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Almond Hulls vs Almond Hull and Shell – Do You Know What You're Feeding?

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First, let's start with some legal definitions. **Almond hull** composition in California cannot exceed 15% crude fiber, 13% moisture, and 9% ash. **Almond hull and shell** is defined as more than 15% but less than 29% crude fiber. Something to note: this is on an as-is basis, which means these values include moisture.

Looking at the Numbers

Almond hull sampling data were obtained from the CDFA Division of Inspection Services, Commercial Feed Regulatory Program. Data for a 5-year period, 2014-2018, were obtained via random surveillance or in response to a complaint. For this article, most violations were based on crude fiber, so we'll focus there.

There were 673 almond hull samples analyzed during the five-year period, with a range of **39 to 62% of samples in violation for crude fiber**. Table 1 includes the sampling data by year and includes percent of samples in violation, and the crude fiber content of those violation samples. As you can see, only a small portion of the almond hulls produced in California are sampled and tested for these purposes, so it is difficult to know the average quality fed on dairy farms.

Table 1. Violation data from five years of CDFA sampling

Year	# CF Violations	# Total Samples	% Violation	% CF in Violations	SD
2014	100	161	62.1	17.6	2.4
2015	101	186	54.3	17.4	2.3
2016	46	117	39.3	17.2	1.7
2017	54	105	51.4	17.4	1.8
2018	47	104	45.2	17.6	2.7

(Almond hull article continues on page 2)

Also In this Issue…

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Violation almond hulls were 4.1 percentage units higher in crude fiber content, 17.4% vs 13.3% crude fiber as-is basis, than those not in violation across all 5 years.

Take-Home Messages

Yearly violation frequency for almond hulls is high based on fiber content exceeding the 15% crude fiber maximum. What accounts for a crude fiber violation? Almond hull composition can vary depending on the "debris" content, which are sticks, shells and dirt.

Variety also plays a role since Nonpareil hulls are large in size and the proportion of debris is low relative to hull on a weight basis. In contrast pollinator varieties tend to have smaller hulls, meaning the debris contributes a larger portion of the weight of the hulls. Because of this difference in hull size, crude fiber content tends to be higher for pollinator hulls than Nonpareil hulls. Consequently, hullers often blend Nonpareil hulls with pollinator hulls to stay below the 15% crude fiber maximum, but at times these blends violate the legal definition of almond hulls in California.

Practical Recommendation

At the farm level, **sample almond hulls and send the sample to a feed laboratory for chemical composition to ensure the quality of almond hulls purchased**. What does this sampling frequency look like? It might be sampling loads as they arrive on the farm, or some other schedule that allows for periodic evaluation of the almond hulls delivered.

If you're interested in the full research article, scan the QR code with your phone's camera.

Searching for Genetic Risk Factors for Lameness-Causing Lesions in Dairy Cows

Ellen Lai, Alexa Danner, Thomas Famula & Anita Oberbauer – UC Davis

Lameness is the second most prevalent disease in dairy cattle after mastitis and the third most common reason for culling after mastitis and infertility. Lameness indicates cow discomfort and is often caused by painful foot disorders, most commonly digital dermatitis (DD, also known as foot warts), sole ulcers (SU), and white line disease (WLD). These foot disorders are an animal welfare issue, incur substantial financial losses for the producer, and inflate the environmental footprint per unit of milk due to losses in efficiency of resource use.

Genetic selection against DD, SU, or WLD is possible since there is a small but significant unknown genetic component. We sought to identify genetic markers associated with risk of developing DD, SU, WLD, and any noninfectious foot lesions. For each foot disorder, we compared genetic markers between cows that had at least one episode of the foot disorder and sound cows to find which genetic markers were overrepresented in the lame cows and therefore indicated genetic regions associated with risk of developing a foot disorder.

Significantly associated regions for risk were found and we were able to identify candidate genes that might play a role in the development of DD, SU, and WLD. Although these genetic markers and genes are promising, they collectively have a very small influence on risk compared to non-genetic means of control (e.g., medicated foot baths to prevent DD, minimizing standing time to prevent SU and WLD).

