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Byproduct Feeding Practices Important to California's Sustainability: Dry Cows & Heifers

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Nearly 41% of the California lactating cow ration is composed of byproducts. That number was calculated from responses to a 2022 survey of California dairy nutritionists. The data set represents approximately 936,700 lactating cows (26 returned surveys); 87.5% of those cows were housed in the San Joaquin Valley. Only 4% of lactating cows (38,100 cows) did not consume byproducts. In this article, we will present the data collected on dry cow and heifer rations in the State. Lactating cow ration data were presented in the April (2023) newsletter.

Byproduct inclusion rate. In the survey, we asked a series of questions about ration byproduct inclusion rates of nutritionists' herds. The values for dry cow and heifer rations are presented in **Table 1**. The range in byproduct feeding amounts was large. On average, California dry cow rations include 48% byproducts and heifer rations include 50% byproducts.

Table 1. Range of byproduct inclusion rates (dry matter basis) in California dry cow and heifer rations (not weighted).

	Dry Cows (%)	Heifers (%)
Minimum	0	0
Maximum	90	90
Average	48	50

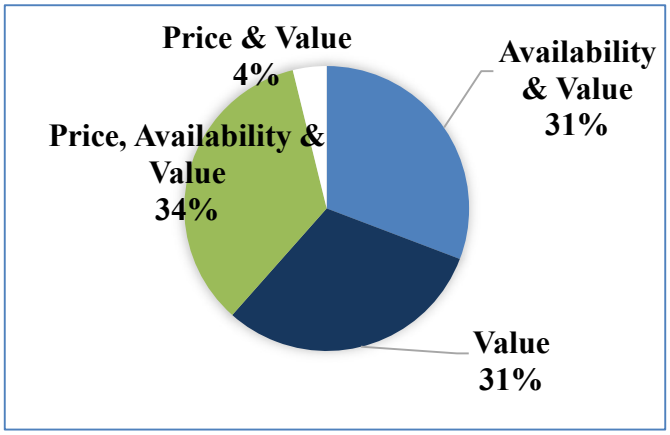

Figure 1. Reasons for incorporating byproducts into dairy rations.

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Reasons to use byproducts. In a "select all that apply" question, every nutritionist selected value (worth the price) as a reason for including byproducts (**Figure 1**). Less chose price (they're cheap; 38%) and availability (65%).

Determination of nutrient composition. Nutritionists fed 63 unique byproducts. Most nutritionists (58%) reported using a commercial laboratory to determine the nutritional composition of all byproducts, whereas 42% analyzed only some byproducts.

Byproduct use trends. Nutritionists reported increased byproduct feeding rates in the last five years (68%); 80% thought feeding rates would increase in the next five years.

Byproduct feeding is not a new practice. The wide range in feeding levels suggests it is possible to feed more byproducts on some dairies. Water regulation and reduced water availability will impact California's ability to produce forages. Byproduct feeding strategies may help mitigate feedstuff disruptions while contributing to the sustainability and resiliency of the California feeding program.

Thank you to the California dairy nutritionists who participated in the survey and to the California Dairy Research Foundation for funding this project.

Is Dairy Plus for Me?

Deanne Meyer - UC Davis Animal Science/UC ANR

Dairy Plus is part of Partnerships for Climate Smart Commodities grant from USDA. A total of 15 projects ($17.97M) from the first solicitation round are in the process of being awarded to California dairy operators. The purpose of these projects is to reduce greenhouse gas emissions AND improve nitrogen management on farms. The program is open to all producers, including those who have previously implemented improved manure management through the Alternative Manure Management Program (AMMP) or installed an anaerobic digester to capture biogas. Hence the name Dairy Plus…going beyond AMMP and digesters.

Dairy operators in Priority 1 or Priority 2 nitrate management zones may want to consider the Dairy Plus program as a possible means to improve nitrogen balance while reducing methane emissions. Important in the application process is understanding where your facility stands with respect to nitrogen management. Consider manure management in five years should your facility have water use limitations due to Sustainable Groundwater Management Act implementation. You can analyze your annual report submitted to the Regional Water Quality Control Board to get an idea of nitrogen balance at your facility. Soon, a spreadsheet will be available to aid in this process.

The upcoming application cycle announcement through CDFA is anticipated in late spring. However, producers who start now will have the greatest amount of time to work with their engineer, vendors, San Joaquin Air District, Regional Water Quality Control Board, county regulatory agency, etc. to complete the application and begin the permitting process. Beginning now provides the greatest lead time to work with the design team to identify the logical area for development and ensure adequate utilities will be available.

