

TECHNICAL BULLETIN

DAIRY



QLF AS AN ALTERNATIVE FEED SOURCE TO COPE WITH DISTILLER'S GRAIN SHORTAGE

Due to market conditions, many biofuel plants in US have been forced to shut down. Not surprisingly, many dairy producers have a shortage of distiller's grain, a byproduct of ethanol production from corn.

Use of distiller's grain in dairy rations

Corn used for ethanol production goes through a process of fermentation in which the starch is removed from the grain. The remaining byproduct is distiller's grain, which contains crude protein around 30 to 35%, and fat around 10%. Distiller's grain is typically included in the diets as a source of protein, yet it also has an energy value equal to or greater than corn.

Common concerns of feeding distiller's grain

Variation

Variation is a huge issue with byproduct feeds. It is common to see large variability in the nutrient profile of distiller's grain from batch to batch and month to month due to differences in the corn that is used. We all know that ruminants need consistency. Variation in nutrients, such as protein degradability, fat and fiber contents, and fatty acid profile, can have big impact on rumen efficiency, DMI and milk components.

Fat

Distiller's grain contains high levels of fat, especially unsaturated fatty acids. Excessive level of unsaturated fatty acids is one of the most important risk factors of milk fat depression. Typically, total dietary levels of fat in dairy diet should be less than 5% of DM, and rumen unsaturated fatty acid load (RUFAL) should be less than 600 g/cow/d. For this reason, there is an upper limit of how much distiller's grain can be fed in the ration, typically around 15% of dietary DM.

Protein

The crude protein profile of distiller's grain is largely composed of rumen undegradable protein (RUP; over 60 to 70% of CP). If the product has been reheated and dried, the protein can be especially rumen undegradable. Similar to corn, distiller's grain is low on lysine, a limiting amino acid for milk production.

Despite concerns in variability and high levels of unsaturated fatty acids, distiller's grains are commonly used in dairy ration due to low costs. With current shortage of this product, dairy producers and nutritionists are actively looking for alternative feed sources to rebalance the ration. Although feeding more corn when distiller's gain is short is an option, there is an

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	Median	Minimum	Maximum
Crude Protein, %	31.7	23.7	41
Soluble Protein, % of CP	6.5	7.9	35.3
Fat, % (EE)	8.2	3	12.51
NDF, %	29.3	21.5	37.3
NDFD (12 hr)	43.1	0	60.6
Starch, %	3.0	0.4	7.1
Sugar, %	8.1	0.3	16.7
Phosphorus, %	0.95	0.59	1.26
Sulfur	0.73	0.17	1.31

upper limit of starch levels before seeing milk fat depression and ruminal acidosis. Sugar is a great fit in this situation, and 7% of ration DM as sugar is recommended to maximize milk component yields. To achieve 7% of ration DM as sugar, approximately 1.5 – 2 lbs of supplemental sugar will need to be fed.

QLF can help replace distiller's grain

QLF contains both highly digestible sugar and protein

The concept of synchronization between protein and carbohydrates in ruminants is known among nutritional professionals. If we provide rumen microbes a fast energy source like molasses sugar, they grow rapidly. In the meantime, if we provide microbes with quick nitrogen source, they can efficiently assimilate the nitrogen and convert to microbial protein. Rumen microbial protein is the highest quality metabolizable protein with a desirable profile of amino acids to optimize milk component production. Furthermore, more protein provided by rumen microbes allows nutritionists to reduce dietary RUP supplementation and feed costs.

Maximize the level of economical sources of crude protein

How much non-protein nitrogen can we feed in dairy rations? Generally speaking, to maximize responses, amounts of dietary urea need to match up with the amounts of sugar: the more sugar in the ration, the more urea can be fed. QLF liquid supplements with 20% crude protein contain about 1 oz urea per pound of feed on an as-fed basis. Feeding 4 to 5 oz of urea per day through 4 – 5 lbs of a 20% crude protein QLF product is recommended because sufficient amounts of sugar and urea are needed to jumpstart rumen bugs and enhance rumen fermentation dynamic. Remember, at 7% of ration DM as sugar, approximately 1.5 – 2 lbs of supplemental sugar will be fed to complement the nitrogen from urea. Be sure to account for urea and NPN coming from all sources in the diet. From an economic standpoint, because urea is much more affordable than bypass protein, feeding more urea through QLF and cutting back some other protein sources can reduce protein costs.

Consistency

In contrast to large variations in byproducts, QLF liquid feed is extremely consistent, which optimizes rumen fermentation to support milk components.

Opportunity to use more home raised forages

Distiller's grain provides fiber into the diet. Using the 29% NDF from the table above, each 5 lbs of DM from distiller's grains provides 1.5 lbs of NDF. Removing distiller's grains may provide the opportunity for this to be replaced by NDF from home-raised forages, further reducing ration costs and creating more consistency in the diet.

No Shrink

Shrink is a major cost of most dairy operations. Byproducts such as wet distiller's grain are estimated to have around 15 to 40% shrink. On the other hand, QLF liquid feed stored in a tank has very little to virtually no shrink.

Other benefits

QLF liquid supplements stimulate feed intake, reduce sorting, and improve feed digestibility, all of which help improve milk and milk components.

Summary

The recent oil price crash is causing a short supply of distiller's grain to dairy producers. Distiller's grain provides economical sources of protein and energy to cows, but also has several concerns. Sugar can be used to partially replace distiller's grain, and 7% of ration DM sugar is recommended to maximize milk component yields. QLF liquid supplements provide highly digestible sugar and protein to drive rumen microbial protein. Because urea is much more affordable than bypass protein, maximizing the level of urea within QLF liquid feeds can reduce protein costs. Among many other benefits, QLF is extremely consistent and has virtually no shrink compared with most other feed ingredients. In short, using or increasing the protein level and/or feeding rate of QLF liquid feed is an effective strategy to cope with shortage of distiller's grain.