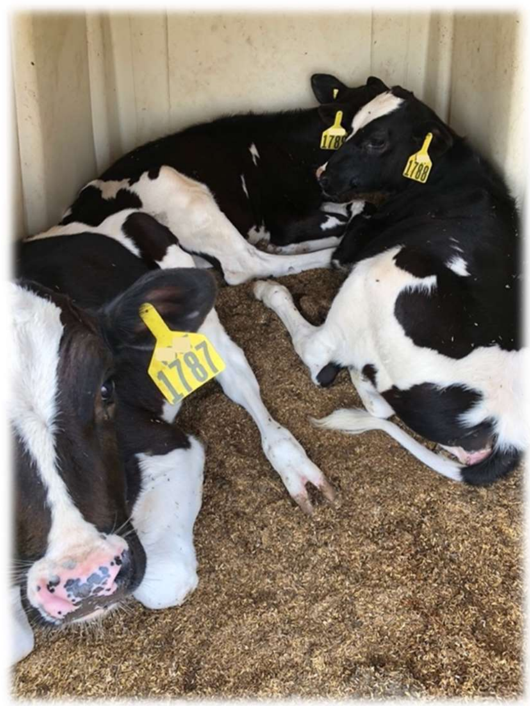
Management remains the most effective method of reducing the prevalence of these foot disorders at this time, especially when coupled with genetically selecting for reduced risk of foot lesions. Importantly, we found that genetic selection against one of these foot disorders will also select against the other two.

Group Housing for Preweaned Calves - Research on Health Outcomes

Betsy Karle – UCCE Northern Sacramento Valley

Research is generally mixed on the feasibility of group housing for preweaned calves, especially relative to calf health. Data from our studies on respiratory disease in calves showed a trend of increased health risk for group housed calves, especially in groups larger than seven calves. Other studies indicate improved weight gain and feed intake in group housed calves and many studies have shown positive effects of paired housing systems, with two calves housed together. With this in mind, we designed a study to test the effects of housing three calves together and monitored their health and growth outcomes.

We enrolled 42 calves in our study between July and October and assigned them to treatment by birth order: 21 were housed in groups of three and 21 were housed individually. All calves were housed individually for at least seven days and group pens were created when the youngest calf of the three was at least a week old. To make group pens, we assembled three hutches with a wire panel fenced outside area that measured approximately 6’ x 12’. Individual pens were a traditional hutch plus a 4’ x 6’ exercise area. Height and weight were measured at birth and when calves were moved out of the hutches one week prior to being fully weaned, at approximately 70 days of age. All calves in the study had adequate passive transfer of immunity and received the same diet of saleable milk from a slow flow nipple and calf starter grain. All hutches were bedded with rice hulls.



We recorded observations of calf health using fecal and respiratory disease scoring systems daily before feeding. Calves were observed for one-hour post feeding where behavior was recorded on 10-minute intervals. Cross sucking was observed minimally in both groups (individually housed calves could reach their neighbor) and was not perceived to be frequent enough to be concerning. Statistically, the group housed and individually housed calves performed the same in terms of average daily gain in weight and height and signs of respiratory disease. All calves experienced diarrhea at some point, so comparisons between the housing structures were not possible.

Interestingly, from a social standpoint, group housed calves nearly always rested together in a single hutch, even though there were three hutches available. During the study period outside air temperatures exceeded 100 degrees as typical in California’s Central Valley, but this did not seem to deter calves from preferring close contact with one another while resting in the hour after feeding.

We plan to replicate this study in other geographic locations and in other hutch systems. At this time, our results indicate that housing calves in these small groups is feasible, not detrimental to calf health and may have positive social and welfare outcomes.

<u>WEBINAR:</u> Prospects for using the SLICK mutation to decrease the negative impact of heat stress in dairy cattle.
November 12, 2021
11:00 am – 12:00 pm PST
Scan the QR code to register

How much does a case of clinical mastitis cost?

