University of California
Agriculture and Natural Resources

California Dairy Newsletter

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Monitoring Forage Particle Length – How and Why?

Jennifer Heguy, UC Dairy Advisor - Merced, Stanislaus & San Joaquin

Summer forage harvest is upon us, and so is a flurry of silage choppers, trucks and packing tractors. Putting feed up quickly is imperative to the ensiling process, making monitoring during harvest equally important. A dairy can harvest and ensile a year's worth of forage in as little as a few days; if the desired chop length is not met, or kernel processing is not adequate, there could be issues with how the forage performs in the ration.

Chop length of forages can be measured as it's delivered to the silage structure. In a recent corn silage management survey, 80% of dairies reported monitoring chop length during harvest with 97% of those dairies doing so visually. Another, less popular but more precise method of evaluating chop length on farm is the Penn State Particle Separator (PSPS) analysis.

What is a PSPS?

In figure 1 (figures and tables are on page 2), there are four numbered piles which correspond to the trays of the PSPS (figure 2). The top 3 trays have openings for material to pass through (Table 1), becoming gradually smaller with a solid bottom tray to catch the "fine" material. For reference, recommended ranges for corn silage and haylage are also included in table 1.

How do I use a PSPS box?

A sample of harvested forage is placed in the top tray of the PSPS (with the other trays stacked under) and "shaken" and rotated according to the instructions. Then, material in each of the trays is weighed and calculated as a percentage of the total weight. The entire process can be completed on farm, in about 5 minutes. For more information: http://extension.psu.edu/animals/dairy/nutrition/forages/forage-quality-physical/separator

PSPS results from harvested sorghum

Last summer, 16 fields of sorghum chopped for silage (nutrient and management information was presented in the April 2017 newsletter) were sampled. There isn't a lot of information available on desired sorghum chop length, but the results were still interesting. Table 2 includes the average, median, minimum and maximum percentages of the 16 chopped sorghum samples at harvest. Compared to corn silage, these sorghum samples were chopped much coarser than typical corn silage and evidenced by the large percentage of material found in tray 1. Tray 3 contained less material than typical corn silages, which may be due, in part, to the lack of starch (sorghum grain) as compared to corn silage. Individual results from the PSPS analysis (including pictures) can be found here: http://ucanr.edu/casorghum16.

Figure 1: PSPS tray forage fractions.

Figure 2: PSPS showing trays

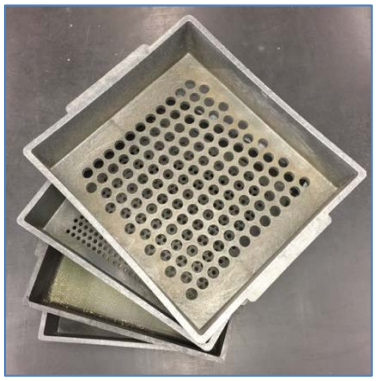

Table 1. Forage separator characteristics (2002 model) and recommendations for corn silage and haylage.
From Penn State Extension: http://extension.psu.edu/animals/dairy/nutrition/forages/forage-quality-physical/separator

	Pore Size (in)	Particle Size (in)	Corn Silage	Haylage
Tray 1	0.75	>0.75	3% to 8%	10% to 20%
Tray 2	0.31	0.31 to 0.75	45% to 65%	45% to 75%
Tray 3	0.05	0.07 to 0.31	30% to 40%	20% to 30%
Tray 4	solid bottom	<0.07	<5%	<5%

Table 2. PSPS results of chopped sorghum (n=16) taken at harvest

	Average	Median	Minimum	Maximum
Tray 1	28%	27%	3%	59%
Tray 2	51%	52%	17%	70%
Tray 3	20%	21%	7%	29%
Tray 4	2%	2%	0.3%	4%

Take home thought

Desired chop length can vary, depending on several factors, including end user (heifers vs. lactating cows) and presence/absence of other forages in the ration that can provide long particles. When particles are too long, sorting may become an issue; too short and rumen issues may occur. Talk with your nutritionist to determine the desired chop length of your summer forages, and monitor chop length throughout harvest to ensure your end product meets your dairy's needs.

Disbudding with Caustic Paste

Betsy Karle, UC Dairy Advisor - Northern Sacramento Valley

As unpleasant of a task as it is, removing horns from dairy cattle is vital for animal welfare and human safety. Many different methods are available, including the use of caustic paste at an early age. This method is only effective if properly utilized before the horn has attached to the skull. Best practices suggest applying as soon as the horn bud can be felt, within the first week of age.

Proper application of the paste is vital. Disbudding calves with caustic paste is still a painful procedure, but, when extreme care is taken to ensure the procedure is precisely followed, the calf's discomfort is lessened. The following tips will help to minimize pain and maximize effectiveness.

- Younger is better. After calves are a few days old, they figure out how to rub and scratch their heads, potentially removing the paste.
- Clip the hair on and around the horn bud before applying paste.
- Consider applying a ring of udder balm or Vaseline around the horn bud to protect the skin outside of the treatment area.
- Don't use too much paste. Only a small amount applied in a thin, even coating, is needed for a young calf.
- Protect calves from rain for 6-24 hours, until the paste is dry. Rain could cause the paste to run into the calf's eye, potentially causing blindness.
- Keep calf away from other animals until the paste is dry to prevent injury when calves rub on one another.
- Apply paste immediately prior to feeding calves milk. Nursing the bottle may alleviate some of the discomfort associated with the paste activation.
- Only apply paste once.
- Consult your veterinarian about pain management protocols.