It is anticipated that the solicitation process for Dairy Plus will be in spring. We'll be sure to highlight dates once we know them. In the meantime, if you haven't already participated in AMMP or installed a digester, those programs will also be available in spring. Each program requires an application. It's important to start this process (engineer design, permits, talking with vendors, working with financial institutions) as soon as possible. For additional information: cdfa.ca.gov/oefi/dairyplus/. *Article originally printed in the January 2024 CDQAP Quality Assurance Update.*

Abnormal Milk: Is that Mastitis or Teat Sealant Residue?

Rúbia Branco-Lopes – UCCE Tulare & Kern, Daniela Bruno – UCCE Madera, Fresno & Kings, Maristela Rovai - South Dakota State University and Noelia Silva-del-Río – UC Davis Veterinary Medicine/UC ANR

It is important to correctly identify mastitis to avoid an overcrowded hospital pen, minimize unnecessary interventions, and reduce costs. Cows with mastitis are primarily identified at the parlor by milkers during the milking routine. The most common detection method is hand-stripping milk prior to milking and observing signs of abnormality in milk or the udder. In general, 2-3 squirts of milk are stripped from each quarter to detect the presence of clots, color changes, or other inconsistencies in the milk that may be mastitis indicators.

Abnormal milk is a good indicator of mastitis (**Figure 1**). However, not all abnormal milk results from mastitis, and sending healthy cows to the hospital pen increases the risk of mastitis and unnecessarily stresses cows.

At milking time, a healthy cow can be mistakenly flagged for mastitis due to teat sealant residue changing the normal milk appearance **(Figure 2)**. Cows treated with internal teat sealant at dry-off can shed treatment residues during the first milkings. While colored sealants are easier to distinguish from milk, white sealants can be mistaken for mastitic milk.

Fig. 1. Mastitis

Fig. 2. Internal teat sealant residue

<u>To differentiate cows shedding white internal teat sealant from mastitic cows while stripping, here are some tips:</u>

- Check records to see if the cow has recently freshened.
- Internal teat sealant will be present in all treated quarters, whereas mastitis rarely affects all quarters.
- Examine the residue's consistency. Teat sealant residue usually has an oily and pasty texture. Cows generally shed the residue for 3-4 days after calving, but this can persist for up to 12 days, especially if the sealant is applied incorrectly at dry-off.
    - *Note: it is necessary to grasp the upper teat portion and pinch tight at application to ensure the sealant is only in the teat canal and not in the gland cistern* **(Fig. 3, next page)**
- Residue shedding seems to be more pronounced in the rear quarters.
- Hand-strip each teat at least 10 times per quarter at each milking for the first 3 to 4 days post-freshening until you do not see residues. Do not send the cow to the hospital pen!

The milking machine should not be used to remove teat sealant residues. Internal teat sealant entering the milk line can accumulate in the milking equipment and it may need to be replaced sooner.

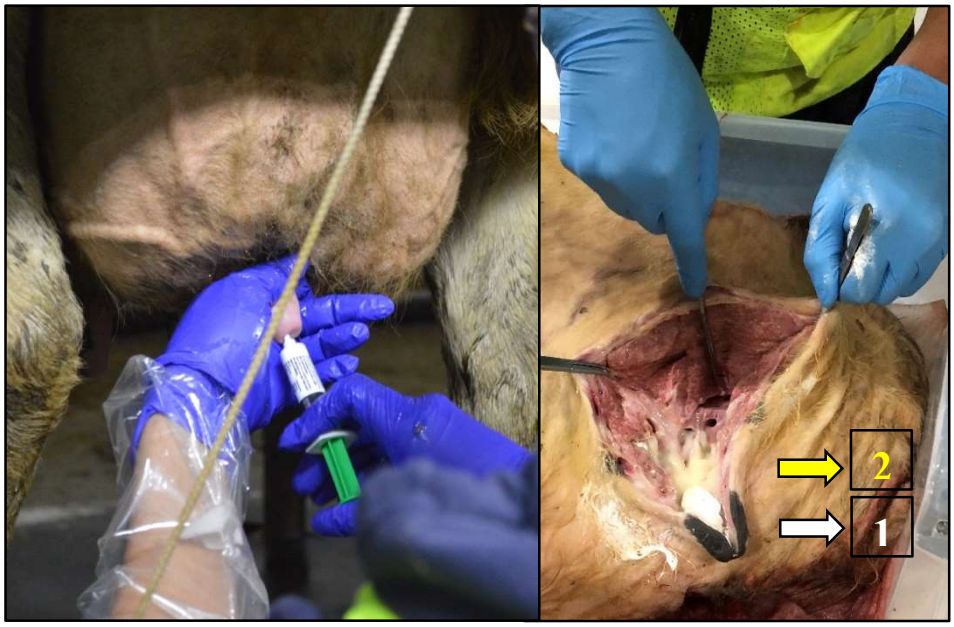

Figure 3. Internal teat sealant application and the correct localization of the sealant in the teat cistern (1) together with the dry cow antibiotic in the gland cistern (2).

