fat formula. As body size increases, calf requirements change so that protein and energy come more into line, supporting lean growth. The biggest difference between the two programs is that fat is substituted for lactose in the 28-25 formula resulting in a large increase in fat percentage and a relatively small increase in total energy compared to the 25-15 formula. Research shows that high fat consumption is linked to reduced starter feed intake. The 25-15 milk replacer formula provides a better energy to protein ratio for Jersey calves, supporting a more efficient growth pattern than the 28-25 formula.

MERRICK'S, INC.

A Division of Merrick Animal Nutrition, Inc

2415 Parview Rd • P.O. Box 620307 • Middleton, WI 53562-0307 USA

800-MER-RICK (637-7425) • 608-831-3440 • FAX: 608-836-8943

www.merricks.com

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