Nutritional Changes

that Reduce Greenhouse Gases

DAIRY FARMERS OF CANADA

Ontario

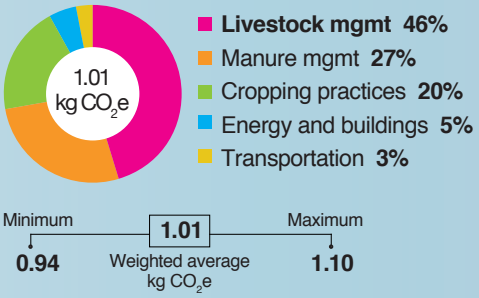
UNIVERSITY of GUELPH

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 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.

CONTRIBUTION OF EACH LIFE CYCLE STAGE



*Source: The Environmental and Socioeconomic Life Cycle Assessment of Canadian Milk (2012)

The Dairy Livestock and Cropping Systems Project

identified several key management aspects related to dairy nutrition that could help reduce methane production from cows.

Reducing Methane

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.

METHANE Reduction

1 Milk Production

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.**

2 Forage Quality

Optimal forage quality and forage management at the point of harvest can reduce greenhouse gas emissions on a per 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. High quality forages can reduce methane production on a per-unit-feed basis.

High quality forage harvested at correct maturity.

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.

Additional Information

www.omafra.gov.on.ca/english/livestock/dairy/facts/greenhousegas.htm

www.omafra.gov.on.ca/english/crops/pub811/3toc.htm

3 Balanced Rations

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

It is important to work with your nutritionist when considering the use of supplemental fat in the 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 can reduce fibre digestion in the rumen and affect milk fat.

As with all ingredients, price will be a factor in choosing the type and amount of fat added to a ration. Generally, inclusion of supplemental fat at 2-4% of dry matter intake is possible without affecting digestion, milk production or composition, depending on the source.

Dairy cows consuming balanced ration to optimize production.

Precision feeding is an approach designed to match nutrient supply with the animal's nutrient requirements. This can be accomplished by regularly monitoring feeds and reformulating diets to match the animal's nutritional requirements. This can save money by eliminating overfeeding of expensive protein and energy which contribute to emissions from cows or from manure.

This project is funded by Agriculture and Agri-Food Canada under the Agricultural Greenhouse Gases Program.

Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

S53 - Latest revision: February 2017