Golden State Dairy Management Seminars at the World Ag Expo!

Don't miss out! Join us February 13th and 14th in Tulare for the latest in California dairy research. We've designed the seminars with the producer in mind, delivering information in a "news you can use" format. Our speaker line-up includes University of California Farm Advisors and Specialists on topics relevant to California dairying. Most importantly, the research presented is derived from California data.

For more information, scan the QR codes or contact Jennifer Heguy (jmheguy@ucdavis.edu).

Dairy Sustainability - Tuesday, February 13th, 1pm – 2pm

Topics: Dairy Plus program updates, benchmarking sustainability metrics and soil and water conservation

Pre-weaned Dairy Calf Management – Wednesday, February 14th, 10:30a – 11:30am

Topics: Colostrum management, disbudding and probiotic use

Hot Topics in the California Dairy Industry – Wednesday, February 14th, 11am – 12pm

Topics: Dairy on beef in feedlots, novel sorghum characteristics to improve quality and diarrhea treatment considerations

Additional Seminar that may be of Interest!

CDFA Climate Smart Agriculture Incentive Programs Update - Thursday, February 15, 12:30 - 1:25pm

UNIVERSITY OF CALIFORNIA
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CALIFORNIA DAIRY RESEARCH FOUNDATION
Science for a Sustainable Future

Check Your Mailbox! California Dairy Industry Sustainability Metrics Survey

What. Benchmark data for energy, water & manure nutrient management.

Who. San Joaquin Valley dairies.

Why. To document additional progress with implementation of energy and water saving practices and nitrate management zone mitigation practices.

How. Postcards were mailed in January: scan the QR code with your smartphone camera or type the website directly into your web browser.

Time to complete. ~ 10 minutes

Questions. Jennifer Heguy, UCCE Dairy Advisor: (209)525-6800 or jmheguy@ucdavis.edu

Recent Updates in Vesicular Stomatitis Virus

Noelia Silva-del-Rio – UC Davis Veterinary School/UCANR

Vesicular Stomatitis Virus (VSV) has emerged as a concern for livestock producers across multiple states, including CA, NV, and TX. This viral disease primarily targets horses and cattle but can also affect swine, sheep, goats, llamas, alpacas, and even humans who handle infected animals. Although VSV rarely leads to fatalities in animals, it has a great impact on the livestock industry. One negative implication of VSV is its clinical resemblance with Foot and Mouth Disease (FMD; eradicated in United States in 1929). Laboratory testing is needed to confirm VSV cases and differentiate them from other diseases (e.g., FMD, swine vesicular disease).

Per CDFA's January 18, 2024 update release, since the outbreak's onset in May 2023 a total of 319 VSV-affected premises have been identified in CA, NV, and TX. Out of these, 96 have been confirmed as positive cases, while 220 remain suspect. Most of the affected premises housed equine species only (n = 309), however premises with cattle species only (n= 7; Fresno, San Diego, and Santa Barbara Counties), equine and cattle species (n = 2; Fresno and Mariposa Counties), and rhinoceros (n =1; San Diego County) have also been affected.

VSV may not pose a significant direct threat to animal life, but the economic losses can be substantial. Therefore, understanding how to prevent outbreaks and the guidelines on animal movement, as well as its clinical signs, and the importance of accurate diagnosis is essential in safeguarding your livestock and livelihood.

For updates on counties affected please check: https://www.cdfa.ca.gov/AHFSS/Animal_Health/VS.html.

ABC's of Winter Cereal Forages: Yield vs Quality

Ed DePeters – UC Davis Animal Science & Jennifer Heguy – UCCE Stanislaus, Merced & San Joaquin

Spring and winter cereal forage harvest are quickly approaching. Winter cereals are often the foundation of dry cow and replacement heifer diets. Depending on its quality, cereal silage can also be a component in lactating cow diets.

Work out of the University of Minnesota Extension demonstrated increased forage yield as winter rye matured from vegetative stages to flowering (**Figure 1**). As forage matured, digestibility decreased.

