Virginia Cooperative Extension
Virginia Tech • Virginia State University

DAIRY PIPELINE

Volume 37, No. 1 January/February 2016

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"Matching nutrient requirements with nutrient supply is essential for maximizing feed efficiency in dairy farming systems."

Are You Delivering a Homogeneous Ration to You Cows?

—Claire Gleason, APSC student, & Gonzalo Ferreira, Extension Dairy Scientist, gonf@vt.edu

Matching nutrient requirements with nutrient supply is essential for maximizing feed efficiency in dairy farming systems. To accomplish this, feeding a consistent and homogeneous ration is critical. In Summer 2015, the variation of the composition of total mixed rations (TMR) was monitored on 7 dairy farms in Franklin County, Virginia.

The assessment consisted of a qualitative description of the mixing and feeding systems, and measuring the nutritional composition of the TMR immediately after delivery. For this, 5 samples were collected and stored independently until analysis. All samples were analyzed using wet chemistry procedures for dry matter (DM), ash, crude protein (CP), and neutral detergent fiber (NDF) concentrations. In addition to chemical composition, the physical characteristics of the TMR were evaluated using the Penn State separator box.

Mixing and feeding systems varied. Mixing systems included reel (5 farms), chain belt (1 farm), and vertical (1 farm) mixers. All mixers had mounted scales, but only 2 of the 7 farms calibrated them periodically (once and twice per year). Mixer overload did not occur in any of the 7 farms. In 6 of the 7 farms, mixing occurred while loading feed ingredients. Mixing time per batch ranged from as little as 6 minutes to as much as 37 minutes. Mixed feed was delivered to feed bunks through conveyors in 5 of the 7 farms, whereas in the other 2 farms feed was delivered to feed bunks directly from the mixer.

In general terms, as reflected by the low coefficients of variation (<7%, Table 1), little variation in DM, ash, CP, and NDF was observed throughout the feed bunks. Adequate mixing and feeding management in most, if not all farms, can explain this little variation.

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Table 1. Variation of the nutritional composition and particle size of the total mixed rations

	Farm						
	F1	F2	F3	F4	F5	F6	F7
Dry Matter, %							
Average	50.4	54.8	42.9	44.8	52.0	44.1	38.0
Coefficient of Variation	1.4	3.4	1.3	2.1	1.2	1.2	2.4
Ash, %							
Average	7.1	7.6	6.8	8.3	7.6	8.6	7.9
Coefficient of Variation	5.4	2.5	2.3	1.6	3.2	2.0	9.6
Crude Protein, %							
Average	16.9	17.2	18.9	17.3	16.5	16.9	16.4
Coefficient of Variation	2.8	7.0	3.5	2.9	4.3	1.5	6.5
Neutral Detergent Fiber, %							
Average	31.1	35.8	30.6	34.8	34.4	36.2	33.0
Coefficient of Variation	5.4	6.7	2.9	5.6	6.4	3.0	6.2
Top Screen (>0.75"), %							
Average	8.67	6.32	1.17	3.31	2.80	9.31	2.02
Coefficient of Variation	21.5	20.2	18.9	51.2	18.5	10.7	30.8
Mid Screen (0.31-0.75"), %							
Average	42.2	33.0	36.5	45.4	52.0	24.2	45.3
Coefficient of Variation	6.7	5.7	4.2	4.2	5.2	6.2	10.0
Bottom Pan (<0.31"), %							
Average	49.1	60.6	62.4	51.3	45.2	66.5	52.7
Coefficient of Variation	4.3	4.6	2.5	6.6	6.3	3.1	9.3

Upcoming Events

See VTDairy for details.

January 2016
Holistic Management & Risk Assessment Workshops for Dairy Farmers in the Southern Region (Workshops 1 & 2)

Workshop 2
Jan. 20, 2016—Amelia Co.
Jan. 22, 2016—Franklin Co.
Jan. 27, 2016—Rockingham
Jan. 29, 2016—Smyth Co.

