

# Agri *Resource*

## **MILK 2006**

### The 48hr, 30 hr, or 24hr in vitro NDF digestibility debate

A current debate among laboratories and research institutions is whether a 48 hr, 30hr, or 24 hr incubation period for vitro NDF digestibility analysis is best.

Some laboratories have begun to reduce incubation times from 48 hr, to 30 or 24 hr. These laboratories argue that reducing the incubation time of the in vitro assay to 30 or 24 hr is logical because feed is not retained in the rumen of a high producing dairy cow for 48 hours. Proponents for lowering the incubation time also claim that a shorter incubation time better describes the digestion potential of NDF in high producing, lactating dairy cows. For improved laboratory operation efficiency and turn-around time, a 24-hr incubation time is employed by some laboratories.

Proponents of a 48-hr incubation time argue that this time point is less influenced by lag time and rate of digestion, and thus is more repeatable in the laboratory. There is concern that samples analyzed at earlier time points (24-hr, 30-hr), may lack precision unless sufficiently replicated in the laboratory. Currently, 16 hr or 24 hr NDF digestibility measurements have a much higher laboratory error rate. This is the primary reason our laboratory utilizes a 48-hr incubation time, over the much lower 16-hr or 24-hr.

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When the MILK 2000 equation was developed to calculate the MILK per ton quality index of corn silage, it utilized energy values derived from summative equations provided by the National Research Council (NRC 1989). The most up-to-date recommendations from the NRC are from 2001, in which they recommend a 48-h in vitro NDFd test. For that reason, a 48-hr in vitro NDFd measurement was required when using the MILK 2000 equation.

Because of the above arguments for and against the 48-hr time point, the MILK 2006 equation was created to allow for user-defined flexibility for entry at 48-, 30-, or 24-hr in vitro NDFd incubation time point measurements. Outside of a higher risk for laboratory error with a lower time point, it does not matter whether you use a 30 hr or 48 hr time point. There is a strong positive relationship between these two time points ( $r\text{-square} = 0.84$ ).

### **Determining MILK per ton (lbs/ton)**

An adjustment calculation is used to make the data comparable to the 2001 NRC values (determined at a 48-hr time point). The average lignin-calculated corn silage NDF digestibility in the NRC (2001) is 59%. This reference point is important for adjustment of in vitro NDFd values from different laboratories at varying incubation time points, so that the resulting calculations are comparable to NRC (2001) values. Once the data has been adjusted, NRC summative equations are used to determine MILK per ton (lbs/ton). The 48-hr IV NDFd incubation time point continues to serve as the default in the MILK per ton spreadsheet.

As we work to understand the latest research, there are a couple of other reasons our laboratory uses the 48-hr incubation time. The 2009 Wisconsin Corn Silage Hybrid Performance Trials continued to use the National Research Council (NRC, 2001) energy requirements to convert the intake of energy from corn silage into expected MILK per ton (lbs/ton). There has also been research by the University of Wisconsin that has shown no benefits using the earlier incubation time points over the 48-hr time point for corn silage hybrid selection. Also at this time, NIRS calibrations have been developed for corn silage samples at the 48-hr time point. Many of our seed companies opt to utilize NIRS analysis; the turn-around time is much quicker, the cost is more affordable, and the calibrations utilized are robust.

Reference:

Shaver, Randy. Using NDF Digestibility Information In Dairy Cattle Feeding Programs. University of Wisconsin. <http://www.uwex.edu/ces/dairynutrition/documents/vatech206ndfdfinal.pdf>