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The Devil is in the Details……Don't Forget to…..

Deanne Meyer, Livestock Waste Management Specialist, UC Davis

Spring is in the air, and forage is being ensiled. Dairy producers need good records of how much forage is harvested from each field and its moisture content. This is important not only from a feed management perspective but also from a regulatory compliance perspective. Yield and moisture content, as well as nutrient content of forage are needed for every crop on every field for all dairies within the Central Valley for water quality regulatory compliance. The results for moisture may also be used to document moisture content of forages for Air District compliance. For those dairies in the San Joaquin Valley, it's important to be sure the mil thickness of the plastic covering used on silage piles is documented and records are maintained for Air Quality Compliance. Be sure that either the invoice for covering or your silage operation and maintenance plan documents the thickness of the plastic and/or presence or absence of an oxygen barrier. You'll also need to note that each pile was covered within 72 hours of the last addition of forage. An example operation and maintenance plan acceptable to meet District requirements can be found at:

http://www.valleyair.org/busind/comply/forms/4570operationalplan-silage.pdf.

All producers in the San Joaquin Valley who received permits from the District more than a year ago now need to be implementing those permits. There are several new requirements for feed management (specifically silage management) that must be implemented. Basic record keeping templates are available at the District website (http://valleyair.org/busind/comply/compliance_forms.htm). To locate information on the dairy program and the sample templates, scroll down to the Dairy section. The record keeping checklist is in Excel to allow operators or their consultants to personalize the record keeping checklist to actual permit needs. Once completed, these documents serve as an excellent resource during an inspection. Count on having District staff at the dairy conducting inspections once every 15 months or so.

For the Central Valley, dairies that have not had an inspection from the Regional Water Quality Control Board since May 2007 can expect to see an inspector between now and the end of June. Staff have more than 225 inspections to conduct and are on target to complete their task. Once these inspections are completed, it is understood that the ever-growing pile of Individual Waste Discharge Requirements will be processed.

General Order WDR Annual Reports for 2012 are due by July 1. Please note that all modifications to facilities for nutrient and waste management purposes should have been done, and the nutrient management plan (specifically the budget) should be fully implemented. Central Valley Water Board staff intend to prioritize enforcement of failure to complete modifications or implement nutrient management and to check for instances of inaccurately certifying either. Although there is no immunity from enforcement, the Regional Board strongly recommends that if any of these areas are lacking, it is in the producer's best interest to begin correcting now, rather than wait for Board staff to find and issue a notice of violation.

The ABC's of Forage Analysis: What are NSC and NFC?

Ed DePeters, Department of Animal Science and Jennifer Heguy, UCCE Stanislaus & San Joaquin Counties

Oftentimes, you'll see the carbohydrate terms *nonstructural carbohydrates* (**NSC**) and *nonfibrous carbohydrates* (**NFC**) listed on your forage report, or they may be used as parameters for comparing forage seed varieties. Both NSC and NFC measure carbohydrates that are not "structural", in other words, carbohydrates other than cellulose and hemicellulose (constituents of the plant cell wall). There are key differences between NFC and NSC, and depending on your lab of choice, there might also be differences in how NSC and NFC are determined. For this reason, you should direct procedure related questions to the lab you are working with, and use caution when comparing results from different labs.

Nonstructural carbohydrates (NSC)

- Sugars, starches, and organic acids.
- *Measured in the lab.*

Nonfibrous carbohydrates (NFC)

- Sugars, starches, organic acids, *and pectin.*
- *Not measured, but calculated by difference.*

The primary compounds making up the NSC fraction of plants are sugars, starches, and organic acids. Typically, NSC is measured by an enzymatic method. In contrast, NFC is not determined chemically; rather it is a calculated value based on other determined values of the forage. Basically, NFC is determined by difference, where: NFC = 100 – (%Neutral Detergent Fiber + %Crude Protein + %Fat + %Ash). Similar to NSC, the NFC will contain sugars, starches, and organic acids, but NFC also contains pectin. Pectin is a carbohydrate that is part of the plant cell wall. This is an important difference and one reason why the % NFC and % NSC on your forage lab analysis report will typically not be same.

Using the example report, NFC is calculated as: 100 - (41.69* + 7.7 + 3.01 + 6.46) = 41.14
* NDF must be first corrected for bound protein: NDF (42.80) – NDF Protein (1.11) = 41.69*

In the example corn silage report, the NFC is 41.14%, while the NSC is 34.56%. The corn silage also contains 33.86% starch (DM basis), and the starch makes up 82.30% of the NFC (not shown). Most plants have some amount of pectin in their cell walls, and some feedstuffs, including citrus pulp and beet pulp, are high in pectin. In the rumen, pectin is highly digestible just like sugars, starches, and organic acids. Because the constituents in both NSC and NFC are highly digestible, estimates of NSC and NFC provide information on the energy content of the forage.

