

COW SIDE DIAGNOSTICS

Using Rapid Health Information to Manage the Herd

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Star Trek fans will remember Chief Medical Officers McCoy and Crusher waving their tricorders over ill and injured crew members to get instant medical information. We do not have anything that sophisticated yet, but there are several cow-side diagnostic tests that help us assess the health status of the herd. What is a cow-side diagnostic test? For purposes of this article, we will call it a health related test run on a sample from a cow that can be done at the farm in minutes to hours. Diagnostic tests are typically used in dairy medicine to confirm a diagnosis or to screen a group of animals. Some tests are better than others and no test is perfect. Some require a significant investment in equipment and/or are complicated to run, let's leave those to the experts. To choose the correct diagnostic test, we need to review a couple terms.

- **Sensitivity** – highly sensitive tests rarely give a false negative, which make these tests well suited to rule out disease.
- **Specificity** – highly specific tests rarely give a false positive. If the test says the cow is positive, we can be pretty certain she's truly positive.

Let's explore some new, and some not-so-new cow side diagnostic tests. Maybe you can use some of these tools to help you manage your herd health program.

CMT

The California Mastitis Test is an oldie-but-goody that detects DNA from ruptured somatic cells in milk. Once you have mixed up your test solution from the concentrate bottle, quarters can be checked by mixing equal parts milk and CMT solution. The more it gels, the higher the SCC. Finding subclinical infections is a great way to improve milk quality. The down sides are, it does not identify which bacteria may be causing the infection and cell counts needs to reach $\frac{1}{4}$ to $\frac{1}{2}$ million before the gelling is obvious to most users. We generally use a SCC threshold of 200,000 cells/ml for subclinical mastitis.

OTHER COW SIDE SUBCLINICAL MASTITIS TESTS

Individual cow somatic cell count information is great for managing milk quality. DHIA testing centers have offered this service for many years. Recently, portable somatic cell counters and tests for other mastitis markers have been made available. These tools are more expensive than the CMT but provide more accurate cell counts and better identify subclinical mastitis. Both CMT and cow-side SCC tests work well to find milk culture candidates.

URINE pH

Prefresh diets formulated with anionic salts to prevent hypocalcemia at calving need to be monitored. Checking prefresh cow urine pH lets us know if the cows are responding to the diet. An average urinary pH of 7.0 is a good goal; so choose your paper with the appropriate range to detect that pH. Digital pH meters work well too, but be sure to calibrate your device on a regular basis.

MILK PROGESTERONE TEST STRIPS

The ability to measure blood progesterone levels in cows as way to evaluate where cows are in their estrous cycle has been available for many years. Research has shown pretty good correlation between progesterone levels in blood and milk. Milk progesterone test strips are new to the dairy industry and now the work begins to figure out where they can be utilized to improve reproductive efficiency.

SERUM PROTEIN

With a refractometer, special tubes, centrifuge (optional), and a few other basic supplies, you can start monitoring antibody transfer in your young calves. Your veterinarian can help you set up an SOP and train those who will be responsible to running this test. Make sure to calibrate your refractometer on a regular basis to ensure accurate readings.

HYPOCALCEMIA TESTS

Clinical milk fever is obvious. However, fresh cows can be low in calcium without going down. Fresh cows low in calcium do not perform as well as cows with normal calcium and are at higher risk for health problems. We can check for this by looking at calcium levels in blood. Samples need to be drawn soon after calving, and be processed and used promptly, making routine hypocalcemia monitoring difficult to manage. Water hardness test kits have been shown to effectively measure serum calcium levels in fresh cows. The tests are rather inexpensive but because you also need serum to run this test, they require a centrifuge too.

KETOSIS

Ketosis is a costly disease. Using diagnostic tests to quantify the level of ketosis in dairy herds has become a common management practice. Research from Cornell has shown the benefits of ketosis test-and-treat protocols. There are several test options on the market, choosing the right one for your dairy will depend on how you plan to use the information. Work with your veterinarian to build the test protocol best suited to your dairy.

- Ketostix® (Bayer) – This is a tried and true test for acetouria (ketones in the urine). The test performs pretty well in both sensitivity and specificity (anything trace or above as positive). That is, if you can get a sample.
- KetoCheck™ Powder (Great States) – This test can be used with milk, urine, or serum but most use it for milk samples. It has a relatively low sensitivity so you will miss some positive cows.
- Keto-Test® (Elanco) – A new milk BHBA test for test and treat protocols or herd screening but you will want to set the level at which you call a cow positive depending on how you intend to use the information.
- Precision Xtra® Blood BHBA Meter (Abbot) – This has become the gold standard for subclinical ketosis testing due to its high accuracy. Unfortunately, the manufacturer of this human medical device is no longer selling test strips to the veterinary market. New devices are currently entering the market.

It is possible to quickly collect a lot of diagnostic information right on the dairy. And more tests are becoming available all the time. Work on a plan with your veterinarian to best manage the information to improve your herd's health.