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Don't Believe Everything You Hear at the Farm Show

Deanne Meyer, Livestock Waste Management Specialist

Cold, rainy, windy, gorgeous.

Yes, this year's International Ag Expo (Farm Show) was an ever-changing experience.

As I walked around the grounds, I participated in conversations regarding specific technologies to manage dairy manure. Again, some companies claimed to have CDFA (California Department of Agriculture) or San Joaquin Air District "APPROVED" technologies.

Keep in mind neither CDFA nor the Air District "approve" technologies. Both agencies use a methodical process based on current scientific findings to support management practices. Use of these practices can improve our air.

The Air District is excited to have farmers adopt electric (non-diesel) pumps or stationary feed mixers. Both of these reduce use of and emissions from petroleum-based products. Funding can be available for such practices!

The California Department of Food and Agriculture supports practices that result in less methane from manure being emitted to the atmosphere. This is done by two processes. Anaerobic digesters promote the formation of methane and its use as a biogas. The biogas can replace natural gas in industrial settings or be compressed and used as vehicle fuel. The other category is to reduce the manure going into lagoons to minimize methane emissions and release to the atmosphere.

There were some exciting new technologies at the Farm Show. Contact your Trade Association or local Dairy Advisor before you get too far down the road considering a technology because someone said it's "approved."

Also In this Issue…

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In Case You Missed It: CVDRMP Recommendations to the Water Board

Nicholas Clark - UCCE Kings, Tulare & Fresno

The CVDRMP (Central Valley Dairy Representative Monitoring Program) has been monitoring groundwater beneath dairies for nitrate since January 2012.

On April 2, 2019, the CVDRMP submitted its Summary Representative Monitoring Report to the Central Valley Water Board. This report concluded that groundwater remains impacted by nitrates beneath dairies. The report highlights recommendations on how dairies can improve water and nitrogen management to be more protective of groundwater. It also provides preliminary estimates of costs associated with several of these strategies to avoid increasing leached nitrate to groundwater.

The report's recommendations begin the conversation for revising the Dairy Order. Below is a summary of seven basic recommendations. These should be of interest to dairy operators, dairy farmers, and their nutrient management consultants.

Stay tuned for more information and to engage in future conversations.

Don't take my word for it. You can read the full report at: http://bit.ly/-SRMR

What are CVDRMP's general recommendations?	How might this change things?
Focus on whole-farm N balance	Identify generated manure N that cannot be used efficiently by crops.
Improve industry NUE	Increase precision of N application regarding crop demand.
Increase manure N exports	Build industry capacity and market demand for manure. Remove manure that cannot be agronomically applied.
Better technical recommendations	Modify specific monitoring, reporting, and N management practices on dairy and associated cropland.
Increased education	Require education to support dairy operators' and farmers' practice of the above recommendations.
New role of CVDRMP	CVDRMP should additionally act as a 3rd party coalition for members.
Changes to Dairy Order	Create revised, parallel General Orders for individual and "Coalition" dairies to reflect recommended changes above.

ABCs of Forage Analyses: Wet Chemistry vs. NIR

Ed DePeters - UC Davis, Jennifer Heguy - UCCE Merced, Stanislaus & San Joaquin & Michael Wolf – IEH-JL Analytical

You've sampled your forage and are ready to send it to the lab. You have two choices: wet chemistry or NIR analyses. Looking at the price tag, you're probably asking:

If NIR is faster and cheaper, why bother with wet chemistry?

NIR doesn't work well for all feeds. NIR works well for single source common feedstuffs that are chemically consistent over time. A large data base of wet chemistry values is needed and must be available to calibrate NIR equipment. NIR should not be used for variable and uncommon feedstuffs. For example, bakery waste can contain bread, crackers, donuts, potato chips, etc. The specific ingredients and the corresponding amounts are variable. This will affect the nutrient composition, making calibration of NIR equipment difficult. NIR doesn't work well for TMR samples (because they're mixed) or samples of forages not previously analyzed by wet chemistry. Forages harvested at different stages of maturity may also not lend well to NIR analyses.

Let's step back and define these terms.

Wet chemistry is slang for chemistry-based analytical methods used to measure chemical compounds in plant material. Think lab coat, goggles, and chemical reagents! Methods are published in a reference book (AOAC International – Official Methods of Analysis). A technician follows the book's "recipe." This standardizes the method so all labs performing the same method, in theory, will give similar results. Wet chemistry can be expensive due to labor involved and costs associated with chemicals, safety programs, and waste disposal.

Near Infrared Reflectance Spectroscopy, or NIR, measures light energy that is reflected by the feed sample to determine the chemical composition of forages. It is a rapid, AOAC-approved method requiring no chemical reagents. The amount of light energy reflected is compared to a known set of values (from that big data base of wet chemistry numbers) to determine composition. This is why NIR is not appropriate for all feedstuffs. More about that below.

Wet chemistry and NIR are linked.

