

NUTRITION PLUS
NEWSLETTER



CORN SILAGE: MAXIMIZING A DAIRY NUTRITION STAPLE

If anything good came out of the historically high feed prices of the past few years, it's that dairy producers now are placing much greater emphasis on producing excellent forages, according to John Kurtz with Chr. Hansen Animal Health and Nutrition.

"Corn silage is one of the most economical dairy feed sources," says Kurtz. "But varying levels of quality can have a tremendous impact on cow performance and herd profitability. The herds that achieve excellence in their cow health and performance almost universally achieve excellence in their silage production."

While feed and milk prices have moderated, some producers will continue to invest in technologies and equipment that support efficient feed production, processing and delivery. That investment helps them to produce quality corn silage every year.

Besides capital improvements, there are additional measures that producers can take to improve the quality and quantity of their corn silage crop. Limin Kung, Jr., professor of animal science at the University of Delaware, says that, as in most cases of management success, it is a matter of doing many little things well, ultimately resulting in a big difference.

He says harvest maturity is the starting point. Corn silage harvested too early (< 30% dry matter [DM]) often results in an end product with low starch and excessive production of total silage acids (with a large proportion coming from acetic acid produced by "wild bacteria"). Seepage is another danger with immature corn silage, "and that's a problem you definitely don't want to have," says Kung.

Conversely, overly mature plants (>40% DM) will produce a low - acid crop with poor packing density; greater oxygen entrapment; and poor aerobic stability that could result in more shrink. Both immature and over - mature silage can result in decreased palatability and intake. Kung's recommendation for an ideal harvest maturity: 35 ± 2% DM.

"Milk - line stage alone is not an accurate indication of when to start harvesting," advises Kung. "A whole - plant dry - matter test is the only way to precisely pinpoint maturity." He adds that the ideal maturity window can be extremely narrow, as whole - plant moisture can drop up to 2% on just one hot, dry, breezy day.

New methods of processing silage have emerged in the past few years. Kurtz says a greater degree of kernel processing, without sacrificing stover particle size and effective fiber, is the key to maximizing the nutritive value of corn silage. On traditional harvesters, he prefers a chop length of 24 to 26 mm with a roll clearance of 1 to 1.6 mm.

Visual appraisal alone will not accurately portray the degree of processing in batches of corn silage, which is why Kurtz emphasizes the importance of regularly performing laboratory analysis of corn silage processing score (CSPS) and fecal starch as a percentage of dry matter in manure.

"Monitoring CSPS during processing is important to ensure we are putting away a well - processed crop," says Kurtz. "But ongoing CSPS evaluation also is necessary, because CSPS in well - preserved silage typically will continue to increase through the ensiling process." He says silage going

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SOYPLUS, SOYCHLOR GET NEW LOOK

Company introduces "Dairy Nutrition Plus[™]," a family of quality products.

West Central[®] Cooperative recently unveiled new branding for its dairy nutrition feed ingredients and health aids, SoyPlus[®], SoyChlor[®] and PasturChlor[®].

Dairy Nutrition Plus, a family of quality products by West Central, positions the company for growth by bringing together the company's dairy nutrition offerings under a parent brand while re - energizing well - known products.

"As a manufacturer, West Central has a long - standing commitment for providing quality and consistency and that is not going to change," explained executive vice president of animal nutrition, Mark Cullen. "The Dairy Nutrition Plus family of quality products showcases the ways in which West Central offers more to feed mills, nutritionists and dairy producers.

"We are continuously innovating to add value in a way that not only provides proven results, but provides supply chain reliability, access to the knowledge of industry experts, and tools that improve efficiency for our customers in what they do every day," Cullen added.

Cullen noted that each product's attributes are clearly defined in each product's new tagline.

While the product logos and taglines have changed, their formulations and rigorous testing methods remain the same.

In addition, the company's newly launched website DairyNutritionPlus.com delivers in - depth product information, a comprehensive database of scientific research and trials which utilize the products, an archive of the company's popular "Nutrition Plus" newsletter and contact information for West Central's Dairy Nutrition Plus product sales managers.

DAIRY
 NUTRITION
 PLUS[™]

SOYPLUS[®]
 beyond bypass.

SOYCHLOR[®]
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 calcium light. DCAD right.