Chemistry Analysis Results	
Dry Matter	35.9
Moisture	64.1
Proteins	% DM
Crude Protein	7.7
NDF Protein (NDICP)	1.11
Fiber	% DM
ADF	29.19
NDF	42.80
Carbohydrates	% DM
Starch	33.86
Crude Fat	3.01
Energy and Index Calculations	% DM
TDN	68.02
NFC	41.14
NSC	34.56
Minerals	% DM
Ash	6.46

Other articles in the "ABC's of Forage Analysis" series:

The ABC's of Forage Analysis:
http://cestanislaus.ucanr.edu/newsletters/Dairy_Newsletter45011.pdf

The ABC's of Forage Analysis: Fiber & Digestibility:
http://cestanislaus.ucanr.edu/newsletters/Dairy_Newsletter46368.pdf

Marvelous Improvement Device (MID)

Nyles G. Peterson, UCCE San Bernardino County

"The MID is the greatest thing going and only costs $50,000. My neighbor put one on his dairy and it lowered his mastitis to nothing, and milk production went up ten pounds per cow. In fact, his services per conception have even gone down. It will pay for itself in six months; from then on it's all profit. In these tight economic times, a little more cash flow would really help." When you start thinking these thoughts, what should you do?

The place to begin is your neighbor's dairy. I lived in Missouri "the show me state" for a year. When claims of great improvements are made, become a "show me" dairyman. Visit the dairy that has the MID and look at the records for yourself. See if there has really been a change. Examine the creamery or DHI reports to see if mastitis has really gone down. What did mastitis look like two years ago? Get as many months as possible and look for cyclic trends. The drop might just be the normal drift from the high part of the cycle to the low. How many months has it been lower? One month does not a change make. Nothing in nature stays the same. If any two months are compared, one will always be higher than the other. The difference could be caused by chance and not the MID.

Next, find out if other changes were made about the same time the MID was installed. These changes might be responsible for the progress and not the MID. As you talk, remember that few individuals will admit to making a big mistake. He probably isn't going to say, "You know, (insert your name), it was the dumbest thing I ever did, when I spent that $50,000." The more he paid for it, the less apt he is to tell you that he doesn't like it. When he finally gets rid of the product, he'll probably be more honest. That's human nature. You will, however, be able to find out about the type of service and support he has received from those who sold him the MID.

Sometimes we don't actually care about the facts, but instead base our decisions on what we feel, hope, or imagine the facts to be. Adolph Hitler is a notorious example of one who did not always go with the facts. On one occasion during a great rage, he is reported to have said, "My mind is made up—don't confuse me with the facts."

Some people believe and are guided entirely by what they hear. The last person they talk to determines their belief. Much of the information we get from others is, at best, only partially true. Take time to think it through. Filter out the truth from the untruth. Do the facts show that the MID really helps? Why does the MID do a better job? Could the money be invested elsewhere and produce equal or better results? Are there ways to increase production without spending additional money? These are all questions that would have to be examined before buying the MID.

California dairymen are always looking for ways to do a better job and produce a higher profit. For this reason, they are receptive to new products. During tight economic times, however, it might be more profitable to invest additional time improving management practices, than by buying a MID hoping it will help. Something must be invested to produce a change. Sometimes it is money to buy a MID; often, time and smart work are required. Teat dipping, heat detecting, milking infected cows last, maximizing income over feed costs, and keeping accurate records all become more important when profits are small or non-existent. Before you invest your future in a MID, determine the facts, filter through those facts, and then act on the facts.

Mineral Excretion in Lactating Dairy Cows [(1)]

Alejandro Castillo, UCCE Merced County

Dairy cows that consume inadequate amounts of essential nutrients can suffer from a host of health problems and often have reduced milk production and reduced reproductive efficiency. Because of numerous uncertainties associated with mineral nutrition, including variation in mineral concentrations of TMR feedstuffs, the lack of information regarding mineral absorption, and potential antagonism with other minerals, diets are often formulated so that mineral intake by cows exceeds mineral requirements. Overfeeding minerals can inflate feed costs, reduce absorption of other minerals because of increased antagonism, and have adverse effects on ruminal microbes and the cow (i.e., toxicity). Even if overfeeding minerals has no negative effects on the cow or feed costs, it will certainly result in greater manure excretion of minerals, which could have negative environmental effects.

Accurate estimates of mineral excretion by dairy cows are needed for nutrient management plans. Numerous equations have been derived to estimate mineral excretion by dairy cows, but the underlying function for most equations is: Manure excretion of mineral X = Intake of mineral X – milk secretion of mineral X. In most equations, minerals provided by drinking water are ignored, the concentrations of minerals in milk are assumed constant, and book values are used rather than assayed values. The importance of including information on mineral composition of drinking water and assayed mineral concentrations in milk on estimated mineral balances is not known.

