Feedstuffs, July 5, 2010

Feedstuffs Reprint

Gradual weaning leads to more uniform calves

I THINK there are three critical periods in a young calf's life: birth, the first two weeks of life and during the weaning transition time frame.

The first encompasses how clean, well housed and well fed the cow is before and at calving, including colostrum administration to the calf. Colostrum administration used to focus on three questions: how soon after birth, how much and of what quality is the colostrum provided to the calf? Now, there is an insidious fourth question: How contaminated is the colostrum?

Unfortunately, various field samplings and culturing of colostrum have shown that 33-50% of on-farm samples exceeded total plate counts of 100,000 colony-forming units per milliliter and/or total coliform counts of 10,000 units per milliliter. This may now be the greatest practical problem with colostrum use. It leads to feeding a "bacterial soup," inoculating calves at the most critical time period.

The second critical period is the first two weeks of life because this is when most scours and deaths occur. What happened in the first critical time period may largely set the stage for the next period.

The third critical period is during the two weeks before and two weeks after weaning — the weaning transition period (four weeks total). If this is not well managed, performance achieved up to that point may be "given away." If there is too much stress, too many changes and a slump, calves often have a respiratory outbreak and are impaired for life.

This negative impact may not be noticed since few producers annotate their records to see how a calf treated for respiratory problems does later.

However, New York field studies have shown that calves with respiratory problems were less likely to enter the milking herd, took longer before first

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Bottom Line

with
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calving, had more dystocia problems and were culled sooner (Correa et al., 1988; Curtis et al., 1989).

The challenges with weaning are multiple and include the amount of milk/milk replacer fed, the fat level in the milk/milk replacer, the quality of starter, the management of the starter feeding program, the housing environment and providing free access to clean water. (The water does not need to be cold. Like cows, calves prefer warm water even in hotter weather, most likely because it perturbs rumen content temperature the least. In the winter, warm water reduces the calves' need to use even more energy to warm up that water after it is consumed.)

Typically, weaning should not even be contemplated unless calves are eating 0.5 lb. per day of the starter.

Since calves will approximately double their starter intake each week before the weaning process begins, let's say during week 4, calves are eating an average of 0.5 lb. per day. During the succeeding week (week 5), their intake would double to 1 lb. daily. So, if half of the milk or milk replacer is removed during week 6, calves should double their starter intake to 2 lb. daily. Then, when milk/milk replacer is completely removed during week 7, starter intake should double to 4 lb. per day. During week 8, their starter intake should increase to 5-6 lb. per day.

If done in this manner, calf bodyweight can double from birth depending on the milk/milk replacer feeding program.

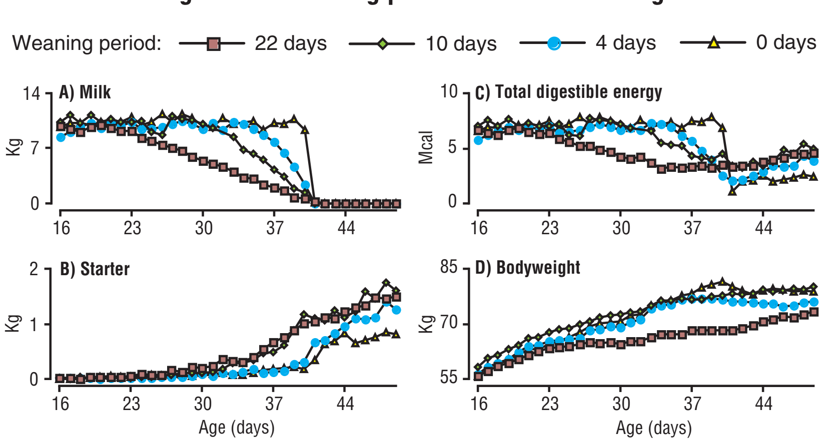
Study

With the advent of more automatic milk/milk replacer feeding equipment — and

Weaning treatments with all calves allowed up to 12 kg per day of milk before weaning

Treatment	Age weaning began, days	Duration of weaning, days	Average daily milk reduction, kg/day
22-day weaning	19	22	0.55
10-day weaning	31	10	1.20
Four-day weaning	37	4	3.00
Abrupt weaning	41	1	12.00

Mean milk, starter and digestible energy intake and bodyweight changes with weaning periods of different lengths



various ways in which weaning can be accomplished — how should weaning programs be constructed?

