



Dairy One

Forage Laboratory

October 2016 Newsletter

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<http://dairyone.com/blog/>

Total Fatty Acids vs. Crude Fat in Feed Analysis

By Sally Flis, Ph.D. - Feed and Crop Support Specialist

Fats in rations are an important component of any ration. They serve as an energy source for maintenance, milk production, body weight gain and performance.

Fats can be defined as compounds that have a high content of long-chain fatty acids (FA) including triglycerides, phospholipids, non-esterified FA, and salts of long-chain FA. Long-chain FA are the richest in energy compared to other fatty acids.

Historically, fat content in feeds has been determined by ether extraction. In addition to fat, ether may also solubilize plant pigments, esters, and aldehydes. For this reason, the result is called "crude fat" and is reported as Fat, % on analysis reports.

Recently, there has been more interest in total fatty acid (TFA) analysis. The TFA procedure is specific for fat and eliminates potential contamination from the aforementioned compounds. As such, TFA is a more accurate measure of the true fat content of the feed.

Earlier this year, the Dairy One Forage Lab began offering TFA analysis by wet chemistry. The TFA analysis includes 14 long-chain FA plus saturated, MUFA, PUFA, and RUFAL. This month, TFA and RUFAL will be added to the **(321) Forage NIR Prime** package and TFA, C18:1, C18:2, C18:3 and RUFAL to the **(327) NIR Pro package**.

Breaking it down

What do all of these abbreviations stand for and what do they mean nutritionally?

RUFAL - Rumen Unsaturated Fatty Acid Load - This represents the sum of C18:1 oleic, C18:2 linoleic, and C18:3 linolenic fatty acids. These unsaturated FAs have been shown when present in high levels to negatively impact rumen function including decreases in intake, fiber digestion, and potentially milk fat concentration.

Saturated Fatty Acids - These are FAs that have no carbon double bonds, or those that are listed on reports as number:0, like C18:0.

MUFA - Monounsaturated Fatty Acids - These are FAs that have one carbon double bond, or those that are listed on a report as number:1, like C18:1.

PUFA - Polyunsaturated Fatty Acids - These are FAs that have more than one carbon double bond, or those that are listed on a report as number:2 or larger, like C18:2 and C18:3.

Putting it to work

We are interested in looking at measures of FAs versus Crude Fat so we can better monitor energy intakes and the potential for impacting rumen health. While there is not an established cut point, the current recommendation is to not exceed 3.5% of the total ration dry matter as RUFAL.

Forages make up a large percentage of most lactating dairy rations. In the Forage Lab we have seen corn silage to have the highest RUFAL concentration (Table 1). The greatest difference between Crude fat and TFA was seen in haylages, 1.97 % (Table 1). Check with your ration software provider to determine if you should be using Crude Fat or TFA for building diets.

Table 1. Forage Fat, TFA, and RUFAL concentrations for forages tested in the Dairy One Forage Lab

Forage Type	Crude Fat, % DM	TFA, % DM	RUFAL, % DM	n
Corn Silage	3.26 ± 0.47	2.21 ± 0.40	1.57 ± 0.35	200
Haylage	3.96 ± 0.91	1.99 ± 0.79	1.09 ± 0.59	200
Dry Hay	2.26 ± 0.63	1.02 ± 0.49	0.42 ± 0.29	196

Question: Do I need to look for a separate calibration for BMR silages depending on the hybrid?

The Dairy One Forage Lab has not seen a need for multiple calibrations depending on the type of BMR gene. The Forage Lab uses the "LOCAL" method in our NIR calibrations. Utilizing LOCAL, the NIR takes the spectra (consider this the fingerprint of the sample) of the current sample and compares it to all of the spectra in the calibration database. It then selects the 120 samples that are spectrally similar to the sample and creates a calibration specifically for that sample based on its closest relatives. The calibration database includes conventional, BMR1, and BMR3 corn silages. Thus, the analysis of each sample is likely only using the corn silage type most related to the sample. Additionally, we update our calibrations with new samples about every 6 to 9 months to increase the robustness of the overall calibration.

Looking at some BMR1 vs. BMR3 samples we analyzed this fall, the BMR3 averaged 70.3% for aNDFdom30 and 67% aNDFdom30 for BMR1 and 63.2% aNDFdom30 for conventional hybrids. All done by NIR using the LOCAL calibration method. These are all from NY and exposed to different levels of drought stress, which will also influence the differences in digestibility over season.

Meet The Bullz-Eye-Boyz



It'd be easy for us to caption this picture as follows:

Forage analysis - taking aim at better nutrition

Forage analysis - the weapon of choice against poor nutrition

Target profit with forage analysis

But we won't do that. Instead, meet the Bullz-Eye-Boyz, the bow enthusiasts of the Dairy One Forage Lab: Paul Sirois, Lab Manager (natural righty, shoots lefty - go figure); James Larow, Sample Prep Tech; Jason Knapp, Protein Tech; Randy Russell, Sr. Protein Tech.

Upcoming Events

October 4th - 8th, 2016

50th Anniversary of World Dairy Expo; Madison, WI

<http://worlddairyexpo.com/>

October 18th - 20th, 2016

Cornell Nutrition Conference - Syracuse, NY

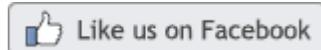
<https://ansci.cals.cornell.edu/news-events/cornell-nutrition-conference>

October 25th - 26th, 2016

Keystone Crops and Soils Conference - Grantville, PA

October 26, 2016

Keystone Mills - Dairy Producer Meeting - Fayette, NY



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