Interactions Between Milk Amount and Fat Content of a Starter Feed on Performance of Holstein Calves

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Introduction

- Dairy industry milk offering to calves:
  - Restricted

≈(4 L/d) → More generous ≈(6-8 L/d)

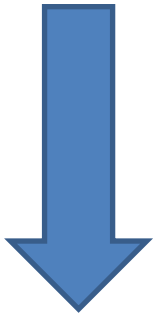
- Milk/MR > 0.8kg/d

→ Starter intake
Rumen develop
Postweaning ADG

Cowles et al., 2006; Hill et al., 2010
Suárez-Mena et al., 2011
Jasper and Weary, 2002; Hill et al., 2007

Introduction

- Need to stimulate solid feed consumption
  - Rumen development
  - Avoid growth and impairs health



Plausible method: with palatable ingredients

- A progressive decrease in MR offer is also needed

Introduction

- In a cafeteria study (Montoro and Bach, 2012)
  - Most preferred ingredients:
    - Soybean meal (rich in protein)
    - Whole soybean (rich in fat)

Final nutrient composition of the diet:

24% CP
9% fat

} 3.7 Mcal of ME/kg DM

Commercial feed starter composition:

18% CP
4% fat

} 3.3 Mcal of ME/kg DM

Introduction

- Strategies to increase energy level in diets of calves:
  - Fat supplements in milk / starter feeds
    - Some authors found a decrease in DM intake
    - Others found performance advantages

Low MR levels

Stewart and Schingoethe, 1983; Kuehn et al., 1994
Johnson, 1956

Hypothesis

We hypothesized that calves may have greater requirements for energy and fat than those currently provided

Objective

The aim of this study was to evaluate differences in performance of Holstein dairy calves fed starter with two different amounts of fat (3.6% versus 9.4%) from whole soybean and two different amounts of MR allowance (4 vs 6 L/d)

Materials and Methods

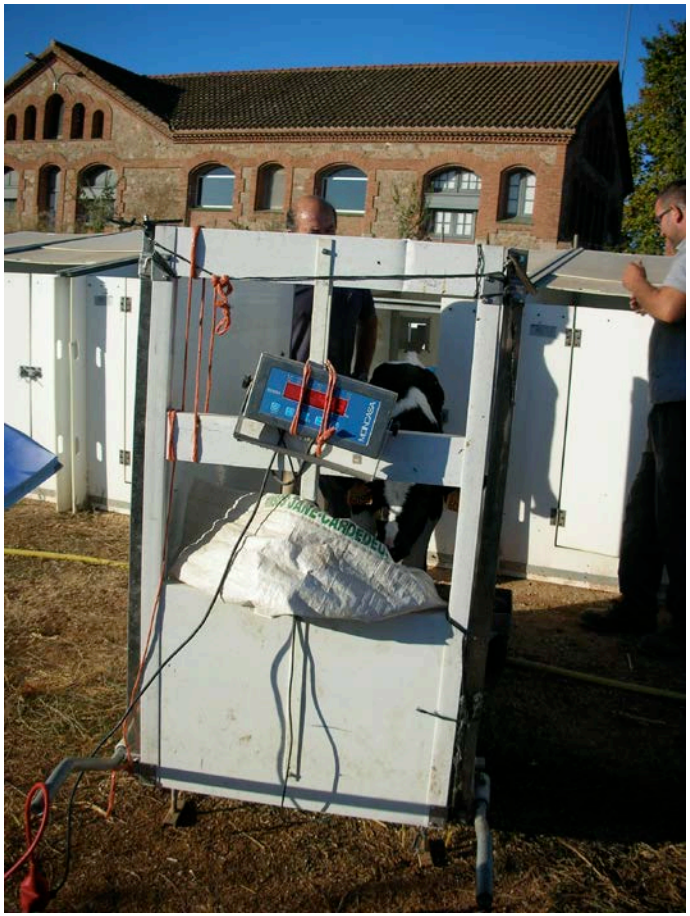
- 68 Holstein male calves (43 ± 5.7 kg BW; 11 ± 3.1 d old)
- 4 treatments (2x2 factorial design)
  - **4LF**: 4L/d at 12.5% DM, 3.6% fat
  - **4HF**: 4L/d at 12.5% DM, 9.4% fat
  - **6LF**: 6L/d at 12.5% DM, 3.6% fat
  - **6HF**: 6L/d at 12.5% DM, 9.4% fat
- Milk replacer (25% CP and 19.2% fat)
  - 8.00h and 16.30h for 5 wk
  - 8.00h for 1 wk
    - Weaning at 42 d
    - 53 days of study