Wet chemistry data are used to calibrate NIR equipment. The NIR equipment does not know how much NDF is in the sample. That is where wet chemistry plays a critical role. The more wet chemistry values are available for a feedstuff, the better the calibration of NIR methods for that feed will be. The quantity of NDF that was determined by wet chemistry for a given forage sample is linked to the NIR spectral pattern (from the reflected light) for that same forage. To put it simply, wet chemistry values are used to develop the "curve" for NIR. Samples are analyzed with wet chemistry. Then they are evaluated at a specific wavelength with NIR. The light energy reflected is determined and assigned the concentration amount based on wet chemistry.

Take home message

Wet chemistry is an accurate method for forage analysis, and NIR can be an accurate method. Wet chemistry takes longer and is appropriate for forages and other feedstuffs where there are limited data. NIR is quick, and so are the reports. NIR works best for common feedstuffs as long as it can be calibrated with good wet chemistry information.

Previous ***ABCs of Forage Analyses*** Articles (reading forage reports, fiber and digestibility, carbohydrates) can be found here: http://ucanr.edu/heguy

Do You Feed By-Products?

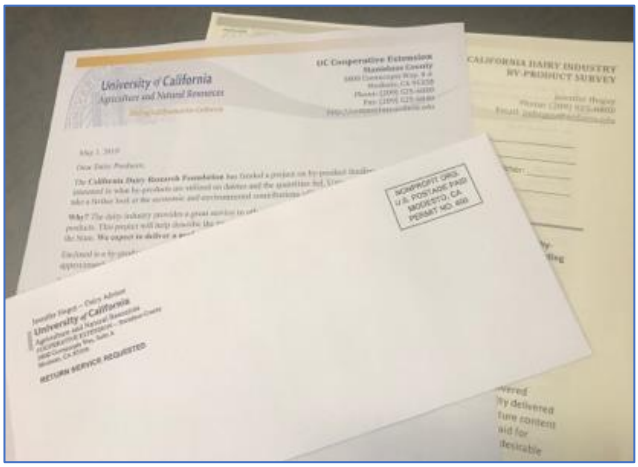
I have a survey for you!

We need to quantify by-product usage on dairies to take a look at economic and environmental contributions of the practice. Dairies provide a tremendous service to other agricultural industries, and the State, by converting "wasted" nutrients into human edible products.

We need your help to tell that story.

Surveys will hit mailboxes this month (May 2019). The survey shouldn't take too much of your time. Your prompt reply is greatly appreciated!

Questions? Contact Jennifer Heguy at 209.525.6800 or jmheguy@ucdavis.edu



UC Davis Welcomes a New Ruminant Nutrition Professor

Timothy J. Hackmann joined the Department of Animal Science as an Assistant Professor in March 2019. He will teach and conduct research in the area of ruminant nutrition.

The goal of Tim's research is to increase the production of microbial protein in the rumen. Microbes produce more than half of the protein digested by ruminants. By increasing production to even higher levels, Tim's research will help decrease feed protein and costs. One way that Tim's research is increasing the production of microbial protein is by determining why microbes grow inefficiently. Even though microbes are a major source of protein, they direct as little as ⅓ of their cell energy (ATP) to growth. Tim's lab is currently exploring reasons for poor efficiency at both the cellular and animal levels. If this work can increase growth efficiency by just 5%, it would reduce feed costs for the US dairy industry by $122 million per year

In the past, Tim has engaged in research on forage quality and mathematical modeling of cattle digestion and metabolism.

You can contact Tim at tjhackmann@ucdavis.edu

Waste Milk Quality: Minimizing Bacteria is Important for Calves

Betsy Karle – UCCE Northern Sacramento Valley
Richard Pereira, Paolo Tempini, Sharif Aly – UC Davis Veterinary Medicine

Non-saleable milk has value as calf feed. Studies show a milk replacer that is 20% protein and 20% fat may underperform compared with results from feeding whole milk. Yet, it's important to be sure this milk introduces the fewest possible bacteria when fed. The objective of our project was to measure somatic cell counts (SCC), coliform counts (CC) and standard plate counts (SPC) of untreated waste milk on 25 dairies. Here, we focus on the bacteria sampling results.

Coliforms: An attainable goal for coliform counts (CC) is less than 100 cfu/mL in raw waste milk. In our study, only 35% of farms had coliform counts below 100 cfu/mL, and the average was over 700 cfu/mL (median of 420 cfu/mL). Coliforms are a result of a dirty and wet environment, and high counts are indicative of hygiene issues that can ultimately lead to coliform mastitis.

Milk quality parameters for waste milk samples collected from 25 CA dairies.

Variable	Study Median	Range (min - max)
SCC (cells/mL)	1,800,000	110,000 - 5,000,000
Coliforms (cfu/mL)	420	10 – 1,500
SPC (cfu/mL)	99,000	1,000 – 350,000

Standard Plate Count: With good milking system maintenance, appropriate milking procedures and proper udder hygiene, SPC levels of less than 5,000 cfu/mL are realistic. Waste milk samples in our study averaged 116,000 cfu/mL (median of 99,000 cfu/ml), potentially due to coliform or environmental Streptococcus mastitis. SPC levels were also likely elevated due to storage of the waste milk prior to sampling - most waste milk was stored in open and unrefrigerated containers.