Oregon State University published an excellent bilingual reference guide about using caustic paste to disbud calves. It is accessible at: http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20420/pnw626.pdf.

Properly applied caustic paste on a day old calf

Managing Lagoons When There's Water!

Deanne Meyer, Livestock Waste Management Specialist

Water, water everywhere! That was the winter of 2017. Water's been flowing in irrigation ditches and canals since early winter. It's been so long since surface water has been available, it's good to review nutrient management strategies. Many dairy operators will use this abundance of surface water to dilute ponds during the irrigation season. It's important to manage this magnificent opportunity and potentially sample your liquid manure more frequently.

Here's why you may want to sample your liquid manure more frequently than once a quarter if you're using surface water to dilute your pond. Liquid manure nutrient concentration is a function of the amount of manure that is collected and the amount of water than ends up in the liquid system. The liquid manure nutrient content decreases when the same amount of manure is collected and more water enters the lagoon. Use of feedline or holding area soakers, or addition of irrigation water to lagoons usually results in a decrease in liquid manure nutrient content. If you overestimate liquid manure nutrient content, then you end up providing fewer nutrients for your growing crop.

Let's look at an example. You're planning to apply 3 inches of liquid manure per acre (nitrogen concentration is 450 mg/l) over the course of summer. This should apply about 306 lbs of nitrogen (N) per acre to your corn crop. [Note—with expected yields of 225 lbs of N per acre, the 306 lbs of N applied per acre is roughly at the targeted 1.4 N applied to N removed ratio]. That's a reasonable target. If the first inch of liquid manure applied is near the date of sampling, you have confidence that you applied about 100 lbs of N per acre. After adding surface water to your lagoon, the concentration of N will drop. If it drops to 250 mg/l before the remainder of the applications, the other 2 inches of liquid manure will contain less N. Two inches of water applied per acre at 250 mg/l of N provided 113 lbs of N per acre instead of your anticipated 204 lbs of N per acre. This difference ends up shorting your crop of N for growth. Your target value of 306 lbs of N applied per acre is missed when only 213 pounds of total N are applied per acre (the 100 lbs of N in the first inch of liquid manure plus the 113 lbs of N in the remaining two inches of liquid manure applied per acre). Since your expected yields were in the 225 lbs of N per acre range, the diluted manure application results in under application of N for your crop.

Importance of having representative samples of liquid manure to use in determining nutrient applications. Pounds of nitrogen (N) in liquid manure when the pond is diluted between first application and remaining applications of liquid manure. Estimated total N to apply is near 315 lbs of N/acre.

	What I thought I had	**What I ended up with**
First inch of liquid manure applied	102 lbs of N applied/acre	102 lbs of N applied/acre
Next two inches of liquid manure applied	204 lbs of N applied/acre	113 lbs of N applied/acre
Total pounds of Nitrogen applied per acre	306 lbs of N applied/acre	215 lbs of N applied/acre

For a mere cost of another sample of liquid manure, you would be more informed about the nutrient content of your liquid manure and be able to more closely apply N to meet crop needs.

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AREA COOPERATIVE EXTENSION ADVISOR – DAIRY
Serving Fresno and Madera Counties

Submit your application packet by Monday, August 14, 2017 via e-mail to ANRacademicsearch@ucanr.edu with your cover letter, academic application form, curriculum vitae and university transcripts for full consideration.

Visit our online job board at http://ucanr.edu/Jobs/Jobs_990/?jobnum=1218 to access the required academic application form, position announcement and "How to Apply" instructions. This is job posting AP#14-08.

We seek a Cooperative Extension advisor who will conduct a locally-based extension, education and applied research program focused on Dairy Science. The Advisor will schedule events across a spectrum of industry issues as they relate to dairy production systems in Fresno and Madera Counties, and will address production issues and sustainability in an integrated approach that considers economic viability and conservation of natural resources including land use, air, water, and energy. Critical issues include reproduction, herd health and related human health issues.

The advisor will:

- develop and implement effective, applied research and education programs to address identified priority needs, evaluate programs, and report accomplishments, results, and impacts,
- conduct and report regular, comprehensive needs assessments of issues relevant to the local clientele,
- disseminate useful, science-based information to technical, scientific, industry and lay audiences,
- develop collaborative teams with UC ANR colleagues, Specialists in CE, AES faculty, CE Advisors, etc.,
- compliment UC ANR's Strategic Vision, and Cooperative Extension's credibility and visibility.

This position is an academic career-track appointment; a minimum of an earned master's degree is required, though advanced degrees are welcomed, by the appointment start date in disciplines such as dairy or animal science, or a closely related field.

SALARY: Beginning salary will be in the Cooperative Extension Assistant Advisor Rank and commensurate with applicable experience and professional qualifications. For information regarding the Cooperative Extension Advisor salary scale, please refer to: http://ucanr.edu/sites/anrstaff/files/263860.pdf.

This position will be headquartered in Fresno, located in Fresno County and serve Fresno and Madera counties. For more information about these counties, please visit: http://cefresno.ucanr.edu/ and http://cemadera.ucanr.edu/ .

Contact Karen Ellsworth at kaellsworth@ucanr.edu for more details and refer to position listing **AP#14-08**. Please visit http://ucanr.edu and for University of California benefits, visit http://ucnet.universityofcalifornia.edu/ .

The University of California is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age or protected veteran status.

University of California Cooperative Extension

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