Materials and Methods

	Low fat	High fat
CP, %	18.4	18.6
NDF, %	14	13
ADF, %	6.7	5.4
EE, %	3.6	9.4
Ash, %	3.9	4
NFC, %	60.1	55
ME, Mcal/kg DM	3.14	3.48

Materials and Methods

- Daily individual starter and MR intake
- BW weekly
- Data were analyzed using a mixed-effects model with repeated measures

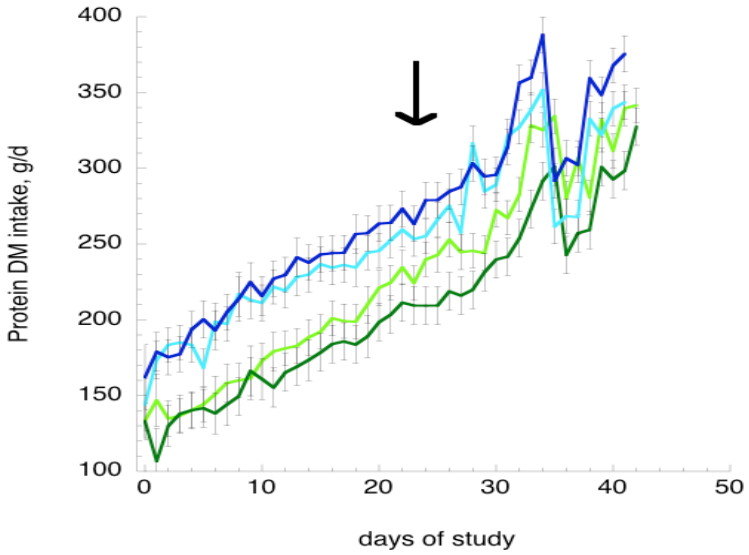


Results – before weaning

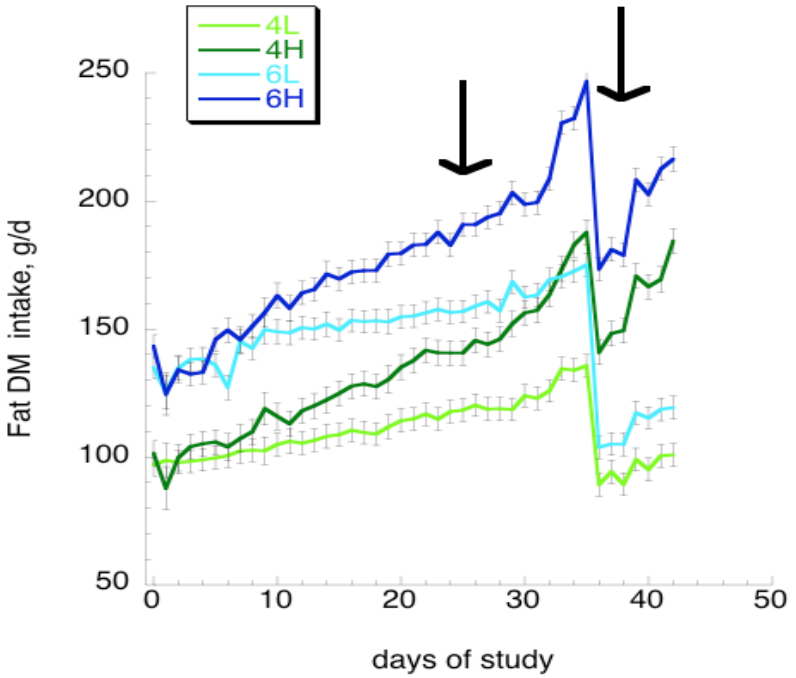
- Starter intake:
  - **4LF** > **4HF**, **6LF** (725 vs 572 ± 65.7 g of DM/d)
- Total DM intake:
  - **6HF** > **4LF**, **4HF** (1309 vs 1122 ± 70.3 g of DM/d)
- Total protein intake:
  - **6HF** > **4LF**, **4HF** (264 vs 216 ± 8.3 g of DM/d
- Total fat intake:
  - **6HF** > **6LF** > **4HF** > **4LF**