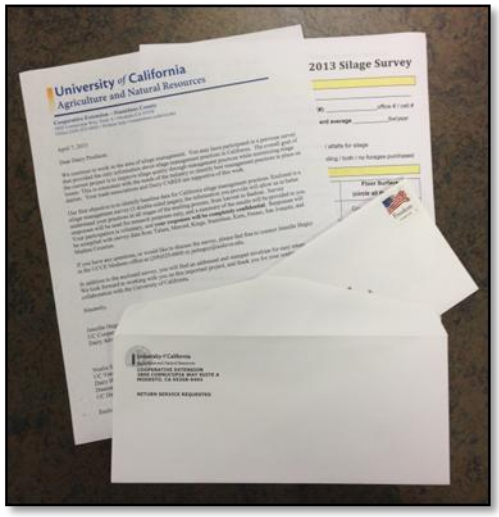
Research took place in Merced County, California on 40 dairy farms. Milk yields varied from less than 55 to more than 86 Lb/cow per day, and concentration of total solids in water varied from less than 200 to more than 1490 mg/L. Accounting for drinking water minerals in the diets increased dietary concentrations by <4% for all minerals except for Na and Cl, which increased by 9.3 and 6.5%, respectively. Concentrations of P and K in milk were essentially the same as the National Research Council (NRC, Nutrient Requirement for Dairy cattle, 2001) value to estimate lactation requirement. However, NRC milk values of Ca, Cl, and Zn were 10 to 20% greater than dairy farm values; and Na, Cu, Fe, and Mn were no less than 36% below NRC values. Estimated excretion of minerals via manure varied substantially across farms. Low milk yield farms had 2 to 3 times less estimated mineral excretions than high milk yield farms (depending on mineral). Although including water minerals increased excretion of most minerals, the actual median effect of Ca, Mg, S, Cu, Fe, and Mn was less than 5%, and about 8% for Na and Cl. Replacing assayed concentrations of minerals in milk with NRC constants resulted in reduced estimated excretion of Ca, Na, Cu, Fe, and Zn (Table 4), but median differences were <5% except for Na, which was 7.5%.

The main conclusion of this study indicates that for some farms, ignoring minerals consumed via water and using NRC constants for estimating milk secretion of minerals rather than assayed concentrations introduced significant errors when estimating manure excretion of minerals via the mass balance technique. Mineral excretion data from our study are not necessarily applicable to other farms; at this time, it is not possible to identify farms that should include measured mineral data for water and milk. Therefore, sampling and analyzing water and milk for mineral concentrations should be considered for all farms that are estimating mineral excretion via mass balance. Although not measured in this experiment, ignoring disappearance of free choice minerals in the mass balance equation is another potential error and should be included when calculating whole farm mineral balances or when developing Nutrient Management Plans.

(1) Based on: " Castillo, A.R., N. R. St-Pierre, N. Silva del Rio and W. P. Weiss. 2013. Mineral Concentrations in Diets, Water, and Milk and Their Value in Estimating On-Farm Excretion of Manure Minerals in Lactating Dairy Cows. *Journal of Dairy Science* (accepted for publication). For a copy of this article please contact Alejandro R. Castillo (arcastillo@ucanr.edu), Farm Advisor - Dairy Science. UC Cooperative Extension, Merced, CA.

Silage Management Survey

In the next few weeks, dairy producers in the San Joaquin Valley will be receiving a **"Silage Management Survey"** from the University of California. Surveys will be mailed out of the UCCE Modesto office. The overall goal of the current project is to improve silage quality through management practices, while minimizing silage losses. This is consistent with the needs of the industry to identify best management practices in place on dairies. Your trade associations and Dairy CARES are supportive of this work.



The information you provide will allow us to better understand your practices in all stages of the ensiling process, from harvest to feedout. Survey responses will be used for research purposes only, and a summary of the results will be provided to you. Your participation is voluntary, and **your responses will be completely confidential**. Responses will be compiled with survey data from Tulare, Merced, Kings, Stanislaus, Kern, Fresno, San Joaquin, and Madera Counties.

We look forward to working with you on this important project, and thank you for your continued collaboration with the University of California.

If you have any questions, or would like to discuss the survey, please feel free to contact Jennifer Heguy in the UCCE Modesto office at (209) 525-6800 or jmheguy@ucdavis.edu.

Managing for Quality

Gregorio Billikopf, UCCE Labor Management Advisor

Editor's note: This is not a dairy article, but the basic message of keeping employees accountable for their work and rewarding success is applicable to most employee/manager relationships.

Some farm managers spend their days frantically going from one crew to the next telling pickers not to pick certain fruit (or to be more careful with pruning, thinning, etc.). The crew members all agree to change their behavior while the supervisor is present, but by the time the manager makes the rounds through all the other crews and comes back, he has to start all over making it clear that he is not satisfied with the quality.

Contrast this to the manager who makes sure that each fruit bin or box is clearly marked with employees' numbers so at any time any bin or box may be inspected and the picker evaluated in terms of the quality of the work. And now add the fact that not every box is inspected, but only a few through a random sampling procedure. Through this approach, responsibility for quality is passed on to every crew worker. Even better, when there are clear rewards for excellent work and consequences for poor performance, crew leaders and supervisors do not seem to be fighting against the current.

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