



Milk Replacer Research Comparison of Milk Replacer Programs: 0 – 12 weeks

We have conducted several trials over the last few years evaluating the rate of Akey Pinnacle milk replacer (MR, 26% CP, 17% fat) fed to neonatal calves. In each trial, when more than the recommended rate of 1.5 lb per head per day was fed, calf gain was not increased. Feeding up to 2.0 lb per head daily resulted in reduced starter intake and feed efficiency. In the current trial we compared feeding four MR programs: A) Akey White Gold MR at 1.0 lb daily, B) Pinnacle MR at 1.5 lb daily, C) a commercial 28% CP, 20% fat MR at increasing rates to 2.5 lb lb daily, and D) Pinnacle MR at increasing rates to 2.5 lb daily.

Ninety-six Holstein calves initially 3-5 days of age and 96 lb body weight were used in the winter of 2006. Calves were maintained in 4 by 8 feet pens in a curtain sided and naturally ventilated barn with no added heat. Calves were bedded with straw. Free-choice water and an 18% CP starter were offered at all times. Calves were weaned at 42 days and maintained in the nursery individual pens through 56 days and moved to group pens of 6 calves per pen through day 84. Calves were fed their MR divided into equal AM and PM feedings. Calves fed programs A and B were fed the assigned amounts of MR until days 40, 41, and 42 when they were only fed the AM feeding. Calves fed programs C and D were fed 1.5 lb of MR during week 1, 1.8 lb of MR during week 2, 2.2 lb of MR during week 3, 2.5 lb of MR during weeks 4 and 5, and 1.25 lb of MR (AM only feeding) during week 6.

Results are shown in Tables 1 – 4. Calves fed program A (White Gold fed at 1.0 lb per day) grew the slowest during the first 6 weeks when MR was fed, resulting in the slowest overall rate of gain. Calves fed programs C and D (MR at 2.5 lb per day) grew the fastest during the first 6 weeks, but the slowest thereafter, and they consumed the least starter during the first 6 weeks, resulting in the least overall starter intake. Calves fed programs C and D had the best gain to feed efficiency during the first 6 weeks and the poorest thereafter. Calves fed program C had the most days with abnormal fecal scores (A= 1.1, B = 1.2, C =2.2, and D = 1.3 days, respectively).

Calves fed program B (Pinnacle MR fed at 1.5 lb per day) had the most hip width change, numerically gained the most body weight and numerically consumed the most starter over the 84-day trial. While feeding up to 2.5 lb of MR daily with programs C and D depressed starter intake and efficiency relative to program A, calves fed the intermediate amount of MR with program B did not experience a reduction in starter intake or efficiency relative to program A.

Calves fed programs C and D had much greater feed costs (Table 5) than calves fed the other programs and because of the reduced starter intake and compromised efficiency of gain, their overall body weight gain was no more than calves fed program B. Thus, the value of programs C and D are questionable because there was no performance advantage over program B and a large economical disadvantage vs. all programs (Table 6).

Calves fed program B (Pinnacle MR fed at 1.5 lb daily) were 18 lb heavier at the 42-day weaning and 20 lb heavier at 84 days than calves fed program A. Additionally, there was about \$7 more value of gain for calves fed program B, even with greater feed cost compared to calves fed program A. Consistent with our previous controlled research, feeding more than 1.5 lb of a high protein MR is not advised.

Table 1. Body weight gain

| Program | A | B | C | D | Contrast | | |
|-----------------|----------|-----|-------|-----|----------|--------|-------|
| | WG | PIN | 28-20 | PIN | Avs BCD | Bvs CD | Cvs D |
| MR ¹ | 1.0 | 1.5 | 2.5 | 2.5 | | | |
| Fed, lb | | | | | | | |
| Period | Gain, lb | | | | P value | | |
| 0-6 wk | 39 | 56 | 66 | 63 | 0.01 | 0.01 | 0.33 |
| 7-8 wk | 33 | 32 | 28 | 26 | 0.01 | 0.01 | 0.38 |
| 9-12 wk | 64 | 68 | 59 | 62 | 0.19 | 0.01 | 0.01 |
| 0-12 wk | 136 | 156 | 153 | 151 | 0.01 | 0.55 | 0.68 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat

