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## SIMPLE, ACCURATE URINE PH MONITORING

Dairy clients don't have to follow a urine-pH monitoring program to take advantage of a DCAD balancing system, but when done right, it can make a cheap, relatively easy and accurate early warning system to spot glitches before they show up as milk fevers and other costly metabolic disease. West Central's director of research Dr. Phillip Jardon, a recognized authority in the practice for more than a decade, suggests these tips to make pH monitoring run smoothly and — more importantly — accurately:

**SAMPLE EFFECTIVELY.** In time-pressed dairies, over-sampling that causes reluctance to follow the program may do as much as harm as under-sampling. If the labor and facilities allow it

### KEEP THE TARGET WINDOW RELATIVELY WIDE

Although some recommendations suggest you aim for Holstein lactating cow urine pHs within a range of 6 to 6.5, West Central's Dr. Jardon believes that window is too narrow. Here's why: Work from Wisconsin veterinarian Garrett Oetzel in 2000 showed that if cows' pH fall below about 6.0 or rise above about 7.0, it takes a relatively greater change in DCAD to effect a urine pH change. But when they're within the 6.0 to 7.0 range, a small DCAD change causes a bigger pH jump. That has two

practically, collecting eight to ten samples twice weekly is ideal; however, once a week will suffice, unless the groups are so small that you can't test adequate numbers. If you have first- and multiple-lactation cows in the same group, segregate the samples. Step up the frequency during feed changes or increased fresh-cow problems.

**CONSIDER CONVENIENCE — FOR PEOPLE AND FOR COWS.** Contrary to some recommendations, Dr. Jardon believes that for dairies feeding a TMR once or twice a day, the time of collection makes only a slight difference in test accuracy. For that reason, he believes, you should base your timing on how convenient it is for crews and cows. Usually those two coincide at feeding, where the easiest lock-up occurs.

**ALLOW FOR LAG TIME.** Once you make a change in the ration DCAD, changes in cows' acid/base balance will follow in about 36 hours. Therefore, any pH results should be applied to ration changes made two to three days previously; likewise, any changes won't show up in the tests until two or three days later.

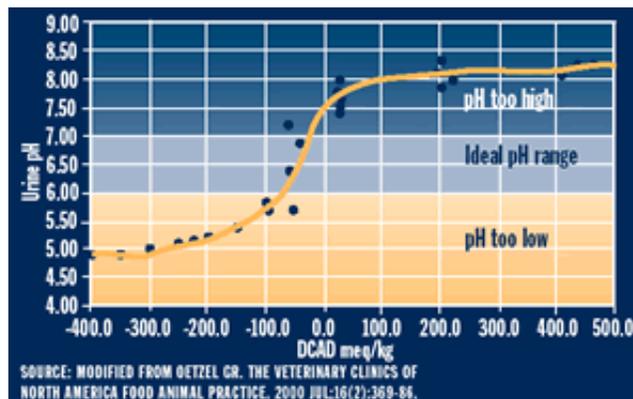
**READ THE GROUP.** Using DairyComp's ability to create user-defined fields for individual cows or Microsoft Excel's statistical analysis functions, it's relatively easy to run group averages and chart interference levels for weekly test results. Dr. Jardon suggests you focus more on those averages and less on the occasional outliers. Keep the brunt of the group within the interference-level window. The only exception might be to watch for an excessive number in the extreme ranges. That might indicate cows are sorting.

**STREAMLINE COLLECTION.** Dr. Jardon suggests a good hand ought to, with experience, cow restraint and some of these real-world tips, be able to collect samples in less than 10 minutes:

- Keep cows quiet by working slowly and talking quietly. Don't try to collect while somebody else is working around the head, tagging or vaccinating.
- Stroking a cow just under the vulva will usually stimulate her to urinate. If you sleeve up, the plastic will create less drag, providing better stimulation. Don't touch the tail in the process; it will worry some cows and hinder the urination response.
- Try to sample from mid-stream. The first flow often has a higher pH than the full stream, and it's more likely to be contaminated. Always make sure you're starting with clean containers, and don't contaminate them in the process.
- Because many cows will urinate in response to running water, turning on the flush can encourage some of the reluctant ones when you can't get a sample. However, it may also encourage the majority of the group to let loose as well, making it impossible to sample all.

**DON'T OVER-INTERPRET.** Urine pH changes can signal a number of feed factors. It may take some lab analysis and detective boot-leather to track down the cause.

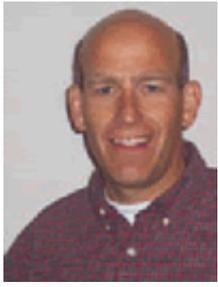
implications, Dr. Jardon says: 1) it's relatively difficult to keep the group within a half-point range; 2) trying to make pH changes within that range can easily lead to overcompensation that pushes them outside the ideal range.