January 11, 2016
Calf meeting,
Rockingham Co.

February 17-19, 2016
VSFA Convention and VT Dairy Science "Cow College"— Roanoke, VA

February 20-21, 2016
Atlantic Coast Calf College, Blacksburg, VA

March 8-11, 2016
Area Dairy Conferences

If you are a person with a disability and require any auxiliary aids, services or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

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However, for most of the farms, a small proportion (average = 4.8%) of large particles was retained in the upper screen of the Penn State separator box. Having too large proportions of small particles could explain the homogeneous composition of the TMR throughout the feed bunk.

In conclusion, little variation on TMR composition was observed on 7 dairy farms in Franklin County. Even though this indicates adequate feeding and mixing management, managers might need to work on increasing particle size of their forages, while maintaining a homogeneous composition of the TMR.

Watch Out For Bad Fat When Battling Milk Fat

—Kevin Spurlin, ANR Extension Agent, Grayson County VCE, spurlink@vt.edu

Milk fat depression is one of the more complex nutrition-related issues dairymen and their nutritionists face. Dr. Tom Jenkins of Clemson University is one of the foremost experts on this subject. He suggests that five main nutritional factors impact fat test results including: dietary fat amount and source; dietary starch level; amount of fiber, particularly from forages; yeast and mold contamination; and diet management.

This subject is too extensive to cover all the dietary and management interactions related to milk fat depression, so the focus here is on research related to "bad fat". Zhang et al. (2008) shows that rumen microflora and the products of rumen fermentation were altered due to the addition of unsaturated fatty acids into the rumen. However, not all dietary fat impacts the rumen in the same way.

Researchers have characterized fats fed to cows which are most likely to contribute to milk fat depression as "high risk", or those which contribute to a high rumen unsaturated fatty acid load (RUFAL). Those include oleic (18:1), linoleic (18:2), and linolenic acids (18:3). The presence of these three in the diet at elevated levels may predispose cows to low milk fat if other conditions also exist.

Rumen microbes don't like unsaturated fats found in many plant oils. The microbes try to saturate them, and that process—called biohydrogenation—is influenced by other dietary characteristics. Low rumen pH, high starch, and low forage content can exacerbate a high RUFAL and cause milk fat depression. Conversely, a diet with a high RUFAL will not automatically result in low milk fat, especially if some precautions are taken. Those precautions include maintaining at least 0.85% body weight as forage NDF and 1.1—1.2% BW as total NDF, keeping dietary starch levels under 30%, adding buffers up to 0.8% of total diet dry matter, and keeping yeast and mold counts under 1 million cfu/gram. Manage particle size so that not over 47% diet is in the bottom of Penn State Shaker Box, and 49% or more is in the middle pan.

One important point to consider is the total unsaturated fatty acid content of the diet. It is easy to discount "bad fat" of base ingredients such as forages, protein and starch sources, but they all contribute to the RUFAL. Dr. Jenkins illustrates this point in that a corn silage-based diet can be either low risk or high risk simply because of the fatty acid content of the silage, since it is the largest component of the diet. Forages are not often tested for fatty acid content, and book values may not represent true conditions for a particular sample. It may not pay to routinely test forages for fatty acid profile, but this test may be considered if the fat test dilemma on a farm cannot be explained by other means.

A herd that is experiencing milk fat depression should work with a nutritionist to evaluate indicators of rumen health such as observing rumination behavior and manure consistency. That should be done along with a review of feeding management to ensure the delivery of the diet matches what has been formulated. If the answer to low milk fat is not found in those areas, it may be connected to RUFAL, or too much bad fat.

For more information on Dairy Extension or to learn about current programs, visit us at VTDairy —Home of the Dairy Extension Program at: www.vtdairy.dasc.vt.edu.

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2016 Extension is a joint program of Virginia Tech, Virginia State University, the U.S. Department of Agriculture, and state and local governments. DASC-73NP