MAXIMIZING A DAIRY NUTRITION STAPLE

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into the bunker at a CSPS of 70 — already an excellent score — can be expected to feed out several months later at a CSPS of 80 or higher. The payoff is more digestible silage that can be fed at lower rates.

Low fecal starch scores correlate with high total tract starch digestibility (TTSD). A score of 5% or lower is considered desirable; 2 to 3% is an even better goal.

To avoid dry-matter loss, forage needs to ferment quickly and remain stable during storage and feed out. Rapid production of lactic acid and a fast drop in pH during ensiling are good signs of a quick fermentation. Inoculating silage with additional lactic acid-producing bacteria can help accelerate the process. In addition, inoculants specifically containing *Lactobacillus buchneri* can promote stability because they produce moderate amounts of acetic acid that inhibit spoilage yeasts in silage, says Kung.

Kung notes that the temperature of the water used to mix and distribute inoculant solutions is critical. Water exceeding 100°F can kill a large percentage of the live bacteria in an inoculant, resulting in significantly low numbers of effective bacteria actually being distributed in the silage. Kung's research group has measured inoculant mixtures in tanks with temperatures exceeding 130 F! In most cases high water temperatures in inoculant tanks are due to poor placement of the tanks (e.g. too close to an exhaust or engine).

Avoiding silage spoilage is, of course, an important goal once the crop is put away. Excellent packing, tightly covering bunkers and excellent face management all are necessary to limit spoilage. But when spoilage does occur, Kung's advice is: "Pitch it. It's potentially not even a good feedstuff for steers."

What's next on the silage front? Kurtz believes technology will continue to drive the quality and value of corn silage. Specifically, he would like to see agronomic advancements that could lower the content of ash — an inert, unusable compound — in corn plants. He believes activity monitoring that provides frequent, individual — animal data on feed consumption, along with a host of other variables, also will become more widely adopted. Kung says additional research on the hundreds of volatile compounds in silage, such as ethyl lactate, could identify factors that affect silage intake and animal performance.

"We've come to a point at which we can't get any more feed into these animals," says Kurtz. "Our goals now must be centered on doing some of the digestive work for them, so that every bite they take maximizes their performance potential."

HAPPENINGS: SOYPLUS MANUFACTURER ANNOUNCES \$27 MILLION PLANT EXPANSION

West Central Plans Expansion to Increase Availability of High Bypass Protein Soybean Meal

West Central®, the manufacturer of SoyPlus®, an industry-leading high bypass protein dairy feed, recently announced its plan for a major expansion which would increase production capacity by 50 percent.

The \$27 million investment in Ralston, Iowa is slated to include an additional line of mechanical presses, soybean storage, soybean oil storage, finished product storage, and load-out access. The company plans for production to come online in phases with new production volumes available as early as fall 2016.

"Nutritionists and dairy producers worldwide trust SoyPlus for its proven quality and consistency," explained Mark Cullen, executive vice president of animal nutrition at West Central. "Expanding the process at our current manufacturing site allows us to continue our more than 30 year tradition of going beyond bypass with customer service and supply chain reliability."

Due to strong domestic and international demand, the company's current Ralston, Iowa facility has been producing at maximum capacity for more than a year.

SoyPlus, a member of West Central's Dairy Nutrition Plus™ family of quality products, provides a uniform 60 percent RUP and 93 percent digestibility. The company plans to expand its current ISO and hazard analysis critical control point (HACCP) certifications upon construction completion and will continue to transport finished product by truck and rail.

As a farmer-owned cooperative, West Central originates soybeans from more than a dozen counties in western Iowa. At full capacity, the SoyPlus expansion would create demand for an additional six million bushels of soybeans each year and create 11 full-time jobs.

FROM THE MATERNITY PEN

The Role of Choline in Transition Rations

Fatty liver syndrome is a common and troublesome condition, occurring in 50 to 60% of all transition cows.

Ric Grummer, Ruminant Technical Director for Balchem Animal Nutrition and Health, says fatty liver is a classic symptom of choline deficiency. "At calving, there are hormonal changes that trigger an intense period of lipid mobilization from adipose tissue," says Grummer.

