Replacement Report

Calf Starter Research

Protein Levels in Calf Starters and Weaning Age of Calf

The Dairy NRC (2001) recommends 18% CP (all levels in document on as-fed basis) in calf starters. The calf model in the Dairy NRC (2001) suggests that energy, not protein, limits gain in calves 130 to 200 lb BW receiving only a dry feed. Akayezu et al. (1994; J. Dairy Sci. 77:1882) fed starters from 13.2 to 19.7% CP and observed calves fed 17.2 and 19.7% CP starters performed equally well or better than calves fed the lower protein starters through 56 days of age when weaned at 28 days (Figure 1). Their calves were in two geographic locations in different hutch types outside or in elevated stalls in heated rooms, in all seasons, with several types of liquids (transition milk, fresh waste milk, soured milk combined with MR) fed at conventional amounts (~ 1 gallon of liquid daily). Luchini et al. (1991; J. Dairy Sci. 74:3949) observed no difference in performance of calves fed 18 and 22% CP starters through 84 day of age and weaned at 26 days. They fed a 22% CP, 16% fat MR at 10% of birth weight for 7 days and 12% of the 7-day weight thereafter. Drackley et al. (2003; http://traill.outreach.uiuc.edu/dairynet/) found that calves fed starters containing 22% CP were more efficient and had similar gains compared with calves fed starters with 18% CP through 42 days. They fed 18 and 22% milk protein MR at 10% of birth BW through 35 days and 5% of birth BW through 42 days. We reported the results of two trials where we fed starters containing 18, 20, 22, 24, and 26% CP to calves fed 1 lb of a 20% milk protein, 20% fat MR and 1.5 lb of a 26% milk protein, 17% fat MR. In both trials the calves were weaned at 42 days (2007; Prof. Anim. Sci. 23:123). There were no differences in gain, starter intake, efficiency of gain, body condition score change, hip width change, or health from 0 to 56 days (Figure 1).

Greenwood et al. (1997; J. Dairy Sci. 80:2542) weaned calves based on starter intakes (14.2% CP) of 1.0, 1.5, or 2.0% of initial BW (which corresponded to 32, 43 and 45 days of age) and observed similar weight gains from 0 to 8 weeks and also up to 20 weeks of age among all 3 groups. Calves weaned at 1.0% of initial BW starter intake, consumed the most starter from 0 to 8 weeks and tended to grow faster than calves weaned at greater starter intake percents of BW. Quigley et al. (1991; J. Dairy Sci. 74:250) weaned calves from milk (7.9 lb per head daily) at either 28 or 56 days of age. They saw no differences in rate of gain due to weaning age and calves weaned at 28 days of age consumed more starter (16.8% CP) but similar total amounts of dry matter over the 98-day trial. Luchini et al. (1991; J. Dairy Sci. 74:3949) observed no difference in performance of calves fed 18% CP starters through 84 day of age and weaned at 26 or 42 days.

We have evaluated feeding high levels (1.8 lb) of a 30% milk protein, 20% fat MR powder for 2 or 3 weeks followed by a conventional MR and feeding level (1 lb powder) for 3 weeks (5 or 6 week weaning) vs. a conventional level (1 lb of a 20% milk protein, 20% fat MR) for 5 or 6 weeks. Our idea was to see if we could feed calves to grow fast during their first 2 or 3 weeks with liquid nutrition and reduce the liquid nutrition to encourage starter (18% CP) intake in an attempt to avoid a weaning slump in growth rates. We saw no difference in rate of gain from 0 to 56 days of age even though the calves fed the high rate;

high CP MR grew faster initially. Those calves consumed less starter and were less efficient than calves fed conventionally. Additionally, the calves weaned at 5 weeks consumed more solid feed and were equally as efficient as those weaned at 6 weeks.

We fed calves starters with 15, 18, and 21% CP plus (1 lb daily of a 20% protein, 20% fat powder) and weaned them at either 28 or 42 days (2007; Prof. Anim. Sci. 23:123). Calf gain and efficiency of gain improved linearly with increasing level of CP in the starter from 0 – 42 days. However, by 56 days, there were no differences in gain, efficiency, hip width change, and body condition change between calves fed the 18 and 21% CP starters (Figure 1). Calves fed the 15% had the slowest gains, poorest efficiency, and least change in hip width. Calves weaned at 28 days had a slower daily gain, greater starter intake, and poorer efficiency from 0 – 42 days than calves weaned at 42 days (Figure 2). However, from 0 – 56 days, calves weaned at 28 and 42 days had similar gains, efficiency, hip width change, and body condition change. Calves weaned at 28 days consumed more starter from 0 – 56 days than calves weaned at 42 days.

Collectively, these data suggests that 18% CP (as-fed basis) is adequate for calf starters. Data to suggest otherwise was the potential for a better efficiency with a 20% CP starter reported by Drackley et al. (2003) and a trend for a better efficiency that we observed in our 2004 trial. Additionally, calves did benefit from a high CP starter during the first 42 days in our 2004 trial; however, this advantage in performance was lost by 56 days.

Weaning earlier than 42 days is a viable alternative to weaning at 42 days. In both of our trials, we successfully weaned all of the calves at either 28 or 35 days with no difference in performance. These data do suggest that calves weaned early will have a slight slump in performance for 7 to 14 days post-weaning but they make up this lost gain in 21 to 28 days. Economics were not applied to these data, however, a savings in feed cost (starter being much less expensive than MR) and a savings in labor time or cost would seem evident with weaning at less than 42 days. Weaning early might not be advisable for all farms, especially if calf management is inadequate and/or calf health problems exist on a farm.

Figure 1. Daily gain of calves fed starters of varying protein percents

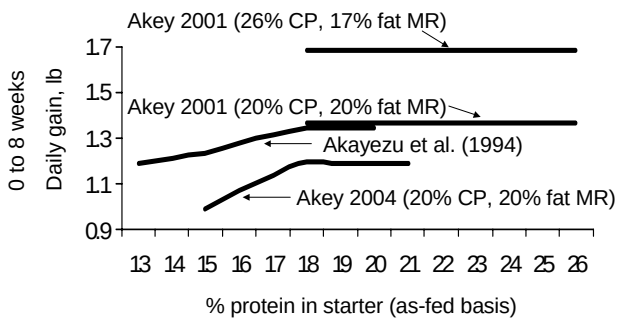

Figure 2. Effect of weaning age on body weight