

## There's an Argument for 'Rapid Carbo'

In a recent article highlighting Dick Rau, 1998 Wisconsin Farm Family of the year winner, he commented on adding "rapid carbo" as one reason why the herd of 730 cows produced over 27,000 pounds of milk. "Rapid Carbo," or rapid carbohydrate, is getting more attention in building rations.

Rumen microbes need a balance of nutrients available throughout the feeding cycle (defined as the time from one major feeding to the next major feeding, which can vary from four to 12 hours depending on the feeding system and cow behavior). Rumen microbes need sources of rumen available carbohydrate (energy source), nitrogen (protein source), and micronutrients during each feeding cycle. In the first hour, a rapid source of carbohydrate may be needed to "jump start" the fermentation along with soluble protein (such as high quality wet haylage or urea).

### ON-FARM OBSERVATIONS AND COMMENTS

Dairy managers have reported adding rapid carbohydrate to their ration using a number of strategies and products with excellent economic benefits.

1. Adding 5 percent molasses to the grain mix or TMR
2. Supplementing 2 to 3 pounds of feed grade starch
3. Grinding dry corn finer, substituting steam-flaked corn, or feeding high moisture corn
4. Shifting to 2 to 4 pounds of bakery waste, cookies, or candy

In these situations, milk production and/or milk protein content increased while feed costs may have declined. Adding rapidly fermented carbohydrate can be a plus.

### RESEARCH RESULTS

The Cornell University-University of Penn-Miner Institute (CPM) rumen model divides feed carbohydrate in several fractions: A1, A2, B1, B2, B3, and C fractions. The A1 fraction is rapidly fermenting carbohydrates, which can increase microbial growth, protein yield, and rumen volatile fatty acids (VFA). Feeds such as sugar, whey, finely processed corn, wheat or barley grain, and discarded human food products (such as cookies and candy) contain high levels of A1 fraction carbohydrate sources. The model illustrates that feeding the optimal amount of A1 carbohydrate can increase rumen yield and efficiency. The model also indicates if the rumen pH drops and effective NDF levels are marginal, rumen acidosis occurs reducing rumen output. Dairy managers and nutritionists must be careful with rapid carbohydrate as disastrous results can occur if too much is fed or improperly used (leading to rumen acidosis, laminitis, off-feed, and twisted stomach).

### STRATEGIES AND GUIDELINES

**Most rations can use a small amount of rapid carbohydrate. I suggest adding 1 pound for a week, evaluate, and increase to a second pound if the rumen is healthy.** Be sure to consider other nutrients in the added feed that can impact results (fat levels, total non-fiber concentration in the diet, and effective and total NDF amounts). For example, if candy contains high levels of fat/oil and nuts, the added oil can reduce rumen pH and lead to acidosis. Potato chips and fried bakery waste can contain high levels of fat/oil and nuts; the added oil can reduce rumen pH and lead to acidosis. Potato chips and fried bakery waste can contain high levels of unsaturated oil, which can be a negative factor. The following guidelines can be helpful.

Situations where more rapid carbohydrate can be a plus in a ration:

- High levels of top quality haylage (excess soluble protein)
- Hay based rations (limited amounts of A1 carbohydrate)
- Haylage rations (most of the haylage carbohydrate has been converted to organic acids in storage and little A1 remains)
- Corn silage that has whole kernels and is drier than optimal (starch is not available and has not fermented well)
- Dry corn based grain mixtures
- Coarse processed dry corn (cracked)
- Use of by-product feeds where starch and/or sugar has been removed (beet pulp, corn gluten feed, hominy, or wheat midds for example).

Situations where less rapid carbohydrate would be recommended:

- Corn silage based rations, especially if the silage is wet and high in grain (excess rapid carbohydrate).
- Functional fiber is limited (risk of acidosis)
- High moisture corn (over 28 percent moisture)
- Herd not fed a TMR (finer feed particles can be sorted)
- Slug feeding of grain
- Rations containing over 38 percent NFC or less than 28 percent NDF

If you decide to experiment with your herd after reviewing the situations listed above, be sure to monitor and watch your cows. Cows will communicate to you (the following would be favorable responses to added rapid carbohydrate).

- Increases in milk components (protein and/or fat)
- Drop in milk urea nitrogen (using more soluble protein)
- Desirable manure dropping (score 3 manure)
- Increase in milk yield
- No signs of acidosis
- Less corn in the manure (greater digestion)