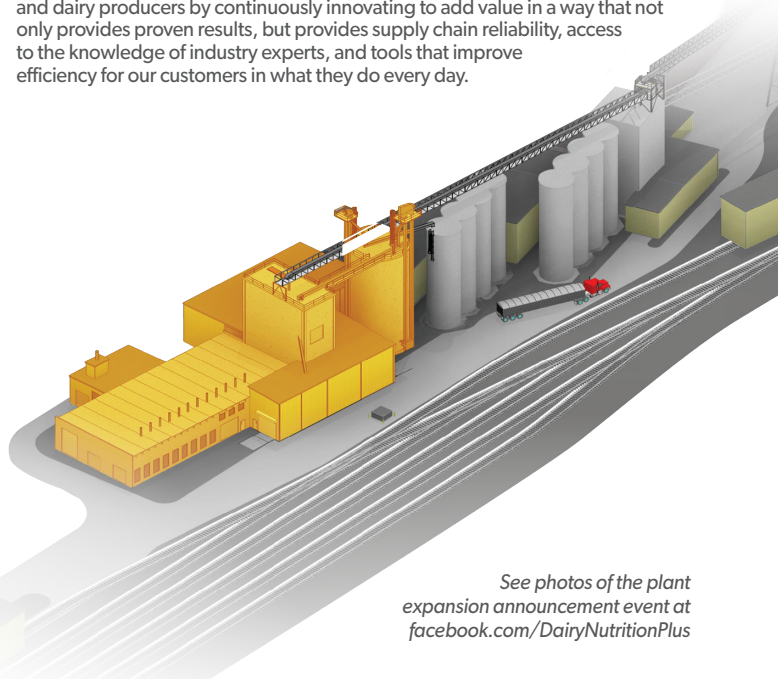
"As a result, blood nonesterified fatty acid (NEFA) concentrations typically increase 5- to 10-fold." He adds that blood flow to the liver doubles as cows transition from the dry period to lactation.

NEFA remain elevated, although to a lesser extent, during early lactation until cows enter a state of positive energy balance. Grummer notes that not all of the fatty acids taken up by the liver will be stored and contribute to fatty liver. But, he says, research has proven that ruminants have a low capacity to process the fatty acids that are stored by the liver. "Ideally, those fatty acids would be completely oxidized to provide energy to the liver, or become re-esterified and exported as triglyceride from the liver as part of a very low density lipoprotein (VLDL)," says Grummer.

The limiting factor in the conversion to VLDL triglyceride and its export from the liver appears to be choline. Grummer says that in many species, including cattle, the rate of VLDL export is highly related to the rate of hepatic synthesis of phosphatidylcholine (PC).

Grummer acknowledges that the exact availability of choline from rumen-protected sources is not fully understood. At the same time, he says there is "overwhelming evidence" that feeding transition dairy cows 15 grams of choline per day, in a rumen-protected form, will alleviate the classic choline-deficiency symptom of fatty liver, and help to improve fresh-cow health and performance.

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See photos of the plant expansion announcement event at facebook.com/DairyNutritionPlus

CONSULTANTS CORNER

Getting More Mileage From Silage



BY JOHN KURTZ
BUSINESS MANAGER, CATTLE
CHR. HANSEN ANIMAL HEALTH
AND NUTRITION
MILWAUKEE, WIS.

When a crop of corn silage is put away, it is effectively charting the herd's success in the near-term future. We have one chance to get it right for the next 12 to 14 months.

A lot of our emphasis in silage production is focused on agronomic details and harvesting. But it is common for at least 20% — and up to 40% — of the corn crop grown in the field to be lost before it reaches the digestive tract of the cow. So protecting both the quality and quantity of that crop are important factors with which we can help producers succeed. Some suggestions include:

1 Pay attention to the growing season. Every growing season is different. As the summer progresses, keep a handle on moisture, growing degree units and other factors that will help you advise producers on how to best manage that particular crop.

2 Process and evaluate. Corn silage processing scores (CSPS) and fecal starch evaluations should be a routine part of your consultation with every dairy. You also should use on-farm methods of evaluating kernel processing to measure real-time results during harvest. In addition to the "dishpan" method, I predict it won't be long before we have cell-phone "apps" to perform these evaluations.

