A few months ago one of the Pine Creek Nutrition consultants mentioned that a competitor was out measuring pH of manure. This had never come up before regarding applied feeding of dairy cows so we just brushed it off. Then a couple weeks ago a friend in the industry asked if we were measuring pH of _ _ _ _. Twice in a period of less than 6 months meant we needed to look into it.

Why?

There are two main reasons reported for why you would be interested in knowing fecal pH.

1. **Rumen Acidosis.** A simple, non-invasive, estimate of potential rumen acidosis would be a good diagnostic tool.

2. **Fecal Starch.** If fecal pH could be related to starch in manure this test could be used to diagnose potential starch digestibility issues without waiting 3 days for laboratory analysis.

Science

1. **Rumen Acidosis.** A report from 2012 (Jacque, K, et al.) offers insight into the value of fecal pH to identify acidosis. The study was designed to experimentally produce acidosis with a high starch diet and then evaluate bacterial changes in manure. In addition, fecal pH and milk fatty acid profiles were obtained.

Elevated concentrations of trans-10, cis-12 fatty acid in milk indicated some degree of rumen acidosis was produced, although clinical signs were not observed. There was no dietary impact on fecal pH in this study.

So the old rules still apply for diagnosing/preventing rumen acidosis. Proper diet formulation. TMR presentation that minimizes sorting. Evaluate cud chewing. Check manure consistency. It is also possible to do a rumen tap, but this is invasive, probably not necessary, and rarely provides actionable information.

2. **Fecal Starch.** Knowing the amount of starch not getting digested is very important. Grain in the manure not only represents a cost, but when evaluated with fiber particle in manure, can be an indicator of rumen function and total tract digestibility.

A recently published Journal of Dairy Science article (Fredin, et al., 2014) found no relationship between fecal starch and fecal pH. These experiments were conducted in 2012 and 2013. A great deal of research was conducted in the 70s and 80s trying to relate fecal pH to fecal starch. In only a few instances was a significant relationship identified.
The results are not surprising. Fecal pH would be impacted by more factors than just starch. Dietary buffers, forage quality/quantity, effective fiber, sampling time, and grain processing would be just a few of the variables that would confound results.

Fecal starch is a useful analysis for fine-tuning diets. But measuring fecal pH will not be a short-cut to the information. Neither will a snap shot look at the residue from flush lanes.

There are 3 better tools for determining digestibility of starch (grain) in the manure.

a. Screen manure at the dairy. Identify what is not digested. In this sample there were very few visual corn/starch particles.

b. Send manure sample for laboratory starch concentration. Less is better. Less than 4 or 5% means no action required. Over that may require more investigation.

c. Check kernel processing on corn silage (see the PCNS Newsletter from May 2013 for details).

One Exception?

Fecal pH might be an acceptable indicator of excess hind-gut fermentation of starch. Starch not digested in the rumen and small intestine may be fermented in the cecum. Theoretically this should result in lower fecal pH. This has been done experimentally by infusing over 8 pounds of starch directly into the small intestine. However, this amount of starch escaping rumen digestion is virtually impossible. IF this amount of starch did escape rumen fermentation in all likelihood it is not digestible and would simply bypass the cow. There would be little practical interpretation possible from identifying excess hind-gut fermentation beyond what grain in the manure would tell.

Practical Application

Fecal pH is just show-and-tell; an activity with limited scientific support or a solution looking for a problem. If you see signs of acidosis (inconsistent manure, casings in manure, bubbly manure) go to the front of the cow. Diet formulation, diet presentation, and cud chewing will confirm your suspicion. Then fix the problem.

If you believe there is too much grain in the manure, grab a sample and screen it. If you see too much corn, send another sample to the lab for fecal starch. If there is starch in the manure, check the processing score on the silage. If CSPS is low, there is a good
chance starch will be passing through the cow. These tests are scientifically proven to help in evaluating starch digestibility.

» **Quote of the month**

“The big secret in life is that there is no big secret. Whatever your goal, you can get there if you’re willing to work.” Oprah Winfrey.

» **References.**


Pine Creek Nutrition Service, Inc.

“Knowledge, Passion and Integrity for our client’s success.”