University of California
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Golden State Dairy Newsletter

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GOLDEN STATE DAIRY MANAGEMENT WEBINARS

Recorded Webinar Sessions Now Available

https://ucanr.edu/sites/CAdairyconference/Agenda/

Did you miss the Golden State Dairy Management Webinars? Links to the recorded webinar sessions are now housed on the "agenda" page of the website (**link above or scan the QR code with your phone camera**).

Nutrition Topics:

* Almond hull feeding * Reducing enteric methane emmisions * By-product feeding in CA *

Animal Management and Health Topics:

* Polled genetics * Feeding more milk * When to treat or not treat *

Crop Production Topics:

*Recharging groundwater aquifers * Forage sorghum * Growing sugar beets & safflower as feed *

Priority Nitrate Management Zones Topics:

* Manure management options * Manure as fertilizer * Irrigation management automation *

Also In this Issue…

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Almond Hulls: A Valuable, yet Highly Variable, Byproduct Feedstuff

Ed DePeters, Katie Swanson, Hannah Bill – UC Davis Animal Science, Jed Asmus – January Innovation & Jennifer Heguy – UCCE Merced, Stanislaus & San Joaquin Counties

Field weight at almond harvest is 23% nuts, 14% shells, 13% debris and 50% hulls. Shells are often used for bedding material. Hulls are an excellent byproduct feedstuff that are fed to lactating dairy cows because of their high sugar content. However, because the hulling process cannot remove all of the sticks and shells from the nutritious hull fraction, almond hulls are highly variable in nutrient and energy composition.

The aim of our research was to determine the chemical composition of almond hulls and the impact of **total debris (sticks and shells)** contamination on the chemical composition (quality) of almond hulls. There is surprisingly little information on the composition of almond hulls. The information that is available has not identified the contribution and impact of total debris on feeding value of commercial almond hulls.

Why is identifying the amount of total debris in almond hulls important? Sticks and shells are of little nutritional value and these contaminants lower the feeding value of the hulls.

We obtained 12 samples of commercial almond hulls that included 5 samples of Nonpareil hulls and 7 samples of pollinator variety hulls. The 12 samples were split into 2 portions. One portion represented **Commercial Hulls** that contained debris. The other portion was hand sorted to remove sticks and shells to create what we called **Pure Hulls**.

What did we find for composition? Pure Hulls were high in sugar and high in fiber, and higher in sugar and lower in fiber than Commercial Hulls. The total debris contamination in Commercial Hulls reduced the sugar content and increased the fiber and lignin content. Lignin is indigestible so the debris contamination lowered the energy value of the Commercial Hulls. Hulls, Pure and Commercial, were low in protein.

What did we find for variety? Commercial Nonpareil hulls had a lower proportion of total debris compared with Commercial Pollinator hulls which impacted the chemical composition. Nonpareil hulls were higher in sugar and lower in fiber and lignin than Pollinator hulls. Because of the lower debris content, Nonpareil hulls are higher in nutritional quality than Pollinator hulls. For both varieties of hulls, the ranges in chemical composition were large indicating that there was large variation in chemical composition.

For full details of our findings on the chemical composition of almond hulls, view the publication here: https://www.appliedanimalscience.org/article/S2590-2865(20)30149-X/fulltext

Take Home Message: Commercial almond hulls can be an excellent byproduct feedstuff for lactating dairy cows because of their highly digestible sugar content. Commercial almond hulls also contribute fiber to the diet of which a portion is digested by the rumen microbes to provide energy to the dairy cows. The hulls also add a physical aspect to support rumen contractions and chewing. Nonpareil hulls are higher in feeding value than Pollinator hulls. Purchased almond hulls are often a blend of Nonpareil and Pollinator hulls; this blending of hull varieties contributes to the high variability in chemical composition that is found with delivered almond hulls.

Much more research needs to be done to better describe the feeding value of almond hulls that will allow for feeding higher amounts of hulls to lactating dairy cows and reduce the large variation that exists in quality delivered to a dairy farm. In the meantime, **testing the chemical composition of almond hulls is important** to ensure diets are formulated with accurate information, and that you're not paying premium price for an inferior product.

Calf and Herd-Level Passive Immunity: New Industry Guidelines

Dr. Noelia Silva-del-Río - UC Davis & UCANR, Rúbia Branco Lopes - UC Davis, Laura Latorre - Universidad Nacional de Colombia & Jennifer Heguy - UCCE Merced, Stanislaus & San Joaquin Counties

Calves are born without maternal immunity; the bovine placenta prevents transfer of immunoglobulins, such as IgG, from the dam to the fetus. Thus, immunity must be acquired passively from colostrum.

Providing newborn calves with adequate IgG supply from colostrum is an essential management practice. For decades, industry guidelines defined failure of transfer of passive immunity (FTPI) as when calves had serum IgG concentrations below 10 g/L at 24 to 48 h of life. Calves with FTPI are not only at greater risk of illness and death during the preweaning period, but they will also have lower feed efficiency and milk yield as mature cows.