Fernanda Ferreira – UC Davis & UC ANR & Daniela Bruno – UCCE Fresno, Madera & Kings

Clinical mastitis **(CM)** is a common disease in dairy herds that causes huge financial losses. Most cases of CM happen during the beginning and towards the end of the lactation. Mastitis negatively impacts production, reproduction, and the productive life of lactating cows. Calculating the cost of a case of CM can help farmers make informed decisions regarding treatment protocols, culling strategies, and management practices that may result in financial gains and better animal welfare.

Funded by the California Department of Food and Agriculture, our team developed a user-friendly CM calculator. Using your own inputs, you can calculate the average cost of a case of CM in your herd. For example, you can change milk and feed prices, the average milk production of your cows, and the incidence of CM in your herd. We have also created a short video explaining how the tool can be used and adapted to different scenarios. You can find the calculator and video by scanning the QR code with your phone's camera.

Using the tool, an example:

Assumptions for an average California herd (note these inputs can be modified in the calculator):

1. 1,000-cow herd with an average milk production (305 days) of 25,600 pounds/cow/lactation
2. The incidence of CM = 12% (for every 100 lactating cows in the herd, 12 will have at least one case of CM during their lactation)
3. Treatment cost: antibiotic tube = $3.40; three days of treatment; one quarter affected per clinical case
4. Milk losses: six-day milk discarded (396 lbs); milk price = $18/cwt.
5. Labor costs = $15/hour (treatment application, moving cows, etc.)

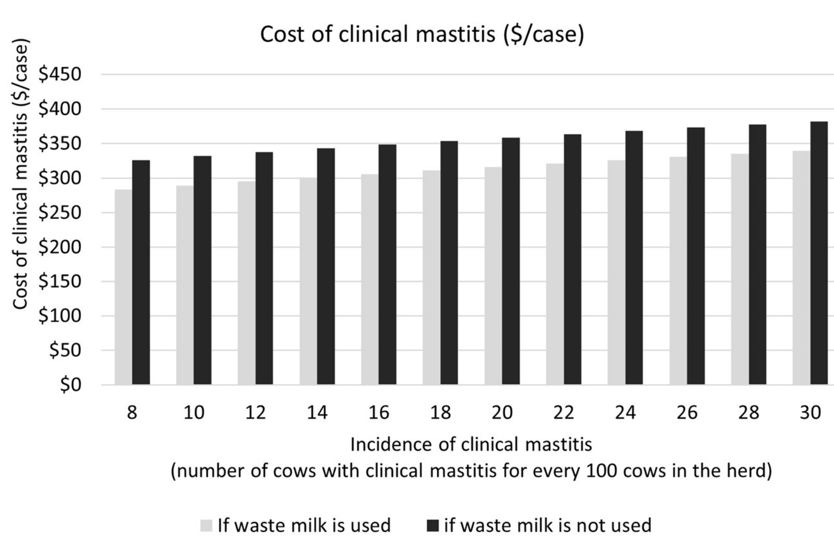
The results:

Based on the scenario we created, the average cost of one case of CM in this herd is $295, if waste milk is fed to calves. The greatest losses are due to a decrease in milk production due to CM ($212/case), and milk withdraw due to treatment ($29/case). That same case can cost up to $338 if waste milk is not used (milk withdraw due to treatment: $71/case). For a 1,000-cow dairy with a 12% incidence of CM, the cost per milking cow per year is $41.

Comparing different rates of clinical mastitis:

Using the above inputs, if CM incidence is reduced to 9%, the cost of one case would be $329 if waste milk is not used, and $287 if it is fed to calves. If incidence of CM is 20% and waste milk is not used, these costs would be $359/case, and if waste milk is used, they would be $316/case **(Figure)**.