Results – before weaning

- Protein intake:



- Fat intake:



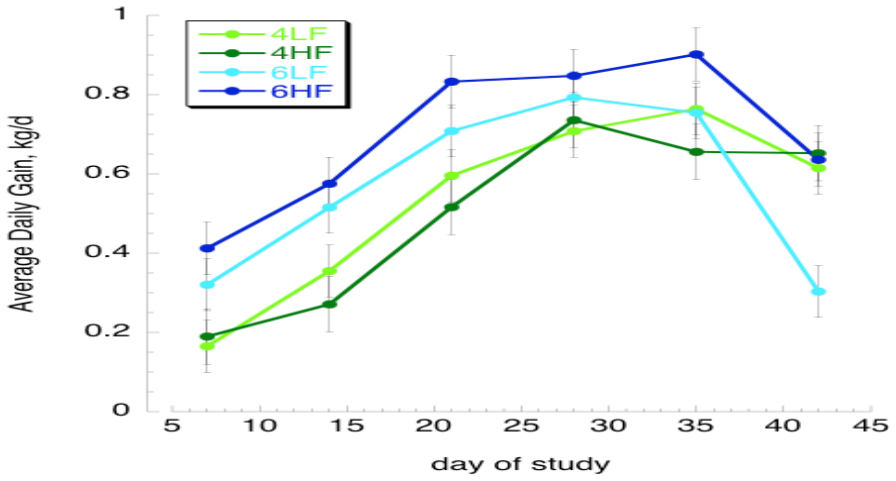
Results – before weaning

- ADG:
  - **6HF** > others (0.7 vs 0.5 ± 0.05 kg/d)
- Gain-to-feed ratio:
  - **6 L/d** > **4 L/d** (0.58 vs 0.53 ± 0.016)
  - **HF** > LF (0.58 vs 0.53 ± 0.016)

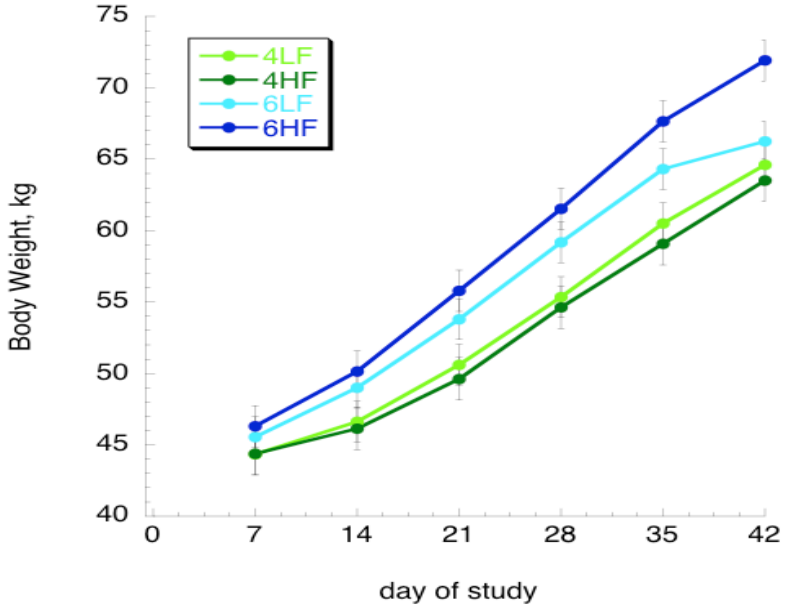
- Some interactions with time were found among treatments