<b>8.0-8.5</b> Too high; insufficient anions; hypocalcemia risk	<b>7.0-8.0</b> DCAD is working, but need more	<b>6.0-7.0</b> Optimum	<b>Under 6.0</b> Too anionic; back out the anions	<b>Less than 5.5</b> Seriously acidic; risk of metabolic disorders
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## CONSULTANT'S CORNER

### MAKING URINE TESTING WORK



*Jim Barmore, MSc, PAS, Five-Star Dairy Consulting LLC, Verona, Wis.*

Sometimes dairy producers and nutritionists may get stuck in the paradigm of, “I don’t have milk fever, so I don’t have to monitor urine pH.” But I try to encourage clients to look at it as a much broader application than that. This business is, to some degree or the other, all about minimizing risks and variability in feed management — and about making those risk-management tools a routine part of day-to-day management. Over and above its value in preventing milk fever — both clinical and subclinical — a good urine pH-monitoring program fits that broader description. It’s just one more risk-management tool that allows us to run a tighter fresh-cow program.

For that reason, I usually have little to no problem convincing dairy clients of the value of a well-run — but lean — urine-testing program. Most find it’s a more-than-cost-effective investment and quickly find it useful beyond simply a tool to adjust the levels of chloride in the ration. It’s an excellent monitor to use in gauging how well the intended ration matches the presented or consumed ration. In addition to less milk fever, we end up with fewer retained placentas, DAs, ketosis — most of the conditions that indicate a metabolic imbalance. Some general guidelines I suggest:

- First things first, I always try to be clear that it is not a prerequisite to test urine pH in order to balance ration DCADs. Sometimes the impression to the contrary might be created, but it’s entirely possible for a well-managed dairy to run an effective DCAD program without it.
- As with most of your recommendations, it may require some work up-front to first develop a customized plan that’s organized yet simple, and second, to obtain buy-in from the feeder, herdsman, veterinarian and management team alike. This may seem like overkill, but in my experience, unless all significant stakeholders embrace a program like this, it stands risk of failure in the future. It’s important to help them recognize the significant costs associated with transition-feed variation, set clear expectations with the entire team regarding goals and commitments, help deploy enough labor and capital to make improvements and assist in training to make it all work.
- Schedule a specific day of the week for running the tests — even a specific time. I like to recommend testing once a week, eight to ten cows at a time. As with any necessary procedure, like dry-off, sometimes the secret to success is to simply get a dairy into a regular routine that becomes habit.
- I like to set them up with a pH meter, collection vials and recording mechanisms. We typically work together initially on the collection and testing so everybody’s familiar with the process. Make sure the records include days on the ration for the test animals and whether the animal is a springing heifer or a cow.
- It’s important to devote a little time in advance to acquaint everyone with the statistics at issue, particularly averages and distributions around the mean. I usually work them through a few examples. Your familiarity with the dairy’s level of management should be a guide as to how precisely you can pick out actual effects of actions from the background noise of normal variation. I typically vary the target pH window from dairy to dairy for that reason. In some dairies, we target as narrow as three-tenths of a point. But I know those are exceptionally well-controlled nutrition programs.
- I ask them to fax me the weekly results, and I’m careful to take a look at them and respond as soon as I can. That attention communicates that the effort is important and addresses what follow-up action may be needed.
- Don’t over-interpret results. Don’t immediately jump to the conclusion a high pH means a chloride breakdown. Look at laboratory analysis, feed changes, feeding routines, mix changes, etceteras.

## WEST CENTRAL HAPPENINGS

### **SOYMOR BIODIESEL PLANT CONSTRUCTION UPDATE**

The 30 million-gallon-per-year SoyMor Biodiesel Plant, currently being constructed in Albert Lea, Minn., is quickly taking shape. West Central’s Renewable Energy Group (REG™) is the design-build contractor hired by the SoyMor management team. Construction at the plant site began in October 2004 and is expected to wrap up by July 2005.

As of this month, the Crown® transesterification equipment has been installed in the taller biodiesel process building, and piping and electrical crews are now feverishly working in that building. In addition

to the biodiesel process, this project also includes a soybean oil pretreatment process; approximately 2 million gallons of biodiesel, soybean oil, methanol, glycerine, and miscellaneous storage; and both truck and rail load/unload facilities. The entire plant will be fully computerized and will be the largest and most advanced biodiesel plant in North America.

## FROM THE MATERNITY PEN

### TWEAKING DCAD TO ACCOMMODATE MAGNESIUM AND CALCIUM

The typically oversimplified DCAD equation —  $(\text{Na}^+ + \text{K}^+) - (\text{Cl}^- + \text{S}^{2-})$  — ignores the fact that both calcium and magnesium contribute some alkalinization to the process, just as ammonium created from non-protein nitrogen does. One of the most precise alternative equations so far comes from USDA researchers Drs. Jesse Goff and Ron Horst:  $(.2 \cdot \text{Ca} + .16 \cdot \text{Mg} + \text{Na} + \text{K}) - (\text{Cl} + .6 \cdot \text{S} + .64 \cdot \text{P})$ .