Improvements in colostrum management practices have driven down FTPI from 41% to 13% (1991 to 2014). Accordingly, from the mid-90's to 2018, preweaned calf deaths have decreased from 11% to 6%, but the proportion of illness remains relatively unchanged from 36% to 33%. The insignificant reduction in the number of preweaned calves with disease has raised questions about the adequacy of using 10 g/L of blood IgG as a threshold to define FTPI.

In 2018, a group of calf experts started working together to re-evaluate the definition of FTPI in calves. Their conclusions have been recently published in a peer-review journal (Lombard et al., 2020). The group proposed 4 categories of transfer passive immunity and set herd goals as outlined in **Table 1**. The new categories of TPI were defined considering their practical application on-farm and if they were achievable. Once these categories were defined, this group of experts evaluated them using National Animal Health Monitoring System (NAHMS) data that included IgG measurements (>24 h to 7 d of age) and preweaned illness and death records from 2,360 calves housed on 103 US operations (Table 1). As shown in Table 1, a decrease in preweaned calf illness and deaths was observed when improving from poor to excellent TPI.

Table 1. New industry guidelines for transfer of passive immunity (TPI) in newborn calves aged >24 h to 7 d. Reported illness and death using the new TPI categories from NAHMS study (n = 2,360 calves, 103 herds).

TPI category	IgG (g/L)	Equivalent TP (g/dL)	Equivalent Brix (%)	Goal for percent of calves in each category	Illness (%)	Deaths (%)
Poor	<10.0	<5.1	<8.1	<10%	46.1	7.4
Fair	10.0 - 17.9	5.1 - 5.7	8.1 - 8.8	20%	36.1	3.8
Good	18.0 - 24.9	5.8 - 6.1	8.9 - 9.3	30%	34.8	1.5
Excellent	≥25	≥6.2	≥9.4	>40%	28.5	2.5

Adapted from Lombard et al., 2020

Dairy producers are encouraged to evaluate their calves' TPI using the new proposed guidelines. Herds that fail to achieve >40% of the calves with excellent TPI (≥25 IgG g/L) should re-evaluate their colostrum management practices.

Lombard J, et al. Consensus recommendations on calf- and herd-level passive immunity in dairy calves in the United States. J Dairy Sci. 2020 Aug;103(8):7611-7624. doi: 10.3168/jds.2019-17955.

Nutrient Content of Vacuumed Manure

Nicholas Clark – UCCE Kings, Tulare & Fresno, Dr. Anthony Fulford – UCCE San Joaquin, Stanislaus & Merced, Joy Hollingsworth – UCCE Fresno, Madera, Kings & Tulare & Dr. Deanne Meyer – UC Davis & UCANR

Would you consider using a vacuum to collect manure? This is an option for producers who want to reduce manure loading to lagoons or move manure nutrients off-site. Vacuums used in California come in two basic models: self-propelled or attach to a tractor.

Vacuumed manure is a slurry. It does not stack (see photos). Data from a current project funded by the California Dairy Research Foundation provide insight to the nutrient content of vacuumed manure. Multiple vacuum loads at four different dairies (one heifer manure) were sampled under summer and/or winter conditions. The manure stream from lactating cow lanes is in Figure 1. The manure stream from heifer lanes is in Figure 2. The total solids concentration of vacuumed manure ranged from 15.0 to 21.6%. That means the moisture content was 78.4 to 85%. It's no wonder it doesn't stack! Moisture needs to be removed (via solar drying or by mixing into drier material) before this manure will stack. If the intent is to compost, optimal moisture content is between 40 and 60%.

Figure 1. Lactating cow lane manure stream

Figure 2. Heifer lane manure stream

Characteristics of manure samples from vacuum systems across four commercial dairies in the San Joaquin Valley	
Constituent	Range (percent)
Total solids[1]	15.0 to 21.6
Carbon[2]	24.4 to 42.0
Nitrogen[2]	1.91 to 2.87
Phosphorus[2]	0.49 to 0.73
Potassium[2]	1.22 to 2.97
[1]100% moisture basis [2]100% dry matter basis	

The ranges of nitrogen, phosphorus and potassium concentrations are large. Some of the nitrogen in vacuumed manure will volatilize as ammonia gas during drying and/or composting. Phosphorus and potassium are also widely variable probably because of differences in animal diets and sources of bedding.

More dairies are using vacuums on farm as part of the Alternative Manure Management Program from the California Department of Food and Agriculture. If you'd like to learn about vacuum use on dairies, a webinar from December is available, and more information will be available soon.

To view the vacuum use webinar, please visit https://cdqap.org/ammp-outreach-project/ or scan the QR code with your phone camera.

