

## It's Acidosis, But How Did It Happen?

Bill called last night and was frustrated. His local veterinarian and foot trimmer agreed: His cows are suffering from acidosis

"But, it can not happen," according to Bill.

First, some of the vitals:

1. He is feeding a one-group total mixed ration (TMR).
2. The Penn State box indicated adequate long fiber (over 10 percent on the top box and less than 50 percent in bottom box).
3. Bill is adding seven pounds of long hay (132 relative feed value).
4. His nutritionist has formulated a carbohydrate balanced TMR with 19.9% ADF, 31% NDF, 36% NFC, and 28% starch.

How can both groups be right or wrong and Bill's cows are telling us something is not correct?

### Selective consuming of the TMR

Vita Plus recently reported an interesting field study conducted by Rod Martin. A high-producing herd (81 pounds of milk containing 3.8% milk fat and 3.2% milk protein) with excellent cow comfort was monitored for 24 hours to evaluate physical sorting and TMR consumption. The TMR specifications for the herd are listed below:

- 54 pounds of dry matter consumed per cow per day containing 54 percent dry matter.
- 17.9% crude protein, 18.8% ADF, 27% NDF, 40.5% NFC, and 6.1% fat.
- Original Penn State box results: top box 9% (recommended 7 to 15%), middle box had 47% (recommended 40 to 50%) and 44% bottom box (less than 50% recommended).
- TMR was fed once a day at 9 a.m. and pushed up several times a day.

Every six hours the remaining TMR was physically evaluated using the Penn State box and the amount of TMR consumed estimated (Table 1).

Bill's answer may be found in Table 1. The cows in the first six hours ate a significantly shorter ration that they selected and consumed compared to the last six hours, which was very long.

Which cows were eating their fill in the first six hours? Which cows had to consume the remaining feed after 18 hours? The Vita Plus data points out (under field conditions with high-producing cows) that all cows do not consume what is mixed in the TMR. The cows only consumed 74 percent of the long particles mixed and presented.

### Solutions and strategies

When our students in our fall semester extramural class saw this data, they asked the following questions:

- **Are TMR feeding systems not the real answer?** No, but a TMR does not guarantee that every mouthful of feed is equal.
- **Should dairy managers feed more frequently?** Yes, if feed sorting is a problem as illustrated in Table 1.
- **Is the data in Table 1 a problem if the herd is over 80 pounds of milk with high milk components?** Yes, I feel the ration is not under the manager's control. The cows have more impact on nutrient balance than the nutritionist. If all cows eat their fair share each six hours, a potential problem may not exist.
- **Should we process the hay more?** No, there is little room to reduce the particle size without risking problems if sorting continues.
- **Would adding some water help?** Yes, if the ration sticks together more or cows will not sort it. The ration is optimal at 56 percent dry matter or 44 percent moisture. I would try adding water and ask the cows to answer the question if the water helps.
- **Could pushing up the TMR more frequently help?** It may depend on how smart the cows are (they quickly sort it again) and if the push up feed mixes with the remaining fresh feed.
- **Should we pick up the weight back or refusals every 12 hours and mix it with fresh TMR?** If the refusal "looks" like the TMR (not true in Table 1), my answer is yes (unless it is unpalatable due to secondary fermentation). If the feed refusal is variable, mixing fresh TMR with the feed refusals results in a "different" TMR with an uncontrolled or predictable nutrient level.

Time after Feed (hr)	Feed Consumed (lb as fed basis)	Top Screen (% top)	Actual Top (lb consumed)	Predicted Top (lb expected)
0 - 6	36	0.97	0.35	3.35
0 - 12	27	1.55	0.42	2.50
12- 18	17	12.2	2.08	1.58
18 - 24	20	20.0	4.02	1.87
<b>Totals</b>	<b>100</b>	<b>NA</b>	<b>6.87</b>	<b>9.30</b>

**Each dairy manager reading this column will have a different strategy (here are some ideas from Vita Plus and our group).**

1. Feed higher quality hay to encourage long particle forage consumption.
2. Add buffer if sorting can be prevented to minimize acidosis risk.
3. Process hay before adding it to the TMR to achieve the desired hay length.
4. Plant processing of corn silage can add more effective fiber to the TMR and will be more difficult to sort (no cobs) and improve palatability.
5. Chop haylage to achieve more particles in the middle box (40 to 60%).
6. Add ingredients to the TMR to optimize feed particle size.
7. Longer particles in a TMR are not always better.
8. Check weigh back or refusals to monitor if sorting has occurred.
9. Consider several feedings a day (keep some fresh TMR in the mixer to be distributed later is another approach to avoid having to mix again).
10. Maintain top quality, wholesome, and palatable feed ingredients.
11. Consider adding water or molasses to stick feed particles together.

Our professional thanks are given on to Rod Martin and Vita Plus for sharing their data and ideas. Vita Plus and University of Illinois Dairy Extension, plan to expand the database this year under different field conditions (heat stress), ages (first lactation cows), and dry matter intake levels. We plan to pick up the TMR every six or eight hours, weigh it, remix and sample, and chemically and physically test the remaining feed.