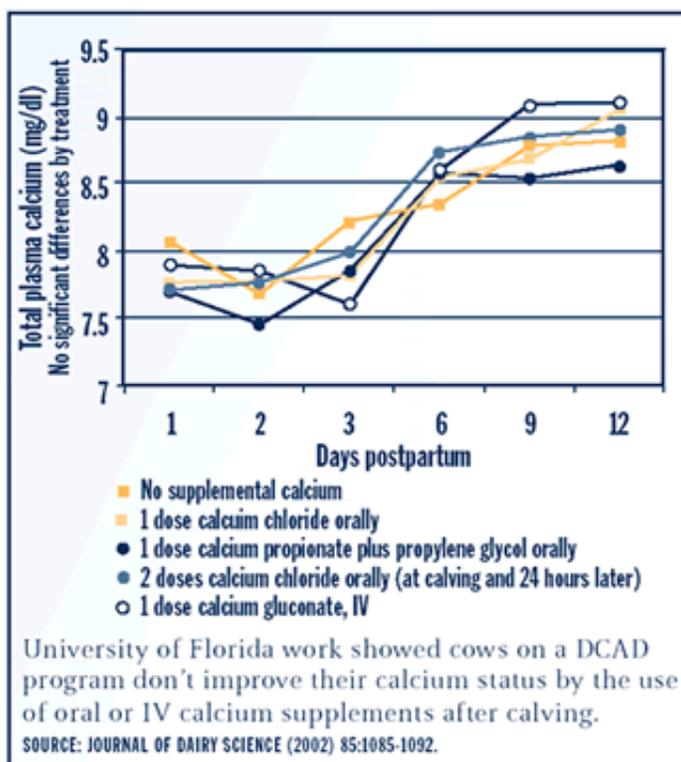
They're the first to concede even that formula remains incomplete. The point, though, is that although calcium has a small alkalinizing effect, the traditional practice of limiting calcium in the transition ration is not only practically impossible to accomplish, it's also unnecessary, says West Central's Dr. Phillip Jardon. It can be easily offset by addition of a relatively small dose of chloride. The '80s vogue of intentionally starving cows of calcium in order to stimulate the hormonal system to mobilize bone calcium may still be theoretically valid, but it's impractical and has been supplanted by the DCAD approach. Don't try it. Under a good DCAD program, calcium should instead be included at 1 to 1.2 percent of the diet — about 140 grams.

By maintaining sufficient calcium mobilization via appropriate DCAD balance, a 2002 study from University of Florida further suggests, individual calcium supplementation at parturition may become unnecessary.

The same thinking holds true for magnesium levels in transition cows as well, Dr. Jardon says. The cow's hormonal system needs a certain amount of magnesium to regulate calcium homeostasis. So again, in spite of any alkalinizing contribution, he recommends feeding magnesium at about 0.4 percent of the ration dry matter.

Supplementing magnesium is especially important if you can't avoid high feedstuff potassium, which interferes with the absorption of magnesium.

SoyChlor,<sup>®</sup> which is made from hydrochloric acid, not only offers a safe and effective source of DCAD anions, it also fortifies the transition ration with sufficient calcium and magnesium, without compromising balance. And because it's low in both phosphorus and crude protein — unlike many alternative products — it offers nutritionists the flexibility to improve DCAD balance without incurring the toll in magnesium utilization and energy balance to detoxify rumen ammonia that others may require.



## BEYOND BYPASS

### SUPERIOR IN-PLANT MANUFACTURING CONTROLS

SoyPLUS<sup>®</sup> is manufactured in our computer-controlled plant in Ralston, Iowa, designed specifically to optimize the quality of bypass protein. The process permits us to produce SoyPLUS as an all-natural product — no chemicals need be used during manufacturing.

Based primarily on the normal expeller extraction method, the SoyPLUS modified expeller extraction system is so unique it has been granted a U.S. patent. It contains additional reaction and conditioning steps unique to SoyPLUS, designed to increase the bypass protein levels without damaging the protein

quality. Computerization throughout the process monitors and regulates more than 400 individual points, enabling our quality-control team to detect and adjust even slight deviations in moisture, protein, fat, bypass level and other nutrients. That level of quality control is just not possible in even the best manually operated manufacturing plants.

## QUALITY CORNER

### IS THE PRODUCT FROM THE NEW SOYCHLOR® PLANT IN JEFFERSON DIFFERENT FROM THAT MADE IN ADAIR?

The formula, and thus the analyses, of the SoyChlor products have not changed. We still use the same low-sodium and low-potassium ingredients as carriers for hydrochloric acid. However, the SoyChlor produced in the new facility is lighter in color due to a more efficient drying system. The color is similar to that of a baked chocolate chip cookie. The average chloride level checked by use of our in-house chloride analyzer for mid March 2005 was 9.3 percent with a standard deviation of 0.4 (N=23).

The production of SoyPLUS includes a very stringent quality control program. In addition to our continuous monitoring using an in house NIR we send check samples to Woodson - Tenent Laboratories in Des Moines. Here are results from the first three weeks of November 2004 to January 2005:



Laboratory technologist Megan Fry measures SoyChlor moisture, just one of West Central's daily quality-consistency checks.

	Percent	Standard Deviation
Dry Matter (N=21)	88.09	0.50
Crude Protein (N=21)	42.95	0.56
Crude Fat (N=21)	5.62	0.13



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