Mycoplasma Prevalence in California Herds

Dr. Daniela Bruno - UCCE Fresno, Madera and Kings Counties &
Dr. Fernanda Ferreira - UC Davis & UCANR

Mycoplasma is an important pathogen that can cause clinical, subclinical, and chronic intramammary infections that can persist through the current lactation and into subsequent lactations. Cases of mastitis caused by *Mycoplasma* spp result in severe infection and are usually highly contagious. The infection can affect more than one quarter, which causes significant decreases in milk yield, and does not respond to antimicrobial treatment or therapy. Culling remains the most common recommendation for controlling Mycoplasma infections. Across the US, the prevalence of *Mycoplasma* spp in bulk tank milk varies between 1 and 6%, and past results of California dairies showed a prevalence of less than 5%.

To capture more current trends of Mycoplasma infections throughout California, we looked at the results of milk samples (n=369,718) submitted for Mycoplasma culture to the milk quality laboratory at the VMTRC-UC Davis (Tulare, CA) between January 2009 and November 2019. Milk samples included individual cow milk samples (n=242,150) and bulk tank milk (BTM) samples (n=127,568). There was no further information regarding the reason for sending the individual cow sample or the BMT sample. Usually, BMT samples are sent as a herd surveillance, and individual cow samples from cows with chronic mastitis or cows with history of unsuccessful mastitis treatments, high somatic cell count, and fresh cows.

Overall, 6.5% (n = 8,266) BTM samples and 1.2% (n= 2,900) individual cow samples tested positive for *Mycoplasma* spp. Prevalence of samples positive for *Mycoplasma* spp ranged from 4.8 to 10% for individual cow samples and 0.4 to 2.6% for bulk milk samples (Figure 1). The greatest proportion of Mycoplasma positive samples were observed during the winter period. Past data from the USDA has shown that the western region has the highest proportion of Mycoplasma positive milk samples (30.2%) compared to the eastern region (5.1%). *Mycoplasma* spp prevalence is probably higher than reported in studies, but shedding patterns, minimum level of detection and dilution by herd milk in large dairy herds, may mask the true prevalence. Additionally, our study found that over 75% of Mycoplasma isolated were *Mycoplasma bovis*.

Surveying the dairy for Mycoplasma with routine testing of bulk milk tanks remains imperative for herd health. Further attention should be paid to cows with multiple quarters infected, dramatically decreased milk production, cows that appear otherwise healthy but have severe mastitis and/or milk secretion with sandy or flaky sediments in watery or serous fluid, and chronic infections that do not respond to any treatment. Talk to your veterinarian about the best strategy for treatment and monitoring for your dairy.

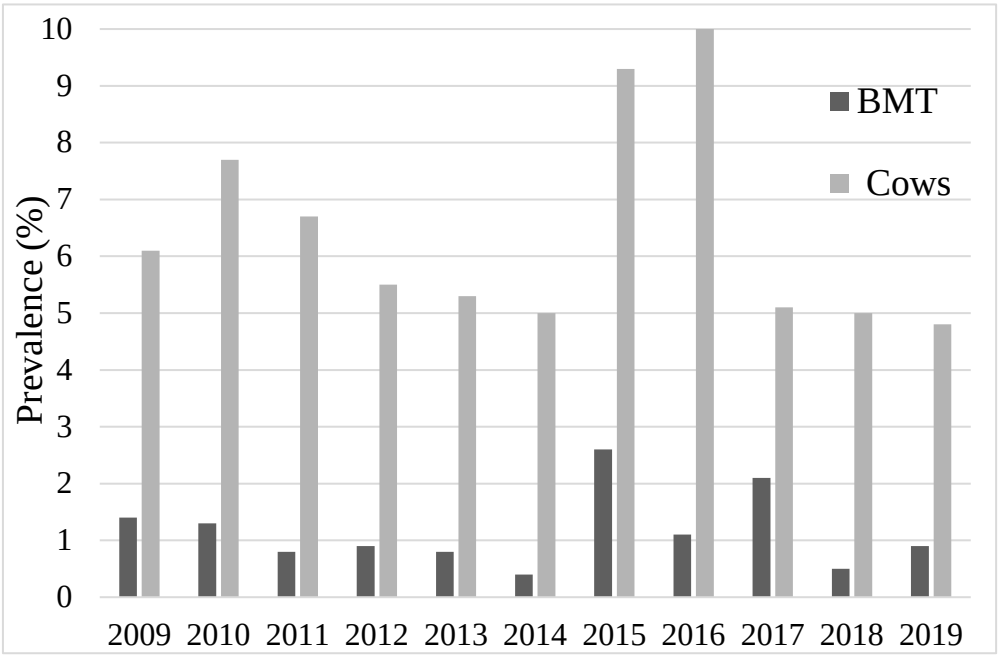

Figure 1. Proportion of samples positive for Mycoplasma species from January 2009 to November 2019

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