

# Can Dairy Corn Silages be Compared?

The Professional Dairy Managers of Pennsylvania (PDMP) and Penn State partner in a corn silage hybrid testing program. Results for NDF and starch digestibility yield discussion about the impact of corn silage in rations for dairy cattle.



In an ideal dairy corn silage world, we would be able to see and measure the corn silage varieties, compare their forage digestibility related to how they might work in our dairy rations, and then purchase those varieties for next year's planting. Just like on a team event, where we all work together on the same issue, if the dairy farm corn silage testing was using the same analysis testing as the corn silage trials, this would be great.

The Professional Dairy Managers of Pennsylvania (PDMP)/Penn State corn silage trials have partnered with other Northeast corn silage trials and they have agreed to test corn silage digestibility the same across the Northeast. The parameter uNDF240om was added to all sample tests by the following partners in 2017: PDMP/

Penn State, Cornell, University of Vermont, and Western NY Crop Management Association (WNYCMA). The trial data was tested at Cumberland Valley Forage Labs for uNDF240om as a group.

See the PDMP/Penn State corn silage results at "[2019 Results: PA Commercial Grain and Silage Hybrid Corn Tests Report](#)."

Dairy producers could also have their own corn silage tested for uNDF240om and then compare silage results against other varieties.

Let's take a look at how many samples had been tested for uNDF240 from the 2019 harvest season across NY and PA. Looking at the Dairy One forage testing lab for NY and PA corn silage samples, in NY from September 2019 to December 2019, 526 corn silage samples with 194 being tested on the basic program of NDFD 30 and 151 being tested on the Forage PRO program of uNDF240om. Only 1/3 of corn silage tests run at Dairy One tested for uNDF240.

In PA, 84 corn silage samples with 30 being tested on the basic program of NDFD 30 and 47 being tested on the Forage PRO program of uNDF240om.

Dairy farms that submit samples to Cumberland Valley Forage labs, could also add uNDF240 to their list and then have the opportunity to compare their home corn silage results with the University trials data.

By spending an extra few dollars to test for uNDF240, on-farm data can be compared with other samples taken in the Northeast that best matches your farm. By having many sample locations available to compare on farm samples with, the strength in the results will greatly increase. This might be the most important change this winter to do more testing with all the planting, growing and harvest challenges that we have had across our corn silage season.

### **Labs:**

- [Dairy One Forage Lab](#)
- [Cumberland Valley Forage Lab](#)

### **Webinars**

On Nov. 12 Penn State Extension hosted a Webinar on the PDMP/Penn State corn silage variety trials. The goal was to highlight the variety plots, across Pennsylvania for yield and quality. Dairy producers, employees and agribusiness professionals are invited to join Penn State Extension for the Technology Tuesday webinar. This recorded webinar features Jessica Williamson, Penn State Extension forage specialist, and Chris Canale, technology manager with Cargill Animal Nutrition, who discuss the results of the Professional Dairy Managers of Pennsylvania's 2019 Corn Silage Trials.

To learn more on this great opportunity, I encourage you to log into the recorded [Corn Silage webinar](#) from November 12, 2019.

All webinars in this series are free and are recorded for viewing later. To learn more or to view webinars, go to the [Technology Tuesdays](#) link.

## New for 2019

### Penn State Corn Silage Trial Digestibility Box

In 2018 we added ash, fat (Total Fatty Acids), NDFD30, NDFD120, NDFD240, and in vitro starch digestibility (IVSD) at four locations to data spreadsheets.

For 2019 we will add an index called organic matter digestibility (OMD). The OMD calculation will use wet chemistry to determine NDFD12, NDFD30, and 4h starch digestibility.

The OMD Index: We know that digestibility of nutrients in corn silage is paramount when determining value. NDF and starch are responsible for much of the energy in corn silage. In order to advance and update MILK 2006, we developed a new quality index based on organic matter digestibility of protein, fat, NDF, and starch called the OMD Index.

For over 15 years the Professional Dairy Managers of Pennsylvania (PDMP) and Penn State have partnered in a corn silage hybrid testing program. Results around NDF and starch digestibility yielded much needed discussion about the impact of corn silage in rations for dairy cattle.

We will continue to look at the relationship between NIR and wet chemistry for the prediction of NDFD12 and NDFD30 in fresh corn silage. We already know that wet chemistry is the methodology to use for starch digestibility. For the OMD Index, we will use wet chemistry data for NDFD12 and NDFD30. These two time points are used when calculating the OMD Index.

The OMD Index — using data derived from wet chemistry analyses — will provide a useful metric to rank hybrids; furthermore, the OMD Index provides nutritionists with an estimate of rumen fermentability — or fuel — overall.

### **uNDF240 still relevant ...**

Our corn hybrid evaluation reports a quality parameter called uNDF240. We developed a few questions below to share some of the potential of this new measurement.

#### **What is uNDF240?**

uNDF stands for undigested neutral detergent fiber (uNDF). NDF, commonly referred to as “cell wall,” is comprised of cellulose, hemicellulose, and lignin. The number “240” refers to the amount of NDF remaining undigested after 10 days (240 hours) in the rumen. The most common technique to determine uNDF is by *in situ* or *in vitro* incubation; once enough data is obtained, either technique can be used to create a calibration, or prediction, using NIR. Excessive uNDF is a problem because it’s NDF that can’t be fermented to end products -- VFA -- that are used to make milk and milk

components. And, once ingested by the cow, uNDF may take up space, creating too much rumen fill.

### **What impacts uNDF?**

uNDF is determined by environment and genetics. In other words, growing conditions play a large role in the formation of the undigested fraction (uNDF). For example, 2018 corn silage had roughly 10%-units more uNDF than 2017 silage. The cool, wet conditions during early growth stages likely contributed to higher uNDF in 2018 corn silage plants. Genetics is a factor as well. BMR hybrids tend to have significantly lower uNDF than conventional hybrids. Forage uNDF240 values are determined by genetics and environment. Tile drainage should improve (lower) uNDF240 content of forages. Flood irrigation may increase uNDF240 content.

### **Why is uNDF relevant?**

A growing body of literature and field experience tells us that uNDF can affect cow performance. Either intake, milk yield, and/or milk components might be affected.

One key element to uNDF is the digestibility of the NDF that is available for digestion. In other words, what is the digestibility of the NDF at time points leading up to uNDF? This year we will report digestibility of NDF at 12, 30, 120, and 240h. These time points can be used to determine the *kinetics, or rate*, of NDF digestion. Rate of digestion is used to predict OMD.

### **Bottom Line**

OMD and uNDF are not new measures. For years, researchers and nutritionists have used digestibility estimates to design experiments and formulate rations for dairy cattle. Today, though, integrating these data is a useful practice to gauge silage value and match hybrid to farm. In the end, we hope OMD and uNDF serve to fine-tune rations for dairy cows and optimize silage hybrids for producers.