



## Technical Review - 2014

# What your cow's manure is telling you



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When I was going through graduate school I conducted several nutrition research trials on horses and beef cattle, very quickly I realized that nutrition has just as much to do with

what comes out of the “back end” as it does with what we put into the “front end” of an animal. During the research trials I “examined” fecal matter in just about every way possible: I shoveled it, sampled it, swabbed it, put it in baggies, labeled it, froze it, weighed it, dried it, ground it up, added chemicals to it, analyzed it for undigested components, pH levels, and gases and microbes present, filtered it, and even sterilized it. I knew more about manure than I ever wanted to. Now, in my current job, the discussion of manure comes up frequently with customers and often I hear comments made by beef producers that comes from an “old school” way of thinking. For example, as a kid, I remember my grandfather always telling me that he really liked it when his cow’s manure “stacked” because that meant to him that “he had her diet right.” Unfortunately, the more that manure stacks, the more it indicates that the cow is either very dehydrated or eating a very poor quality diet. So, for those who learned how to read manure from your grandfather, this article is for you!

Evaluating fresh, undisturbed manure piles can help determine how your beef animals are digesting the ration that you are delivering to them. The rate of passage for the diet that you feed a beef animal takes about 48-72 hours for it to pass through the digestive tract. Therefore, fresh fecal pats represent the undigested part of the diet fed in the last 2-3 days. When you walk through a pen or a pasture to look at manure, the best trick for observing fresh manure is to get the animals that are laying down to quietly stand up (animals will almost

always defecate when they stand up). Once you have fresh pats to observe, make note of its consistency and then assign it a score. Knowing what is “normal” or acceptable for your cattle will help you determine if changes need to be made to the diet. Outlined herewithin is an adapted version of the manure scoring system developed at Michigan State University that you can use as a guide to score manure:

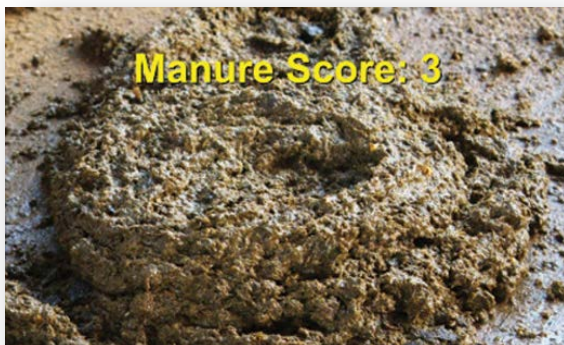
**Score 1:** Manure that is liquid or “soupy” in consistency is not normal and is often referred to as “runny” or as “diarrhea.” This manure will be “projected in a stream” or will “arc” as it is eliminated by the cow. Liquid manure indicates an extremely fast rate of passage and when screened, large feed particles and stalks of undigested fiber (greater than 0.5” length) are typically present. Liquid manure usually occurs due to: (a) disease, (b) not enough fiber (either because it is not offered or they are sorting through the ration and not selecting the fiber component of the diet), (c) abrupt introduction of excess starch, protein, urea, or minerals, (d) early spring pasture, (e) high magnesium, or (f) spoiled or moldy feed is present in the diet. Cattle are likely to bloat when this manure is present.



**Score 2:** This manure also appears runny and is often referred to as “loose” by most cattle producers. This manure does not form a distinct pile, will splatter and spread on impact, and will measure less than an inch in height. High energy, high concentrate diets (typical of most grow-finish rations) will often produce manure in this category, especially if the cattle are getting a very restricted amount of dry, long-stem fiber in the diet. Cows on lush green pasture will also have this manure score, especially if they are also receiving a High Mag mineral for Grass Tetany prevention.



**Score 3:** This is the optimal score! The manure has an oatmeal-like appearance, it will pile and slightly spread, will stack up to 1 ½ - 2,” have several concentric rings, a small depression or dimple in the middle, and make a plopping sound when it hits concrete floors. This manure tells you that the protein, energy, and fiber in the diet is balanced and the rumen microbes are fermenting properly. This manure however, does NOT indicate if the macro or micro minerals or vitamins are balanced in the diet, that can only be determined by herd performance, total diet evaluation, and/or more precisely with analysis of tissue biopsies (such as liver, hair, or muscle samples) to verify the nutritional status of the cowherd.



