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Rethink calf starters to maximize growth

THERE are some troublesome issues about calf starters and young calf costs that I feel need attention.

I was on a large dairy recently that had about 200 calves that were less than two months of age and were well-bedded with straw in hutches. This was a good setup on the surface. Calves had water and starter buckets well separated, which means calves could not do what they will normally do if the buckets are adjacent to one another, and that is dribble starter into water and dribble water into starter, which decreases intake of both and lowers performance, too.

Water buckets were white instead of black, which can otherwise lead to hot water in the summertime. Use of black buckets under those circumstances can be misleading. If you walk by and see water in the bucket, you might think that is good, but the calves will not drink hot water. They will drink warm water, which they like and which will minimize rumen temperature change when consumed.

So, what was this dairy's problem? Over a 15-minute period, I observed only one calf ruminating. Granted, calves less than a month old are not likely to be ruminating, but the older calves with significant starter intake should be ruminating.

If I point my finger at the pelleted starter, the response may be a combination of the following: feed companies prefer pellets because they are easier to make and cost less, dairies prefer them because they are easier to handle, everybody else does it and, after all, calves have straw (or hay) to chew on if they need it. That sounds good from the viewpoint of every party, but what about for the calf?

In a previous column (Kertz, 2007), I reviewed findings from a study (Porter et al., 2007) that evaluated starters with two levels of fiber and in pelleted or mash (texturized) forms in a 2 x 2 design. Calves were in individual crates, so there was no bedding consumption to confound the results.

Bottom Line

with
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There were some benefits of the high-fiber versus low-fiber calf starter (Table 1). That is to be expected with a lower starch content when starters are formulated for higher fiber. There would also be fewer tendencies for marginal ruminal acidosis with higher-fiber content starters.

However, the main advantages in this study were for the mash starter versus pelleted starter. Note the following (all at $P < 0.05$):

- Increased daily gain postweaning (five to eight weeks) and overall as well;
- Increased starter intake after weaning and overall as well;
- Earlier ruminating, and
- Increased time ruminating.

In addition, calves sacrificed on each treatment had numerically increased rumen pH, papillae length and percent muscle/mucosa — all indicating rumen function and development consistent with the performance parameters.

Now, what about the straw or roughage situation? If calves can eat straw, how much will they eat? I do not know of any study measuring this. What would be the range and variation of straw consumption? What does the straw do in the rumen?

We know it does not ferment much, produces the wrong balance of volatile fatty acids for rumen papillae development and contributes to rumen fill, which distorts and confounds true bodyweight gain and feed efficiencies.

Several studies within the last several years have reported calf performance differences when calf starters differed in ingredients or physical forms. However, these were confounded because hay (Kahn et al., 2007; Kristensen et al., 2007) was also fed, or straw was used for bedding (Bach et al., 2007).

The rejoinder usually is "but texturized starters cost more." That brings up the second issue: costs.

A study in 2000 summarized and reported calf and heifer costs (Figure 1) from 62 dairies in Wisconsin. Note that while daily costs were the greatest for

1. Effects of physical form of calf starter on performance

	Pelleted	Mash (texturized)
Daily gain, 5-8 weeks, lb.	1.12[a]	1.41[b]
Daily gain, 0-8 weeks, lb.	0.70[a]	0.90[b]
Starter intake, 5-8 weeks, lb.	86[a]	112[b]
Starter intake, 0-8 weeks, lb.	105[a]	134[b]
Week 1 ruminating	6.0[a]	3.7[b]
% of time ruminating	8.7[a]	21.0[b]
Rumen pH	5.0	5.4
Papillae length, cm	2.9	3.5

[a,b]$P < 0.05$

2. Calf and heifer rearing costs in 2000 and 2007

	2000	2007
Heifer calf cost, $	100	500
Calf period total costs, $	160	326
% as feed costs	38	34
% as labor costs	40	47
% of total heifer costs	13	20
Heifer period costs, $	1,100	1,323
% as feed costs	60	52
Total rearing costs, $	1,260	1,649

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the two-month calf period, the largest component of that cost was 40% for labor, followed by 38% for feed. Daily feed costs were actually greater for older heifers as maintenance costs increase with bodyweight.

Even though a lower cost per pound or per ton of feedstuffs can be used with larger heifers than with calves, the efficiency of nutrient conversion to growth is lower due to greater maintenance costs then. In fact, in some cases (Kertz et al., 1998; Brown et al., 2005), the cost per pound of gain can even be the lowest during the calf period because of this greater efficiency of nutrient conversion to gain at lower bodyweights. Furthermore, of the total costs to raise a heifer in that Wisconsin study, only $160, or 13% of the $1,260 to raise a heifer, came during the first two-month calf period.

In 2000, a heifer calf was valued at $100, which would need to be added to the $1,260 heifer raising costs to get a total cost of the heifer. Of the total heifer period rearing costs, 60% was feed costs, reflecting greater maintenance costs with increasing bodyweight.

