Dairy Research Summary

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The Effects of Offering 10 Litres vs. 5 Litres of Milk per Day on Growth and Starter Intake of Calves

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Why is this important?

Current dairy calf research is focused on offering 8 L of milk per day, in comparison to a conventional feeding plan of around 4 L of milk per day. Studies have shown that offering the additional milk results in increased growth, but feeding more milk may compromise starter intake.

The objectives of this experiment were to determine the effects of amount of milk offered on growth and starter intake of group-housed calves.

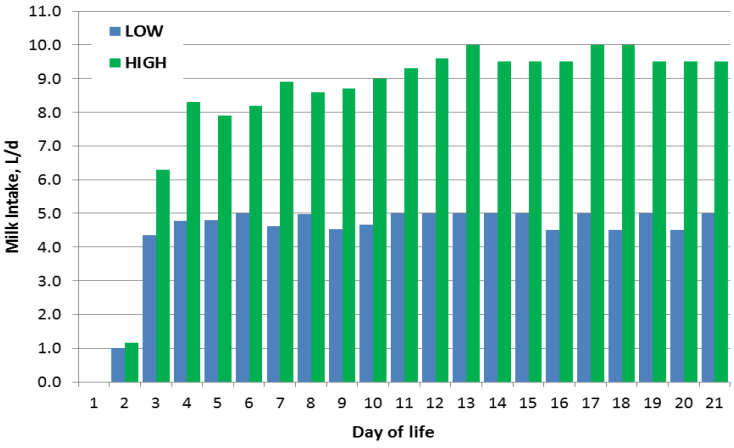

Figure 1: Average milk intake of calves fed a HIGH or LOW plane of nutrition for the first 21 d of life. Calves are allowed their respective treatments after colostrum feeding.

What did we do?

Twenty-seven female Holstein calves were fed four 2L feedings of colostrum in the first 2 d after birth before being offered either 10 L/d (HIGH) or 5 L/d (LOW) of pasteurized whole milk. HIGH calves were fed 4 times per day and LOW calves were fed twice per day with all calves allowed 2.5L of milk per meal. On d 48 calves began a 10-d weaning transition where milk was reduced by 10% per day resulting in all calves being weaned at d 58 of life.

Calf starter and water was offered from d 3 – 70. Calves were housed in individual pens for the first 21 d and fed using the calf rail system before moving to a group pen where they were fed through an automated calf feeder.

Blood samples were taken from d 4-7 to determine whether calves had received passive transfer of immunoglobins (IgG). Individual milk intake was measured from birth until d 58 of life and individual starter intake was measured automatically from d 25 to d 70 of life. Weekly body weight (BW) was measured from birth until d 70.

	Treatment			
Variable	HIGH	LOW	SE	*P*-value
Serum Protein (mg/dL)	5.3	5.1	0.21	0.97
Immunoglobin (g/L)	15.4	15.9	0.90	0.54

Table 1: Average serum protein and immunoglobin content in blood within 7d of birth for calves fed a HIGH or LOW plane of nutrition.

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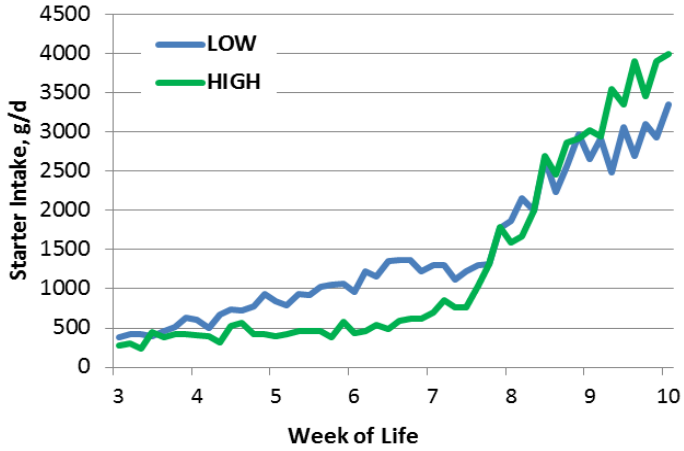

Figure 2: Starter intake of calves fed a HIGH or LOW plane of nutrition.

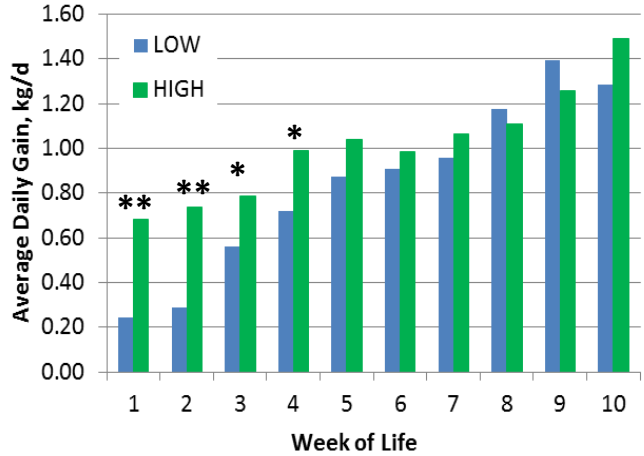

Figure 3: Average daily gain of calves fed a HIGH or LOW plane of nutrition.

What did we find?

Birthweight of LOW and HIGH calves was 40 ± 4 kg and 42 ± 4.5 kg, respectively. Milk intake of HIGH calves was greater than LOW calves on d 3 of life (6.3 vs. 4.4 L/d; respectively) and remained different until the 10-d weaning transition (Figure 1). Blood samples taken during the first week of life indicated all calves received adequate passive transfer of serum protein and IgG (Table 1).

Prior to the weaning transition (d 42-48) starter intake was lower for calves on the HIGH plane of nutrition (569 vs. 1083 g/d; Figure 2) compared to the LOW calves. However, average starter intake during the 10-d weaning transition was similar between both groups. Post-weaning (d 58-70) starter intake was not different between HIGH vs. LOW (3188 vs. 2723 g/d).

From week 1 to 10, BW of HIGH calves was greater than LOW calves. However, average daily gain (ADG) was only greater for the first 4 weeks of life for HIGH calves (Figure 3). While no difference in ADG was seen from week 4-10, overall ADG from birth until d 70 was greater for HIGH vs. LOW calves (1.03 vs. 0.83 kg/d).

What does this mean?

Feeding calves a high-plane of nutrition can improve body weight and average daily gain. While starter intake was reduced for HIGH calves pre-weaning, it increased during the weaning transition and was similar post-weaning.

The results suggest that feeding a high-plane of nutrition to group housed calves may benefit calf growth. Effect of pre-weaning milk intake on heifer development and first lactation performance will be studied in the future.

Summary Points

- Calves were fed a HIGH plane of nutrition (10 L/d) or a LOW plane of nutrition (5 L/d)
- Feeding a HIGH plane increased BW and ADG
- Starter intake was lower for HIGH calves prior to weaning but there was no difference in intake during and the after weaning transition

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