3 Pack, pack, pack. Harvesting silage generally is a fast and furious process, but it should not happen at the expense of adequate packing. Packing layers should not exceed 6 inches. Dividing total tractor weight by 800 will determine the number of wet tons that can be packed per hour. If packing is falling behind, consider adding weights to the tractor; adding another tractor; or slowing down the chopper to avoid inadequate packing.

4 Seal the deal. Seal bunkers tightly and weight heavily. Two layers of covering are better than one. I have seen excellent results with one layer of oxygen barrier film, covered by another layer of 8-mil white plastic. (White is better than black because it attracts less heat). Adequate weight over the plastic can be the difference between 1/2 inch of spoilage on the top layer and 12 inches. When using tires as weights, make sure all tires are touching.

5 Focus on facing. Facers actually can help to increase CSPS because they provide additional kernel processing as they work — particularly those that grind the face. Recent research has shown that facers that rake versus grind can upset aerobic stability in the bunker by exposing more surface area to oxygen.

6 Feed carefully. An amazing amount of silage can be lost simply by being left on the ground or blowing away on a windy day. Advise producers to mix feed indoors or behind the bunker, if possible. Third-party TMR audits also can be extremely helpful in assessing mixing procedures.

7 Ask for the data. When it comes to choosing inoculants, sound data is imperative. Hearsay is not reliable information. There are reputable companies that have made significant investments in research. Accurate decisions depend on accurate information.

8 Keep learning. Technology in the dairy industry is advancing at record speed. We all have busy lives, but make the time to attend trade shows and meetings to learn about new innovations to help your clients. It's critical to their future success, and that of your own career.



BEYOND BYPASS

Oxygen Barrier Film Reduces Surface Spoilage

Covering bunker silos and drive-over piles with plastic and tires or tire sidewalls has become fairly commonplace on dairies. But not all plastics provide the same degree of protection from aerobic activity and spoilage.

Keith Bolsen, silage expert and professor emeritus at Kansas State University, says the advent of oxygen barrier film ("OB film") has vastly improved the benefits of covering silage.

Keith and his wife, Ruthie, conducted a field study comparing a two-layer OB film system with standard 5-mil plastic using two silage crops — (1) whole-plant corn silage and (2) high moisture (HM) corn. (Note: A layer of standard 5-mil plastic is used to protect the OB film from damaging ultraviolet light). Table 1 shows that organic matter (OM) losses in the top 1.5 feet were dramatically lower for both crops when they were covered with OB film. In addition, the Bolsens found no visible discoloration or surface spoilage in the OB-film-covered crops.

They found mold and aerobic spoilage under the standard plastic, especially in the top 3 to 6 inches. Fermentation profiles in the top 1.5 feet of silage also were improved significantly when the crops were covered with OB film.

Covering with an OB film can reduce the total OM loss by 2 to 5 percentage points alone, depending on the size of the bunker silo or drive-over pile. If producers also consider the financial impact of feeding surface-spoiled corn silage or HM corn to lactating dairy cows and replacement heifers, there are even bigger savings to be gained by covering with an OB film.

Think safety first! Ruthie Bolsen advises that it's simply too dangerous to "pitch" surface-spoiled silage off the top of most bunkers and piles today. But when used properly, OB film can eliminate the need to remove spoiled silage.

The Bolsens remind producers to look for the oxygen transmission rate (OTR) when choosing silage plastic. Traditional, 5-mil, white-on-black silage plastic has an OTR of about 1,800, while the OB film in the K-State study has an OTR of about 30. "The lower the OTR, the better," says Keith.

Table 1. Effects of 5 mil standard plastic and OB film on pH, fermentation profiles, estimated spoilage loss of OM, and ash content in corn silage and HM corn at 0 to 18 inches from the surface after 240 days.

Item	Corn silage		HM corn	
	5 mil plastic	OB film	5 mil plastic	OB film
DM content, %	29.2	31.6	72.3	73.2
pH	4.2	3.78	4.70	4.09
Estimated OM loss, % ^{1,2}	34.8	17.8	12.1	6.7
	———— % of the silage DM ————			
Lactic acid	2.7	6.8	0.86	1.08
Acetic acid	2.6	2.2	0.25	0.31
Ash	11.2	9.1	2.10	1.98

¹Values are estimated loss of OM, calculated from ash content using equations from Dickerson et al. (1992). ²Ash content of pre-ensiled samples was 7.6% for the corn silage and 1.8% for HM corn.