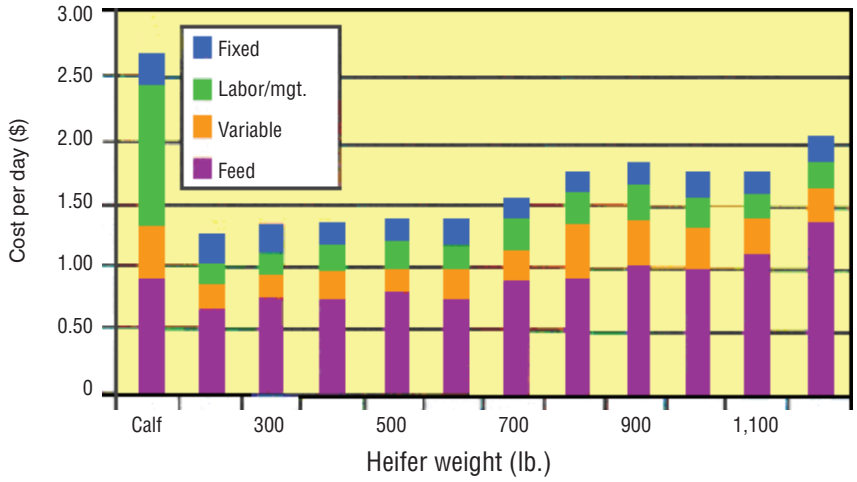
This study was essentially repeated in 2007 using 49 dairy operations, with four being custom calf grower operations (www.wisc.edu/dysci/uwex/heifmgmt/heiferreport.html). However, the 2000 study used a heifer calf cost of $100 compared to $500 in 2007, labor costs increased from $7 to $12 per hour and management costs increased from $12 to $20 per hour. Results in Figure 2 illustrate a similar pattern to 2000 but with some accentuated differences, as noted in Table 2.

From 2000 to 2007, calf value increased five-fold, while the total calf period costs were "only" doubled. The latter was primarily a function of increased labor costs, which accounted for nearly one-half of the daily calf costs. Calf period costs increased from 13% to 20% of total heifer rearing costs.

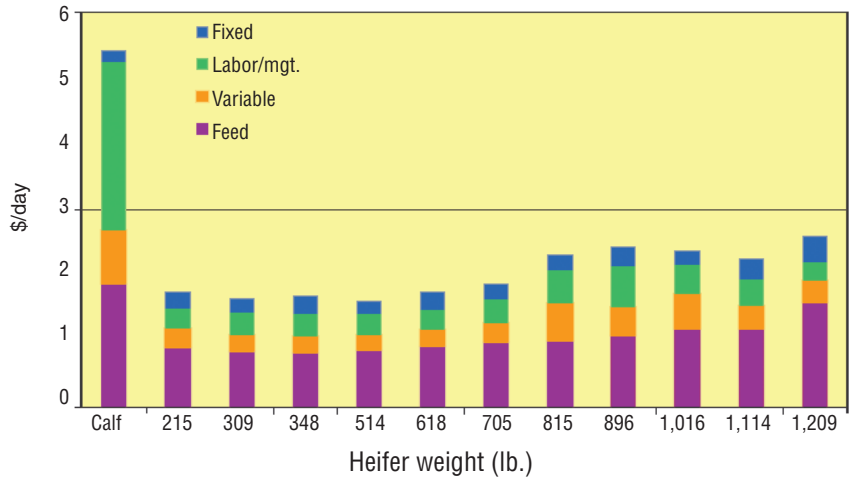
Here is the concern. There is often undue focus on cutting calf feed costs. If lower-quality milk replacer, lower feeding levels or lower-cost calf starter were utilized, this might save $25-50 per calf. That would be only 15%, at the maximum, of the daily calf costs and only 2-3% of total heifer rearing costs. Poorer nutrition would then be provided to the most vulnerable and responsive animal on the dairy when the efficiency and return are the greatest.

The best approach to cut calf period costs would be to reduce the weaning age from an average of eight to six weeks. This would reduce both the cost of the liquid feeding program and labor — the largest cost components of caring for and raising calves — but would not reduce calf performance. Also, the calf would then be in a better situation for moving into a group and changing rations after two months of age. With good milk replacer and calf starter feeding programs, that is a very realistic approach.

1. Rearing cost by heifer weights, 2000



2. Rearing cost by heifer weights, 2007



Last, there are newer data showing that increased daily gain of the calf without fattening before weaning is associated with increased first-lactation milk yield (Bach et al., 2008; Drackley, 2008; Van Amburgh, 2008). There are indications that even at this young calf age, critical mammary gland development is taking place.

The Bottom Line

It is time to rethink how we look at calf starters and liquid feeding programs. Producers should aim to maximize performance of calves rather than looking to simply cut costs of calf feeding programs. Otherwise, negative consequences can accrue for the most vulnerable, responsive and efficient animal on a dairy.

Furthermore, there are now indications that future milk yield could be affected.

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