Results – before weaning

- ADG:

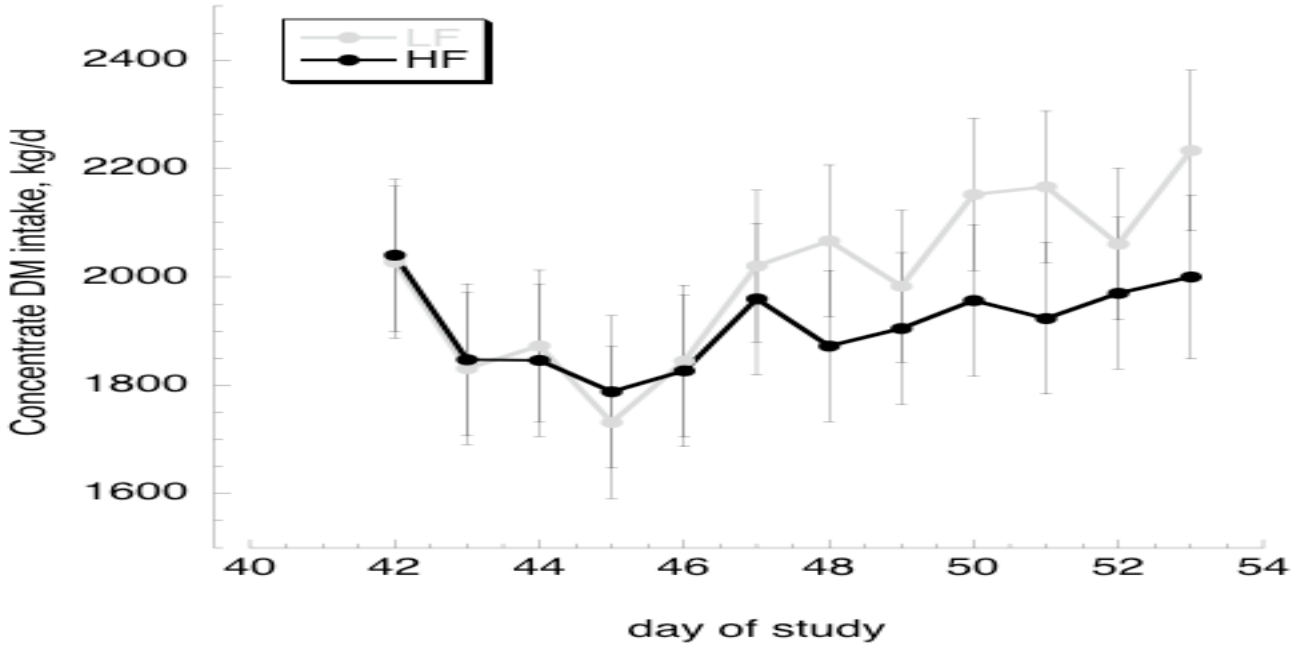


- BW:



