

Low-fat distillers grains **reduce milk fat depression**

Under-used commodity in dairy diets helps producers avoid losses

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The large expansion of the ethanol industry has increased the supply of co-products for the animal feed industry. Each metric ton of corn processed in dry mill plants yields close to 300 kg of distillers grains with or without solubles. Distillers grains, either dried or wet, with or without solubles, are the main feed co-products generated in the process, although other co-products, such as condensed distillers solubles, are also available in the market.

Distillers grains are a good source of protein (>30 percent; ~55 percent of protein is undegradable in rumen) and energy (~0.9 Mcal net energy for lactation/pound dry matter [DM]) for dairy cattle.

According to the Renewable Fuels Association (RFA), distillers grains produced by U.S. dry mill plants increased close to three times between 2006 and 2016, with the production estimated to total 12.0 million and 37.5 million metric tons, respectively, during these years. Distillers grains use rates were 30 percent for dairy and 44 percent for beef cattle in 2016.

Distillers grain in dairy feed

Despite a competitive price when compared with other protein sources and their high availability in the market, distillers grains are not always sought as a dietary ingredient by some nutritionists and dairy producers.

In a survey conducted in South Dakota, in which 28 percent of all Grade A dairy producers replied, many confirmed they did not use distillers grains in



Studies show milk fat depression is an issue in diets with conventional DDGS, but revealed reduced risk with low-fat DDG inclusions.

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REDUCE MILK FAT DEPRESSION

their dairy cattle diets. In another survey on the use of distillers grains sent to 10 nutritionists specializing in dairy cattle, their high fat content was the main reason why distillers grains inclusion was restricted in dairy diets.

Half of those surveyed (5 out of 10) agreed that the high concentrations of unsaturated fatty acids in distillers grains reduced fat content in milk. Nine out of 10 of the dairy consultants indicated that the level of distillers grains inclusion in diets could be increased if a portion of the fat in distillers grains was removed.

Inception of low-fat distillers grains

In recent years, there has been growing interest by many ethanol plants to extract a portion of the oil from distillers grain or other process streams as a means of increasing plant profitability. When part of the oil is removed, the fat content decreases and the rest of the nutrients are concentrated proportionately. These distillers grains are, in general, called low-fat distillers grains. Different commercial processes have been developed to extract the oil from thin stillage, semi-concentrated stillage and even condensed solubles.

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Most of the methods are based on physical separation techniques, using different separation columns or centrifuges. Another possibility is the chemical extraction of the oil in distillers with solvents. The final fat content in the co-products is variable, depending on the method used by each company, and it ranges between 2.5 and 7.5 percent dry matter (DM).

Dry mill ethanol plants extracted roughly 2.9 billion

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pounds of corn distillers oil in 2016. This oil is generally sold as a feed ingredient or as a feedstock for biodiesel production.

Analysis of the effects of fat composition

The fat in distillers grains is mainly composed of unsaturated fatty acids. Linoleic (C18:2) and oleic (C18:1), are the most abundant fatty acids, with an average of almost 50 percent and 25 percent of the total fatty acids, respectively. The high concentration of unsaturated fatty acids, together with high free fatty acids content, can sometimes lead to milk fat depression in dairy cows fed diets that include high levels of distillers grains.

Researchers from the University of Nebraska compared conventional with low-fat dried distillers grains with solubles (DDGS) as the main protein supplements in lactating dairy cow diets. The diets consisted of 35.6 percent forage as DM basis and included 29.2 percent (17.1 pounds) of either conventional (12.0 percent fat and 29.1 percent protein in DM basis) or low-fat DDGS (6.6 percent fat and 31.5 percent protein). Fat and polyunsaturated fatty acid contents averaged 5.8 and 2.78 percent in the conventional, and 4.2 and 2.16 percent of DM in the low-fat DDGS diet, respectively.

The results, published in the *Journal of Dairy Science*, showed milk fat depression in the conventional DDGS diet. Although DM intake (58.5 pounds/day), milk production (76.2 pounds/day), and protein concentration and yield (3.22 percent – 2.44 pounds/day) were not affected by diet, milk fat yield (2.50 vs. 2.75 pounds/day) and content (3.27 vs. 3.65 percent) were lower in the cows fed regular DDGS.

Using values from September FMMO Advanced Component prices (fat US\$3.03/pound), the economic impact of milk fat depression in the regular DDGS diet was 76 cents per cow per day or US\$277 per year. ■

References available upon request.

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