Evaluating organic feed quality for dairies

Final Report for FNE05-557

Project Type: Farmer
Funds awarded in 2005: $10,000.00
Projected End Date: 12/31/2007
Region: Northeast
State: Maine
Project Leader:

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Maine Organic Milk Producers

Project Information

Summary:

Goals

The Maine Organic Milk Producers (MOMP) received this grant to examine the quality of organic grains available to farms in the Northeast, including the variation, mineral content, energy levels, usable protein, and toxin levels in the grains. These characteristics will be compared between different grain companies as well as for grains produced on-farm.

Profile

MOMP is a coalition of all organic dairy farmers in the state of Maine formed to provide a means of communication, education and networking to promote profitability and create a vibrant organic milk industry as well as garner support from governmental agencies and the University. There were 65 members when the project began. There are now nearly 75 members, with Maine currently at an outstanding 22% organic to conventional dairy ratio.

Participants

To complete this project, MOMP has worked in strong partnership with Rick Kersbergen of the Cooperative Extension. Chris Reberg-Horton of Cooperative Extension was also very helpful as the project was coming into focus and helping to get work started. He has since relocated to North Carolina. Gary Anderson, animal nutritionalist at the University of Maine, was also instrumental in data analysis. Samples were taken from organic dairy farms throughout the state. When the project started, there were 3 grain companies : New England Feeds, Lessard, and Morrisons. Samples were taken to ensure best chances for comparison. Most grains were ordered at a 14-18% crude protein content, and at least 3 samples from each company were taken each round. Home-grown samples were taken in the fall near harvest (round 1), during the spring (round 3) and then at the following year's harvest (round 4). Samples of forage were also taken.

Project Activities

During this project, Lessard was sold to Shur-Gain. New England Feeds became

United Feed Cooperatives, and a few new grain companies came to Maine (Cargill, Poulin Feeds, and Blue Seal). These changes are indicative of the volatile nature of the organic grain supply in the Northeast. Although the newest companies were not sampled all four rounds, their grain was sampled and tested. All samples were sent to Dairy One Laboratory to be tested for wet chemistry analysis for crude protein, fiber constituents, starch, minerals and vomitoxin and fumonisin.

The first round of samples included 17 different grains, from purchased mixes to home-grown grains stored on the farm. Forage samples were also taken. These samples provided some background for participating farms to help balance rations. These analyses were used at the fall 2005 dairy forage conference in Albion, Maine where Extension Specialist Gary Anderson led a workshop on balancing dairy rations to maximize forage usage and using ingredients. Nearly 60 farmers attended this workshop (organic and conventional). In the next round of sampling that began in March of 2006, there were 11 samples from 3 grain companies along with one home-grown grain. Round three of the sampling began in May of 2006.

The last round of sampling was done in the late fall of 2006, with results used to compare samples from the previous fall. All companies bringing organic grain into Maine were sampled at this time. As well, a fresh harvest of home-grown grains and forages were also sampled and assessed. Alternative forages sampled throughout the study included triticale silages, BMR sorghum sudan grass, baled oat hay, round bale corn silage, and high moisture ear corn (HMEC). These samples were tested for quality under organic management and were also used as a backdrop to the affects of the varying grain qualities.

Results

Assessing the collection of samples has led to some observations. Crude protein levels varied from 1-2 percentage points above the guaranteed analysis to several points below throughout sampling, except for round 3. Samples from round 3 were taken in the spring and showed consistently lower than guaranteed levels. This grain would represent material that had been in storage the longest and the availability of organic grain would be in short supply at this period of the year. The crude protein of these samples did not meet label requirements in many of the samples. These samples were considered the lowest quality. Fiber and consequently the energy levels also changed as we went through the sampling periods, with no noticeable trend.
There was also a huge swing in mineral levels throughout all sampling rounds. Levels of calcium and phosphorus were extremely variable and did not meet label requirements in many samples. It was suggested that since minerals can settle out in grist mixes, sampling protocol may have affected results. Several samples had detectable levels of vomitoxin, indicating a concern for animal health and performance. There was no obvious correlation between mycotoxin presence and time of sampling. However, one company more than the others seemed to show toxin concern levels, perhaps indicating that contamination occurred with a specific commodity source.

Home-grown grain samples of grain and forage included soybeans, wheat, okara (soy by¬product), barley, grass silage, high moisture ear corn, brown mid-rib sorghum sudangrass (BMRSS) and small grain hay. Crude protein content of BMRSS samples ranged from 19% on a dry matter basis to 10.2%. Other forages also had large variations in analysis that indicates that all farms should test their forages on a regular basis. On the other hand, home-grown grains, including soybeans (averaging 42.5% CP), and wheat (12.5% CP) were much more consistent in quality. Samples tended to show consistency in energy measurements (ADF, NDF and Net Energy of Lactation, or NEL) as well as starch. Variations were within expected

standard deviations of normal sampling results. This is in direct contrast to the variations in crude protein content and other analysis for purchased concentrate mixes. These mixed grain grists are purchased with minimum requirements that were not consistently met for key nutrient components.

Mineral content of home-grown samples of both grain and forage were variable. Many samples were low in calcium and high in potassium. These variations are the result of different soils, pH levels and management. Potassium may become a problem for organic dairy farms that rely heavily on manure as the sole nutrient source. Potassium build-up in soils leads to 'luxury consumption" by plants and is recycled through dairy manure with very little leaving the farm system through milk or meat. Potassium can cause metabolic problems for dry cows, so farmers must look for ways to harvest feed from fields low in soil Potassium for that group of cattle on their farm. Calcium on the other hand is a key mineral that producers need to supplement. If forages contained higher levels of calcium, less purchased minerals would be necessary on organic farms. There was only one incidence of vomitoxin (3.3) in a home-grown wheat sample. The toxin level was very high but was attributed to high moisture conditions during the growing season of 2006 and poor storage conditions. Two other samples showed lower than concern levels of mycotoxin (In addition, while many farmers order their grain based on crude protein levels, no company delivered the right protein consistently throughout the study, with percentages both above and below guaranteed levels. Energy and mineral levels proved to be even harder to utilize in balancing rations. These percentages varied widely throughout all grain companies. In contrast, home-grown grains showed much less incidence of toxins, highlighting once again the extreme unpredictability of purchased concentrates.

The economics of growing your own grain or purchasing single ingredients for on-farm processing and/or mixing was not examined in this study. However, from a quality and consistency standpoint, this study has shown that home-grown grain contained less toxins and provided a consistent, quality product to be used in the balancing of rations. Purchasing single commodities would also allow for quality inspection and a known constant in ration balancing.

The next steps for organic dairy producers might be in the examination of cooperative purchasing of single commodities, investigating the efficacy of growing grains on farms in the region (with or without cooperative exchange of these ingredients), or possibly an integrated program of grain testing for pre-mixes that would act to improve quality and consistency of purchased concentrates through the "watchdog mentality."

One thing is for certain: the quality and consistency of purchased pre-mixes are extremely variable - enough to greatly impact milk production and cow health. These variabilities need to be addressed and monitored at the least at the farm level. A larger, comprehensive program for organic grains could improve the profitability for organic dairy farms. Whether this comprehensive plan work towards improving the quality and consistency of pre-mixes or works to create a more integrated single commodity, on-farm harvest effort is yet to be seen - perhaps a combination of both.

Research

Participation Summary

US Department of Agriculture

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