**Score 4:** This manure is thicker and stacks up over 2”. This fecal score may reflect that low quality forages are being fed and/or there is a shortage of protein in the total diet. Adding more digestible feedstuffs, improving forage quality, bumping up the grain component of the diet, or adding protein may improve rumen fermentation and performance, and thereby lower the fecal score.



**Score 5:** This manure appears as firm fecal balls and indicates that a very non-digestible diet is being fed. The cattle are likely protein deficient, and the source of forage is of poor-quality (or needs to be ground to a shorter length). This can also be an indication of salt deficiency and/or dehydration, or both. Increasing the amount of degradable, soluble, or total protein, decreasing the amount or physical form of the fiber, increasing starch level, decreasing grain particle size (such as fine grinding or steam flaking), and providing more minerals (especially potassium and sodium) can cause manure scores to decline (for example from 5 to 4).





### Manure Color:

- Dark green is typical of pasture-based diets.
- Brown is typical of hay-based diets.
- Gray is typical of grain-based diets.
- Pale represents fast rate of passage (less bile present) and more water present.
- Dark represents slow rate of passage (more bile present) and less water present.
- Black (or tarry) indicates hemorrhage in the small intestine.
- Red streaks indicated bleeding in the rectum.
- Bloody diarrhea is associated with coccidiosis.
- Foamy and liquidy (with mucin casts) is associated with acidosis.

**Acidosis.** Diets rich in concentrates will cause acidosis, which occurs when ruminal pH drops below 5, the lining (and papillae) of the ruminal wall is damaged, and gut tissue is severely inflamed. As a result, mucin casts are often seen in the manure as a sign that the intestinal lining has been sloughed. Destruction of the intestinal lining will result in poor absorption of nutrients, which lowers gains and causes poor feed efficiency (“poor doers”) in the feedyard. Damage to the intestinal lining can also cause a “leaky gut,” whereby microbes are able to enter portal blood via lesions in the gut and infect the liver (which is how liver abscesses form); poor liver scores are a sign of chronic acidosis. Founder cattle are also an indication that acute acidosis occurred 40 to 60 days previously. Most of the problems associated with acidosis can be minimized with proper bunk management, increasing amount of long-stem fiber in the diet, increasing particle size of the grain component, decreasing the starch load in the diet, adding an ionophore, and increasing the calcium content of the diet (or adding sodium bicarb) will all help ameliorate acidosis.

**An example of mucin casts is shown below:**



- Finding pieces of corn with white starch remaining indicates that some feed value was lost. If the seed and starch pieces are hard, additional grinding or processing may be needed to expose the starch to rumen microbial fermentation.
- Corn kernels that are present from corn silage reflect that the seed was too mature or the silage was put up too dry.
- Forage particles over ½ inch long may reflect a lack of long forage particles to maintain the rumen mat and adequate cud chewing. A shortage on long-stem forage increases rate of passage does not allow the rumen microbes time to digest the forage properly.



### References:

- Holin, F. 2012. *Score Manure for More Milk. Hay and Forage:*  
<http://hayandforage.com/dairyforage-nutrition/score-manure-more-milk>  
Accessed Jan. 13, 2014.
- Hutjens, M. 1996. *Manureology 101. Dairy Today, February 1996*, p 26.
- Hutjens, M. 1999. *Evaluating Manure on the Farm:*  
<http://www.livestocktrail.illinois.edu/dairynet> Accessed May 21, 2014.
- Lee, K. *What can Manure tell you about the ration:*  
[http://www.progressivedairy.com/~prodairy/index.php?option=com\\_content&view=article&id=4682:what-can-manure-tell-you-about-the-ration](http://www.progressivedairy.com/~prodairy/index.php?option=com_content&view=article&id=4682:what-can-manure-tell-you-about-the-ration)  
Accessed May 21, 2014.