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Feeding program responses differ by calf breed

THE practice of feeding calves lower levels of milk replacers has been changing to feeding higher levels and with a higher protein concentration, based on Cornell and University of Illinois studies beginning in 2001 (Kertz and Loften, 2013).

Ballou et al. (2013) studied this further in a trial using both Jersey and Holstein bull calves. The trial was a completely randomized 2 x 2 factorial with two levels of milk replacer feeding in which a different milk replacer was used for each of those feeding levels.

Twenty Holstein calves from one dairy operation along with 22 Jersey calves from another local commercial herd were used for a trial at the Texas Tech University calf research facility north of Lubbock, Texas.

Calves (about two days old) were housed in poly hutches with no bedding, which eliminated the possibility that calves were able to consume bedding that otherwise may have confounded the trial.

Temperatures ranged from 67°F to 94°F as the trial was run during the summer. Bodyweight and total serum protein were used to randomly assign calves to treatment within a breed. In two separate feedings per day, Holsteins and Jerseys on the lower plane of nutrition were fed a total of 1 lb. of a 20% crude protein and 20% fat milk replacer (20/20) at only 10.4% solids.

For the higher level, Holsteins were fed a 28/20 milk replacer at 14.9% for week 1 and 15.5% solids for weeks 2-6. They were fed daily in two separate feedings a total of 1.78 lb. for week 1 and 2.6 lb. for weeks 2-6. Jerseys were fed a total of 1.25 lb. of a 28/25 milk replacer for week 1 and 1.50 lb. daily for weeks 2-6 at 11.4% solids. Both milk replacers were medicated with a combination of oxytetracycline and neomycin sulfate (note that the trial was done before the Food & Drug Administration's change on medicated milk replacers went into effect in 2009). All calves were fed by bottle at 7:30 a.m.

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Bottom Line

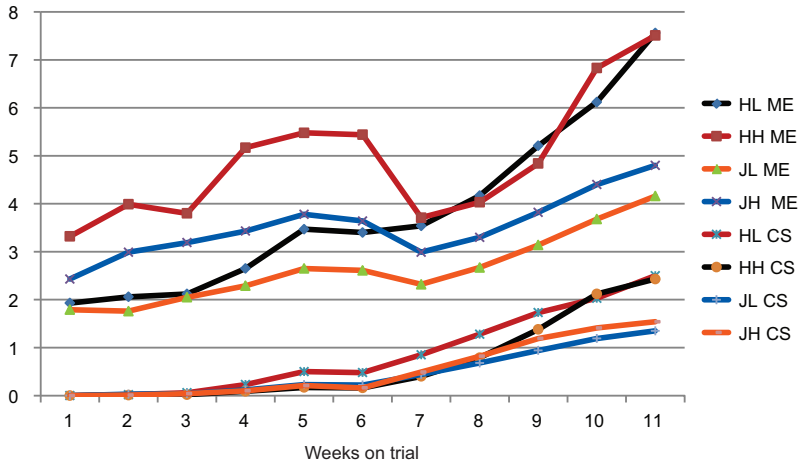
with
AL KERTZ*

and 4:30 p.m.

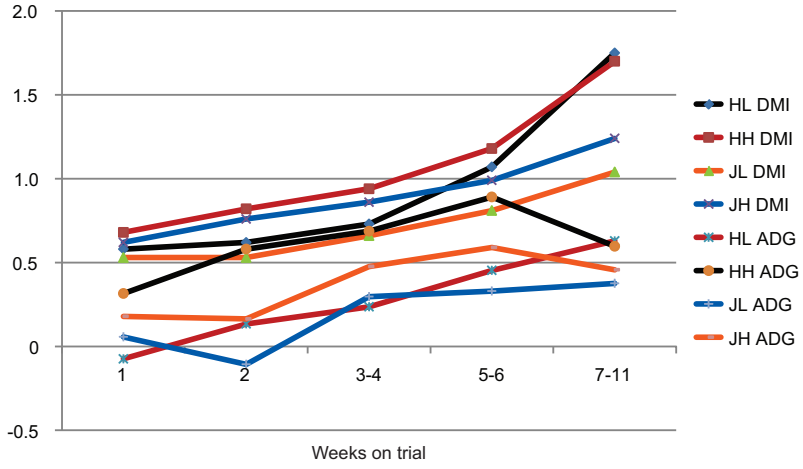
After the first week of life, all calves had access to free-choice water and a calf starter that contained 52.7% steam-flaked sorghum, 23.0% canola meal pellet, 14.0% of a corn gluten feed product, 7.5% molasses and 2.8% of a mineral/vitamin premix. I have had no experience with such a texturized starter in which the only grain source for the texture was sorghum, albeit steam-flaked.