Mastitis is expensive! While impossible to eliminate mastitis from dairy herds, management that reduces CM incidence will likely pay off! Remember that not all cases of mastitis need treatment, and selective treatment of your herd based on culture may help you manage mastitis on your herd. If you have any questions about the tool, please contact: fcferreira@ucdavis.edu and dfbruno@ucanr.edu.



Moisture Content of Compost Bedded Pack Barns

Deanne Meyer - UC Davis & UC ANR, Anthony Fulford – UCCE San Joaquin , Stanislaus & Merced, Joy Hollingsworth – UCCE Fresno, Madera, Kings & Tulare, Jennifer Heguy – UCCE Merced, Stanislaus & San Joaquin & Nicholas Clark – UCCE Kings, Tulare & Fresno

Compost bedded pack barns are making a debut on California dairies. One purpose of compost bedded pack barns is to keep manure solids out of the liquid waste stream. Manure dropped while eating or at the milk barn may end up in the lagoon, while the rest goes into the compost bedded pack.

Management to achieve the desired 30% bedded pack moisture content is largely unknown. A current project funded by the California Dairy Research Foundation provides insight into the variability of moisture and nutrient composition in compost bedded pack barn solids. Representative samples from four different lactating cow pens were collected from one dairy. Each pen was sampled separately for analysis. Samples were collected three times throughout the year. These pens varied by animal density and production stage. The diet fed and dry matter intake of animals were different between pens.

A preliminary analysis of moisture content of the bedded pack shows variability by pen (**Figure 1**). Variability within the facility by month of sampling (**Figure 2**) is also evident. Note: as moisture content decreases, variability of moisture in samples increases. The moisture content of bedded packs reflects the number of animals and their feed intake and manure excretion. Other management practices also affect moisture composition. These practices include daily rototilling, addition of carbon material and the use of fans. Fans are particularly important during winter months. Data from additional barns will be available later.

Figure 1: Compost bedded pack barn moisture content by pen

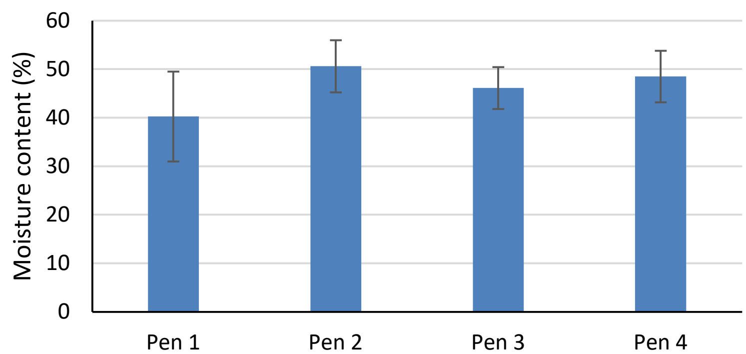
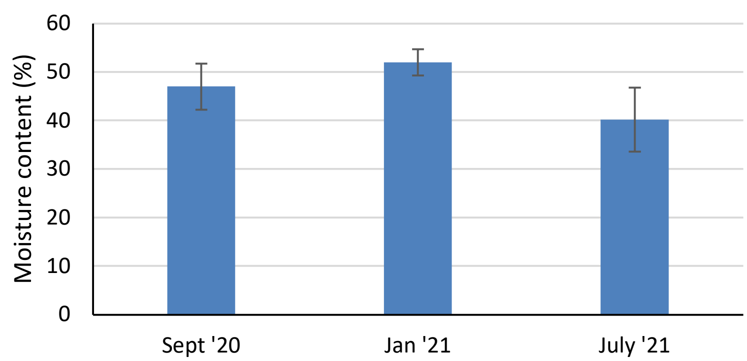


Figure 2: Compost bedded pack barn moisture content by month sampled



Managing moisture is critical in these barns to maintain a functional bedded pack and have solids in the appropriate form at time of removal and land application. Understanding variability of moisture content in compost bedded pack barn solids is important to inform manure sampling protocols and manure utilization. The moisture concentration influences the pounds of nutrients per load applied to fields.