Results – after weaning

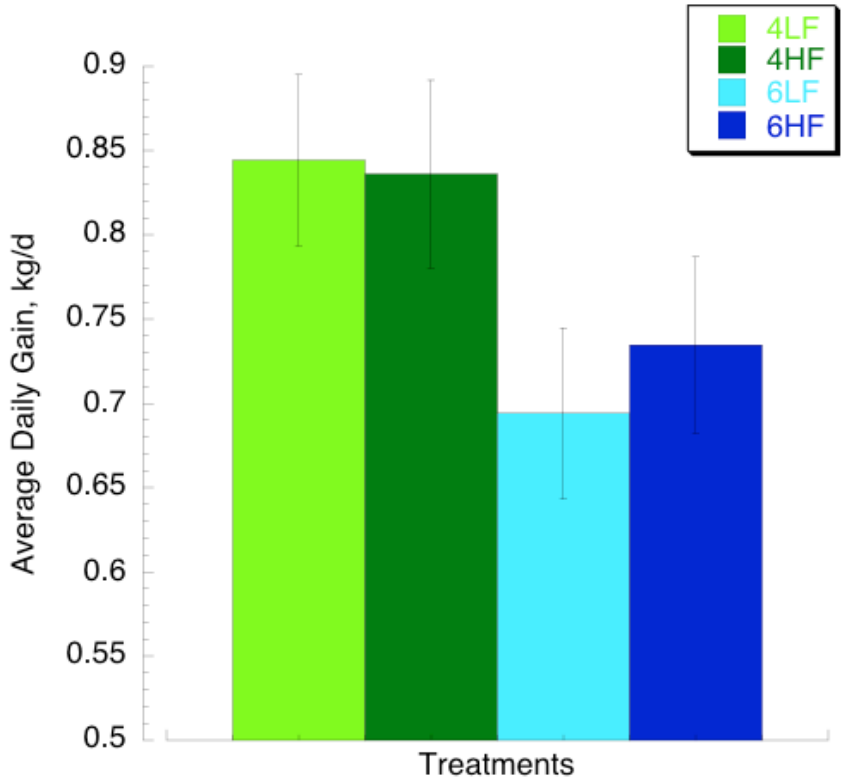
- Beyond 6 d after weaning:
  - LF > **HF** DM intake (starter and protein)



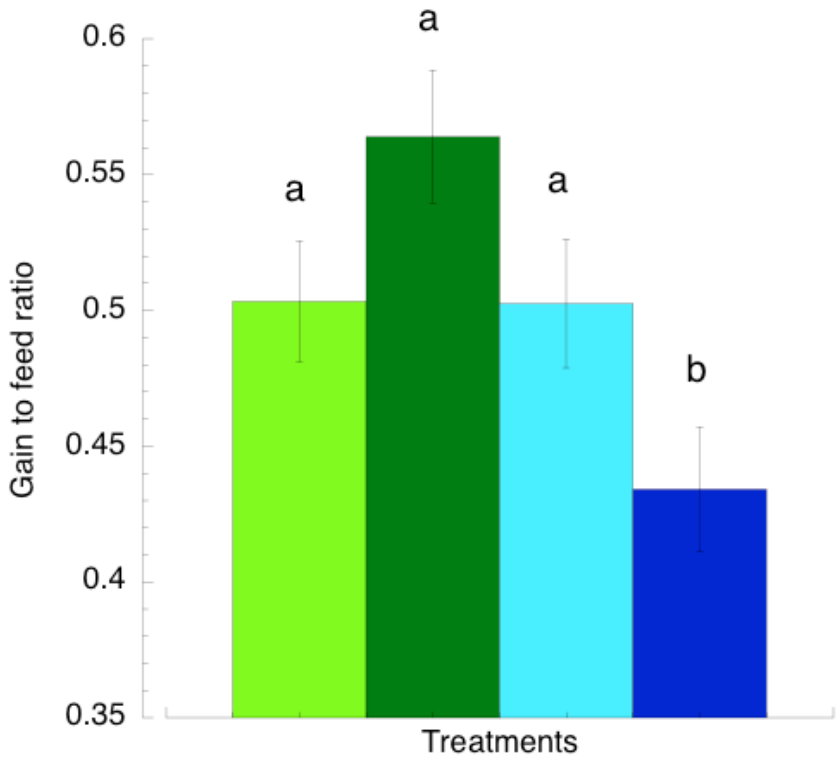
- Fat intake was greater for **HF** > LF