Table 2. Starter intake

| Program | A | B | C | D | Contrast | | |
|-----------------|------------------------|------|-------|------|----------|--------|-------|
| | WG | PIN | 28-20 | PIN | Avs BCD | Bvs CD | Cvs D |
| MR ¹ | 1.0 | 1.5 | 2.5 | 2.5 | | | |
| Fed, lb | | | | | | | |
| Period | Starter intake, lb/day | | | | P value | | |
| 0-6 wk | 0.87 | 0.84 | 0.50 | 0.48 | 0.01 | 0.01 | 0.84 |
| 7-8 wk | 4.68 | 4.74 | 4.62 | 4.28 | 0.47 | 0.20 | 0.18 |
| 0-8 wk | 1.83 | 1.81 | 1.53 | 1.43 | 0.02 | 0.01 | 0.45 |
| 9-12 wk | 6.40 | 6.79 | 6.26 | 6.50 | 0.52 | 0.04 | 0.25 |
| 0-12 wk | 3.35 | 3.47 | 3.11 | 3.12 | 0.18 | 0.03 | 0.39 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat

Table 3. Gain to feed efficiency

| Program | A | B | C | D | Contrast | | |
|-----------------|----------------------|------|-------|------|----------|--------|-------|
| | WG | PIN | 28-20 | PIN | Avs BCD | Bvs CD | Cvs D |
| MR ¹ | 1.0 | 1.5 | 2.5 | 2.5 | | | |
| Fed, lb | | | | | | | |
| Period | Gain/feed efficiency | | | | P value | | |
| 0-6 wk | 0.49 | 0.59 | 0.64 | 0.62 | 0.01 | 0.03 | 0.18 |
| 7-8 wk | 0.53 | 0.49 | 0.43 | 0.43 | 0.01 | 0.01 | 0.93 |
| 0-8 wk | 0.51 | 0.55 | 0.56 | 0.55 | 0.01 | 0.53 | 0.35 |
| 9-12 wk | 0.36 | 0.36 | 0.34 | 0.34 | 0.12 | 0.02 | 0.74 |
| 0-12 wk | 0.45 | 0.49 | 0.51 | 0.51 | 0.01 | 0.11 | 0.86 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat

Table 4. Hip width change

| Program | A | B | C | D | Contrast | | |
|-----------------|----------------------|-----|-------|-----|----------|--------|-------|
| | WG | PIN | 28-20 | PIN | Avs BCD | Bvs CD | Cvs D |
| MR ¹ | 1.0 | 1.5 | 2.5 | 2.5 | | | |
| Fed, lb | | | | | | | |
| Period | Hip width change, in | | | | P value | | |
| 0-6 wk | 0.9 | 1.3 | 1.3 | 1.3 | 0.01 | 0.60 | 0.52 |
| 7-8 wk | 0.7 | 0.6 | 0.5 | 0.4 | 0.01 | 0.05 | 0.92 |
| 0-8 wk | 1.6 | 1.9 | 1.8 | 1.7 | 0.01 | 0.26 | 0.63 |
| 9-12 wk | 1.1 | 1.2 | 1.0 | 1.1 | 0.71 | 0.01 | 0.12 |
| 0-12 wk | 2.7 | 3.1 | 2.8 | 2.8 | 0.05 | 0.02 | 0.47 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat

Table 5. Total feed cost

| Program | A | B | C | D |
|--|-------|--------|--------|--------|
| MR ¹ | WG | PIN | 28-20 | PIN |
| Fed, lb | 1.0 | 1.5 | 2.5 | 2.5 |
| Milk replacer, \$/lb | 0.85 | 0.95 | 1.15 | 0.95 |
| Starter at \$0.15/lb, hay at \$0.05/lb | | | | |
| Milk replacer, \$ | 34.38 | 57.64 | 94.47 | 78.04 |
| Starter, \$ | 40.62 | 42.02 | 37.56 | 37.68 |
| Hay, \$ | 0.36 | 0.38 | 0.35 | 0.36 |
| Total, \$ | 75.36 | 100.05 | 132.39 | 116.08 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat

Table 6. Value of added gain vs. program A

| Program | B | C | D |
|-----------------------------|-------|--------|--------|
| MR | PIN | 28-20 | PIN |
| Fed, lb | 1.5 | 2.5 | 2.5 |
| Added gain over Prg A, lb | 20.4 | 16.8 | 15.2 |
| Value of gain at \$1.50/lb | 30.60 | 25.20 | 22.80 |
| Added feed cost, \$ | 24.68 | 57.02 | 40.72 |
| Value of gain over feed, \$ | 5.92 | -31.82 | -17.92 |

¹WG=White Gold, 20%CP, 20% fat; PIN=Pinnacle, 26% CP, 17% fat