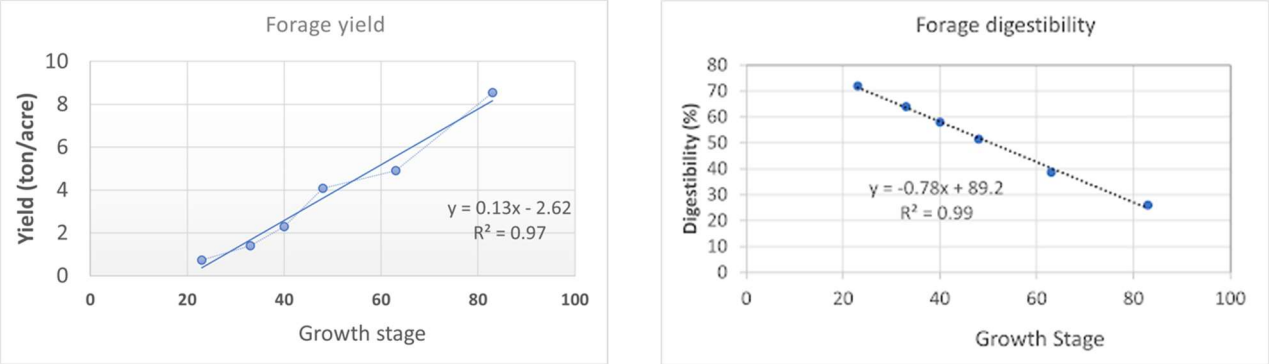

Figure 1. Winter rye forage yield and digestibility by growth stage (figures from UMN article)

Harvesting winter cereals with a focus on forage quality is challenging. Variable rains in March and April complicate when forages can be harvested. Typically, winter cereals are harvested with more consideration for forage yield than forage quality, but quality should not be overlooked completely. This may be increasingly important as water restrictions reduce California's ability to produce year-round forage. Many factors affect forage quality. Important factors include plant species, variety, grain development, and plant maturity at harvest. With most forage plants, forage quality decreases with advancing plant maturity. A decrease in crude protein and an increase in fiber leads to decreased digestibility and therefore a decrease in energy content. For alfalfa hay, the California System uses acid detergent fiber (ADF) to measure quality. As ADF increases, alfalfa forage quality decreases. The relationship between maturity and fiber composition is not as straightforward for cereals.

Early work at UC Davis included a commercial winter forage mix containing oats, barley, wheat, and vetch harvested for hay. Forage was harvested at four stages of maturity based on the stage of maturity of the oats: bloom (flower), milk, soft dough, and hard dough. As maturity advanced protein and fiber both decreased (**Table 1**). Wait! We just said that with advancing maturity fiber of the plant increases. The complication with cereal forage is that as the plant matures and starts to set seed, the seed head becomes a larger proportion of the harvested weight. Because of this, as a proportion of the total plant dry matter, fiber declines. What is important to measure with cereal forages in addition to fiber is lignin. As the plant matures, the lignin content of the stems increases. Lignin helps the plant to stand upright. Lignin is indigestible and because it chemically associates with fiber (cellulose and hemicellulose), lignin decreases fiber digestibility by the rumen microbes.

Table 1. Chemical composition of cereal forages harvested as hay

	Bloom	Milk	Soft Dough	Hard Dough
Crude protein, %	9.5	9.0	8.5	7.5
Acid detergent fiber, %	41	40	39	37
Neutral detergent fiber, %	66	64	64	62
Lignin, %	4.6	4.4	4.7	5.3
In vitro dry matter digestibility, %	56	56	54	52

Article continues on the next page…

In the lab (*in vitro using rumen fluid*), digestibility of dry matter decreased with advancing maturity. These four differing cereal forages were fed to sheep to measure digestibility (*in vivo)*. As maturity increased, digestibility of fiber decreased and the overall impact was decreased energy digestibility (**Table 2**). Lignin content was highly correlated with digestibility. As lignin content increased, forage digestibility decreased. Fiber content was not related to a decrease in digestibility.

Table 2. Apparent digestibility of cereal forages harvested as hay				
	Bloom	Milk	Soft Dough	Hard Dough
Dry matter, %	55	55	52	49
Crude protein, %	60	60	66	60
Acid detergent fiber, %	48	44	40	35
Neutral detergent fiber, %	52	50	45	39
Total digestible nutrients, %	48	47	45	44

One consideration for cereal mixes is that the different cereal species do not always mature at the same time. Barley is often the first to boot stage and wheat the last. These differences in species maturity will impact forage quality of the forage mix harvested. Check with your seed representative to learn what the maturity times are of each component in the forage mix so you can better determine if this will meet your quality goals.

Take Home Message: As cereal forage matures, forage quality (digestibility and energy content) decreases, but dry matter yield increases. Fiber composition alone is not an adequate predictor of forage quality for cereal forages; lignin is an important chemical constituent to measure. Cereal silage harvest decisions should reflect your goals for forage yield and forage quality. This will likely depend on what other sources of forages or fibrous byproducts you have available.

References:

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University of California Cooperative Extension

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Merced, Stanislaus & San JoaquinCounties

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