A study was devised at the University of British Columbia to evaluate several weaning methodologies (Sweeney et al., 2010). Before the trial began, calves were separated from their dams within 24 hours of birth and bottle fed four liters of colostrum with more than 55 g of immunoglobulins per liter within six hours of birth. Birth weights were recorded, and calves were moved into 4 ft. x 8 ft., sawdust-bedded pens and were bottle fed three liters of whole milk twice daily (5.17 $\pm$ 1.03 liters per day) along with free-choice water in buckets.

Twenty-four female and 16 male Holstein calves at four to seven days of age from the Agassiz herd were then housed in groups of four per 16 ft. x 24 ft., wood shavings-bedded pen with a partially slotted floor.

Calves were fed pasteurized, non-saleable milk that was referenced to bulk tank samples that averaged 3.97% fat, 4.1% protein and 3.3% lactose.

However, waste milk is highly variable and would not likely be that close to the tank average; rather, it would reflect what reasons cows were milked into that pool each day and how many cows were in that pool (Jorgensen et al., 2006; James and Scott, 2006).

Calves were provided with *ad libitum* water in a water trough and also a texturized calf starter (17.9% crude protein on a dry matter basis) through an automatic feeder. When calves accessed water and milk, they were automatically weighed each time. Calves were allowed to drink up to 12 kg per day of milk throughout the trial.

The four weaning treatments are shown in the Table, and all calves were weaned at 41 days of age.

Data demonstrated in the Figure (provided by J. Rushen) indicated the following:

- While not shown, during the five-day preweaning period of days 14-18, there were no differences among treatments, with calves averaging 9.3 $\pm$ 1.8 kg per day of milk intake, virtually no measurable starter intake, 6.3 $\pm$ 1.2 Mcal per day digestible energy intake and 0.9 $\pm$ 0.56 kg per day bodyweight gain.
- Milk consumption remained near the maximum allowed until staged weanings began, at which point intake declined accordingly.
- Increased starter intake was largely the inverse of decreased milk intake.
- Total digestible energy intake before weaning reflected combined intakes of milk and starter. It was greatest from day 24 to weaning on the abrupt weaning treatment, intermediate on the 10-day and four-day weaning treatments and lowest on the 22-day weaning treatment. These data indicate that increased starter intake did not compensate for the greater loss in energy from reduced milk intake.

After weaning, the longest two weaning treatments held digestible energy intake the best, reflecting the greater postweaning starter intakes among the treatments.

- Bodyweight increases were lowest for the 22-day weaning treatment and similar among the other three weaning treatments until the last four days preweaning, when the abrupt weaning treatment was greatest. After weaning, calves lost bodyweight on the abrupt weaning treatment and stalled on the four-day weaning treatment. Part of this may be due to less dry matter intake and gut fill since these calves were unable to make up in starter intake what they lost in milk intake.

Feeding whole milk with about 30% fat on a dry matter basis has considerably more energy density than milk replacer with 15-20% fat. However, the latter would encourage more starter intake and would be more typical of what many calf or dairy operations feed. It would be interesting to see how whole milk-fed calves would fare versus conventional milk replacer-fed calves at a higher level such as in this trial.

In a trial by Kuehn et al. (1994), calves fed milk replacer (15% or 21% fat at 8% of bodyweight before weaning at 42 days of age) ate more starter and had greater energy intakes with greater bodyweight gain for the 15% fat milk replacer versus the 21% fat milk replacer.

The Bottom Line

Gradual weaning over a 10-day period resulted in greater or more uniform bodyweight gain before and after weaning than shorter or longer weaning periods when calves were weaned at 41 days of age and fed whole milk.

I expect that similar results would occur if the weaning period was seven days — the midpoint between the four-day and 10-day weaning periods in this trial.

While there was an inverse relationship between milk and starter intake, the more gradual 10-day weaning period minimized the effect of calves' losing the greater energy density of milk and being replaced with starter intake.

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