Alberta Dairy Management
PREPARED FOR AND DISTRIBUTED BY THE DAIRY EXTENSION ADVISORY GROUP

What Manure Can (and can't) Tell You

We often assume than cows with loose manure are consuming too much protein. To test this assumption, researchers in Virginia conducted a trial which was reported in the April 1993 Journal of Dairy Science.

The researchers worked with a group of 30 cows - 18 in their first lactation, producing an average of 26 kg/day and 12 second lactation and older cows producing an average of 34 kg/day. The cows were fed six different rations based on corn silage , alfalfa haylage and corn :

1 low fibre (17% acid detergent fibre - ADF), low protein (15% crude protein - CP);
2 low fibre, high protein (22% CP) where the additional protein was from soymeal;
3 low fibre, high protein (22% CP) where half of the additional protein was from soymeal and half from corn gluten meal;
4 high fibre (25% ADF), low protein (15% CP);
5 high fibre, high protein (22% CP) with soy;
6 high fibre, high protein with soy and corn gluten.

Manure was scored visually by a panel of judges according to the way it hit the floor and settled after being dropped from a height of 1 metre. The scoring system is described in table 1.

Here's what the researchers found :

- None of the cows on any of the diets produced manure that was firm enough to be scored a 4.

Effect of ration protein level and type

- There was a lot of variation in fecal scores among cows receiving the same amount and type of protein. For example, of the cows fed the high protein, soymeal supplemented rations (rations 2 and 5), 29% were given a fecal score of 1, 52% scored a 2 and 19% scored a 3. This distribution is shown in figure 1.
- Average fecal scores were lower (more runny) for cows fed the high protein, straight-soymeal supplemented rations (2 and 5) than for cows fed the low protein rations (1 and 4). This finding supports the common assumption that high protein intake produces loose manure.

SCORE	VISUAL APPEARANCE
1	runny; liquid consistency, splatters on impact, spreads readily
2	loose; may pile slightly, splatters and spreads slightly on impact and settling
3	soft; firm but not hard, piles but spreads slightly on impac and settling
4	dry; hard, dry appearance, original form not distorted on impact and settling

Table 1 : Fecal consistency scoring system.

- When supplemental protein was provided by a combination of soymeal and corn gluten meal (rations 3 and 6), average fecal scores were higher than for either low protein or straight-soymeal supplemented rations . This was probably due to the difference in degradability between soy and corn gluten protein. Soymeal protein is usually estimated to be about 65% degradable (35% bypass) while corn gluten protein is about 45% degradable (55% bypass).

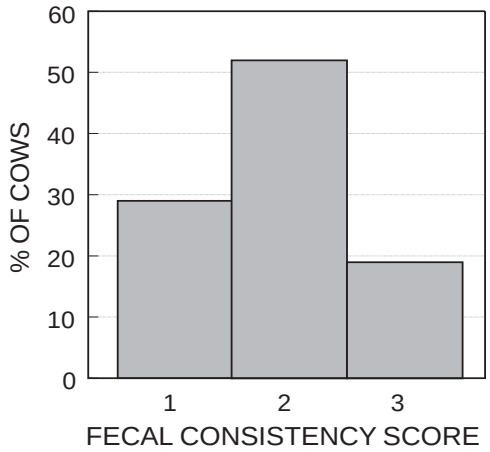

Figure 1 : Distribution of fecal consistency scores for cows fed high protein, soymeal supplemented rations.

Effect of ration fibre level

- 25% ADF rations (4 - 6) produced higher fecal scores than 17% ADF rations (1 - 3). Low fibre rations resulted in higher dry matter intakes, higher milk production and lower fat tests, as expected.
- It might seem reasonable to assume that loose manure contains more water than firm manure. However, in this experiment, the loose manure associated with low fibre rations actually contained less water than the manure from cows fed high fibre rations. Cows fed high fibre rations produced manure which contained more fibre. Since fibre can absorb a lot of water, this may explain the greater amount of water in the manure from these cows.

Effect of dry matter intake

- Dry matter intakes (DMI) were higher for cows on low fibre versus high fibre rations. Protein level (15% vs 22% CP) had no effect on DMI but cows ate more of the soybean supplemented rations than they did of those supplemented with soymeal plus corn gluten meal.

Lower fecal scores resulted from higher dry matter intakes. This is likely due to more rapid passage of feed through the digestive system , reducing water extraction.

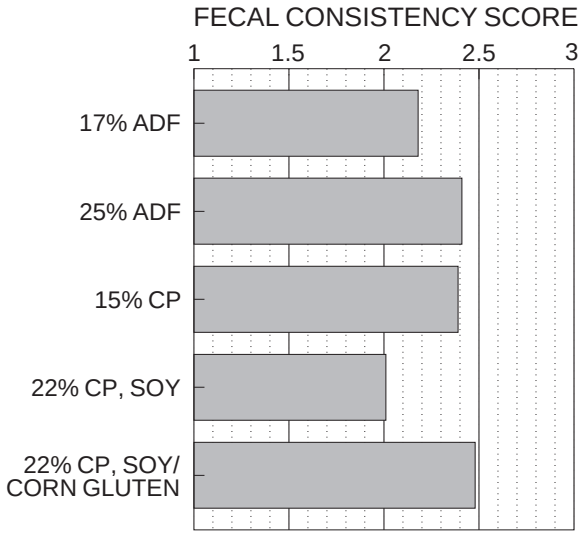

Figure 2 : Average fecal consistency scores for cows consuming rations with different fibre and protein levels and different supplemental protein sources.

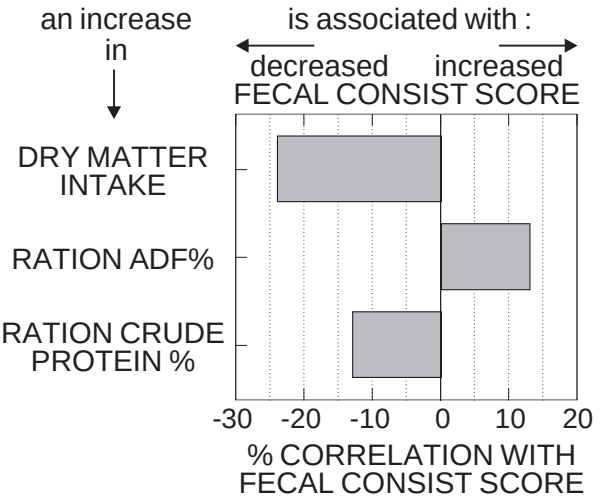

Figure 3 : Correlations between ration characteristics and fecal consistency scores. Increasing dry matter intake and ration crude protein level are associated with loose manure. High ration fibre levels correlate with higher fecal scores.

Conclusions

The results of this experiment support the idea that high crude protein rations can produce loose manure. However, they also demonstrate that the type of supplemental protein used can modify this effect.

It is also clear that other factors, notably ration fibre level and dry matter intake, may be at least as important as protein in altering fecal consistency.

The results demonstrate the high variability of fecal consistency, even among cows on the same ration. This implies that some cows will have loose (and other cows firm) manure no matter what ration they are consuming.

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