Nutritional Changes that Reduce Greenhouse Gases

The most significant source of methane from dairy farms originates from cows as they digest feed. As the feed is digested in the rumen, methane is produced by some of the rumen microbes. Methane represents a loss of energy from the diet that the cow could otherwise have used for more productive purposes like milk production. This loss can vary widely but for high producing cows this typically represents about 4-7% of the cows' total energy intake. Most methane escapes from the cow's mouth through eructation (belching) of rumen gases.

Many factors affect the amount of methane that a cow produces including:

- quality of the forages
- whether forages have been processed at harvest.
- amount of dry matter consumed
- amount and type of carbohydrate in the diet
- amount and type of dietary fats in the diet
- whether feed additives are fed

The Dairy Livestock and Cropping Systems Project identified several key management aspects related to dairy nutrition that could help reduce methane production from cows.

Optimal forage quality and forage management at the point of harvest can reduce greenhouse gas emissions on a kilogram of fat-corrected milk (FCM) basis. Optimal forage quality improves dry matter intake compared to sub-optimal forages and better forage quality increases nutrient digestibility. These characteristics have the potential to reduce methane production on a per-unit-feed basis.

Higher production from cows reduces the intensity of greenhouse gas emissions on a kilogram of milk production basis. Higher producing cows generate less methane per unit of milk than lower producing cows. In Ontario a study showed that the intensity of greenhouse gas emissions by cows ranged from 0.89 to 1.36 kg of carbon dioxide equivalents per kilogram of corrected milk yield. The wide variation indicates there is good potential to lower emissions on an industry-wide basis.

Forage quality declines about 0.2% per day in protein and 0.4% per day in digestibility once alfalfa buds appear. Even short delays in cutting can result in significantly lower forage nutrient quality.

Feeding some supplemental dietary fat, such as those containing unsaturated fatty acids present in some ingredients and by-products, has the potential to suppress methane production in the rumen.

It is important to work with your nutritionist when considering the use of supplemental fat in the diet of cows. While commonly used to increase the energy density of dairy cow rations to support milk production or milk fat content, excess fats or oils have the potential to reduce fibre digestion in the rumen and can affect milk fat. As with all ingredients, price will be a factor in choosing the type and amount of fat to be added to a ration. Generally, inclusion of supplemental fat at 2-4% of dry matter intake is possible without affecting digestion or affecting milk production or quality, depending on the source.

Using strategies to feed closer to a cows nutrient requirements, is a "precision feeding" approach designed to match nutrient supply with nutrient demand by the animal. This can be accomplished by routinely and frequently monitoring the feeds and reformulating the diet(s) to match the predicted. In this way, producers avoid situations of overfeeding expensive protein and energy ingredients that ultimately can lead to emissions from either the cow or from the manure.

Most of these approaches have the potential to be cost-effective in their own right, but each of them comes with the benefit of reducing the most significant source of greenhouse gas production from your farm, which is methane production from your cows.

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