Take Home Message: Our findings emphasize the importance of pasteurization as a tool to reduce bacteria that could result in higher incidence of disease and mortality in calves, possibly reducing their future potential as productive lactating cows. Remember, treated milk can become re-contaminated through poor hygiene of calf feeding equipment or improper storage of milk between pasteurization and feeding. Refrigerate milk if not immediately fed. Think about culturing samples of milk before pasteurization, after pasteurization, and from milk that is in the calves' bottles/buckets. Conducting this testing during calf diarrhea outbreaks or even on a routine basis can be helpful to identify and mitigate potential causes for disease in calves.

Antimicrobial Use Survey

UC Davis School of Veterinary Medicine and UC Cooperative Extension are reaching out to California dairy owners and managers in a follow-up survey to characterize dairy producers' practices with antimicrobial drugs for dairy cows. You did not need to participate in the first survey to complete the current survey.

The objectives of this survey are to identify the use, acquisition, keeping, and maintenance of antibiotics used to treat adult cows on dairies. We expect results of this survey to: 1) further the understanding of the industry's needs and expectations for the availability and effectiveness of antibiotics for adult cows, and 2) guide recommendations and best practices to ensure that antibiotics are effective and accessible in the future.

Questions? Contact Betsy Karle at 530.865.1156 or bmkarle@ucanr.edu

Disbudding and Dehorning Best Management Practices

Randi Black, UCCE Sonoma, Marin & Mendocino

Dehorned animals pose less threat of injury to herdmates, themselves, and handlers. They are also less dominant for important pen resources (feed, resting space, water), and require less feedbunk space. Some dehorning methods are preferable for welfare and performance compared to others and are presented below.

Dehorning vs. Disbudding

Disbudding removes horn-producing cells in calves before they attach to the frontal bone of the skull, typically before six weeks old. *Dehorning* cuts out horns and horn-producing tissue after attachment to the skull, typically after six weeks old. The American Veterinary Medicine Association recommends disbudding over dehorning and at the earliest age possible.

When to Disbud

Younger calves are more docile, easier to handle, and offer less chance for injury to the handler and calf itself. Younger calves also have smaller horn buds, allowing for more effective disbudding and less chance of scurs or horn regrowth. Younger age = less pain and stress = faster bounce back in feeding and growth.

When disbudding or dehorning calves, it may seem logical to combine this procedure with other management tasks, such as weaning, vaccinations, or regrouping. However, combined stressors weaken the calf's immune response and ability to heal or fight off disease, leading to illness, reduced feed intake, and reduced growth rate. Avoiding multiple stressors improves the calf's ability to effectively deal with each stressor separately with less impairment to her health and performance.

Methods

While the process of disbudding or dehorning can't be completely pain free, some methods can reduce discomfort and stress associated with the procedure.

Caustic paste disbudding requires application of a caustic chemical to the horn bud during the first few days of life, as older calves tend to rub their heads from discomfort. However, it can be performed up to six weeks of age. It is important to keep the calf's head dry, assuring paste does not run into the calf's eyes or other unintended areas.

Benefits: non-invasive, bloodless, young animals easier to handle, least painful

Disadvantages: must be isolated, cannot be exposed to rain, age restrictive, some risk of incomplete dehorning

Hot-iron disbudding utilizes high heat to prevent further growth of horn bud cells. The iron is applied to the horn bud for 20 seconds, or until a copper-colored ring appears. This procedure can be used on calves up to six weeks old.

Benefits: bloodless, can be performed in rain and group housing environments, low risk of incomplete disbudding

Disadvantages: age restrictive, restraint required, more painful than caustic paste

Other methods exist for dehorning after six weeks old, including *scoop dehorning*, *Barnes dehorning*, *guillotine dehorning*, or *hand saw dehorning*. Each of these methods occurs once the horn bud has already attached to the skull and causes significantly more stress and pain than disbudding methods. These methods are useful for calves with incomplete dehorning and those requiring removal of a scur or horn for animal safety or use of a headlock.

Benefits: use in older calves/cattle, multiple tools/methods

Disadvantages: bloody, quite painful, risk of exposed sinus and infection, restraint required, injury risk to animal and handler

Pain Alleviation

Local anesthesia acts as a nerve block during the disbudding or dehorning procedure. Use during disbudding or dehorning delays the cortisol (stress) and behavioral (pain/stress) response only while the anesthesia is effective and does not eliminate pain after it wears off. Use of local anesthesia may be more important in reducing the discomfort and stress of calves during the procedure itself, mostly with improved handling, rather than reducing the longer-term pain and stress of the procedure.

Analgesia, through administration of nonsteroidal anti-inflammatories, reduces pain and stress, reduces cortisol (stress hormone), and improves weight gain post-procedure. A combination of local anesthesia and analgesia in dehorning of older calves may be important for ease of handling in the more painful procedure and improving performance after the procedure.

The Take Away

When possible, disbudding younger calves is always preferable to reduce pain and stress. Consult your veterinarian to determine the benefits of analgesic and local anesthesia. Many factors dictate when and how dehorning can occur and choosing a method that best fits your management needs while also considering welfare and future growth and performance is ideal.

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Fresno and Madera Counties

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