The researchers noted that the starter had a crude protein level of 18.8% on a dry matter basis, which

1. Daily intakes of calf starter (CS), kg, and metabolizable energy (ME), Mcal, by week on trial for Holstein low (HL) and high (HH) milk replacer feeding and for Jersey low (JL) and high (JH) milk replacer feeding



2. Daily dry matter intake (DMI), kg, and average daily gain (ADG) by week on trial for Holstein low (HL) and high (HH) milk replacer feeding and for Jersey low (JL) and high (JH) milk replacer feeding



they said was low compared with the 2001 National Research Council (NRC) recommendations.

Actually, when I have used the Young Calf Model from the 2001 NRC, I have not found it necessary for crude protein in a calf starter to be more than 18% on a dry matter basis. The problem is that either calves are eating too little starter or the amount used in the model is too low for what the calves should be eating.

Another argument is that the crude protein percentage is too low in the calf starter. I would counter that, instead, the limitation is too little starter intake, which makes energy intake the limiting nutrient, not crude protein. If there is not enough starter and energy intake, then higher crude protein levels will just be wasted. If the energy intake from the starter is adequate, then crude protein needs to be only about 18% on a dry matter basis.

Granted, this goes against the still ongoing marketing-driven push for higher-crude protein calf starters. In lactating cow rations, crude protein is being driven down to allow for more efficient protein utilization, which does make sense.

Getting back to Ballou et al., on day 42 of the trial, calves were only fed milk replacer in the morning to encourage them to eat more calf starter. When calves were eating at least 2 lb. daily for two consecutive days, calves were completely weaned from the milk replacer.

A big plus with this trial was that it continued through 11 weeks. Too often, there is little or no continuation of a calf trial once calves are weaned. In such circumstances, there is no opportunity to measure if there were major changes in level of calf starter intake, bodyweight gain or other factors postweaning that could be related to the feeding program before weaning. Average days at full weaning were 52, 56, 56 and 58 for the low and high Holstein and low and high Jersey feeding groups.

The researchers noted that Holsteins on the high level of milk replacer feeding during the first two weeks had 1.19 and 1.38 Mcal of metabolizable energy (ME) refusals, so these calves were not able to consume all of the milk replacer that was fed.

In contrast, Jerseys on both the low and high feeding levels during only the first two weeks refused 0.29 and 0.22 Mcal of ME from milk replacer fed, respectively. (I commend the authors for supplying much weekly data by treatment, which allowed for the production of Figures 1 and 2).

Patterns of calf starter intake (Figure 1) did not begin to differ until about weeks 4-5, when the Holstein low level milk replacer feeding treatment increased at a greater rate than the Holstein high level treatment; this effect lasted until weeks 10 and 11, when the patterns became were similar.

Since the milk replacer fed to Holsteins had 20% fat, ME intake was considerably greater for the first six weeks until weaning occurred at 56 days instead of 52 days. After six weeks, ME intake was similar between these two treatments.

Average daily gain (Figure 2) was about 1 lb. less for Holsteins fed on low plane of nutrition compared to Holsteins on the high level of nutrition for the first six weeks, reflecting the greater ME intake difference between these two treatments. However, after six weeks, this difference in daily gain disappeared as Holstein calves on the high level treatment dropped down to the low Holstein level.

This is somewhat surprising and could be related to several factors. The level of calf starter intake was low on both treatments, especially after weaning. This could be due to the ingredients not being very palatable, to the steam-flaked sorghum not providing enough texture and making the calves marginally acidotic or to the hotter weather limiting starter intake.

I would have expected the calf starter intakes to be at least double what was measured, especially after weaning. (Mike Ballou, in an email response to me, confirmed that the calf starter was unusual — made by a local dairy, the bran had considerable moisture, and on some days, the starter felt hot). Since the calf starter intake was low, these Holsteins only averaged about 1-2 lb. of gain at weeks 5-6 and thereafter. I would have expected all Holstein bull calves to be at or above 2 lb. of daily gain during the postweaning period if calf starter intake was adequate.

Jersey treatment differences were less pronounced than for the Holsteins. Differences in starter intake were only really noticeable after about eight weeks (Figure 1).

ME intake, however, differentiated at about week 4 (greater for Jersey calves fed the high level greater than those fed the low level) and stayed that way thereafter until narrowing at weeks 7-11, contrary to the Holstein data. This was likely due to the milk replacer provided to the higher feeding level Jersey group having 25% fat, whereas the milk replacer given to the higher Holstein group had 20% fat.

Resultant daily gains were about 0.4 lb. greater for the high-level Jerseys compared to low-level Jerseys for weeks 2-6, albeit with a negative daily gain for the low-level Jersey treatment during week 2. However, like the Holstein data, daily gains and starter intakes were lower than I would have expected.

Increased shoulder height and body length generally followed higher milk replacer feeding levels in both breeds.

The Bottom Line

Holstein and Jersey male calves responded differently to greater milk replacer feeding levels, with Jersey calves having demonstrably greater daily gain on higher milk replacer feeding than Holsteins.

Lower daily gains than I expected seemed to be due to lower calf starter intakes, which could have been due to the calf starter having lesser texture, less-palatable ingredients, higher moisture content and/or hotter weather during the trial.

References

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