Results – after weaning

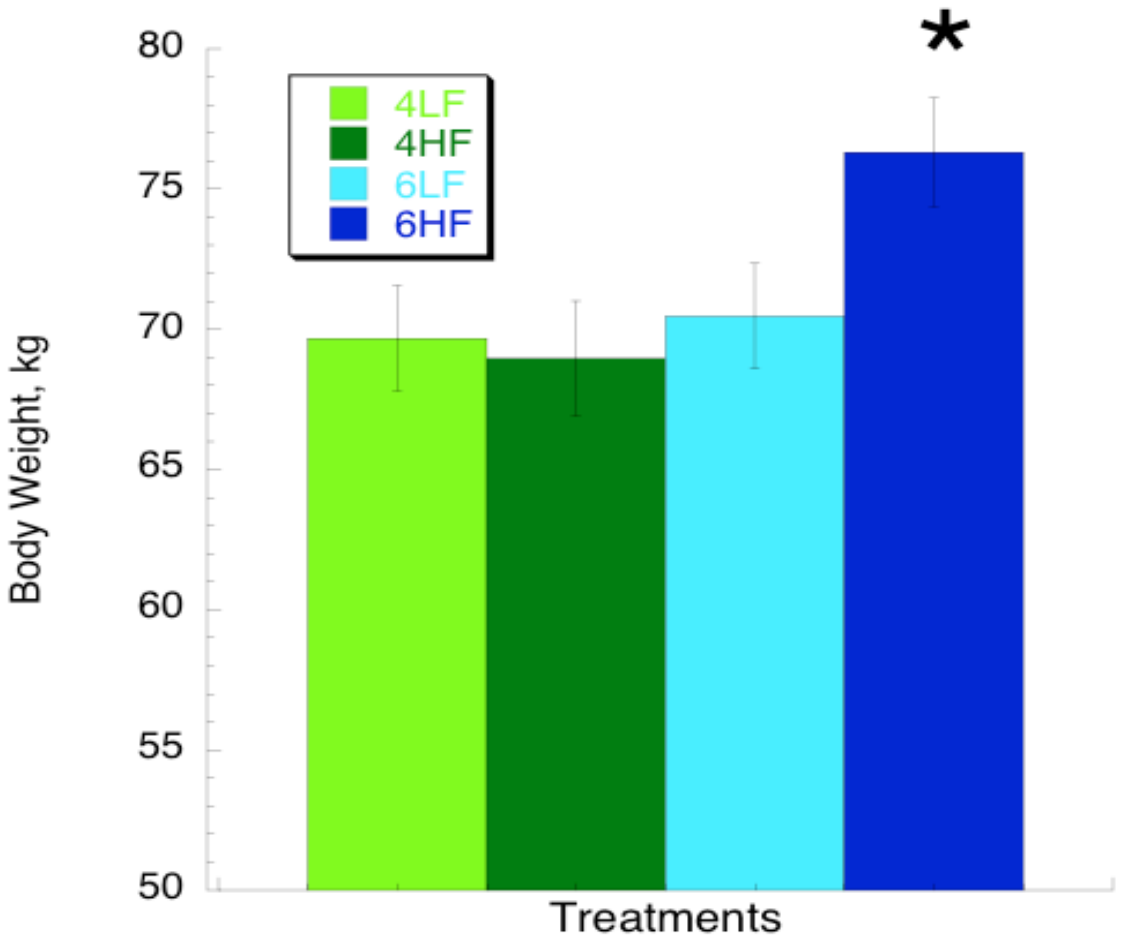
ADG 4 l/d > 6 l/d



Gain to feed



Results – after weaning



Results summary

Before weaning:

- Calves in 6HF had greater total intake and ADG than the others
- BW was greater for calves consuming 6 than 4 L/d MR, but at weaning only calves in 6HF had greater BW compare with the others

After weaning:

- Calves consuming a HF starter had lower starter intake than LF animals, and 6HF calves had the lowest gain to feed ratio
- The week before weaning, 6 L/d calves had lower ADG than 4 L/d calves, specially those in 6LF treatment.
- Although the week after weaning all treatments had greater ADG than the week before weaning, it was greater in 4 than in 6 L/d calves

Conclusion

Increasing fat content of starter feed of calves receiving 6 L of MR/d resulted in a better growth performance before weaning, and the decrease in ADG at weaning was lower than in 6 L low fat animals

Thank you!

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