

Greener milk: How to make cow's nitrogen intake efficient

May 2 2013, by Alexander Hellemans



Credit: Markku Åkerfelt

The amount of nitrogen that is excreted by livestock is directly proportional to the amount it is fed. This is according to Chris Reynolds a researcher in nutritional physiology of ruminants at the University of Reading, UK. He is a principal investigator of one of the workgroups of the [REDNEX project](#), about to reach completion this year. Funded by the European Union, the project investigated ways to reduce the excretion of nitrogen by dairy animals. "Our aim was to look at management approaches so that we can reduce the amount of nitrogen we are feeding the animals," says Reynolds.

The total milk production in the European Union is 140 million tonnes per year. Nitrogen, taken up by [dairy cows](#) in their fodder, mainly ends up incorporated in the [amino acids](#) that make up an important part of milk. But large amounts of the ingested nitrogen—in the form of proteins—are lost in the rumen, or first stomach, and during the cow's digestion and metabolism.

[Nitrogen compounds](#), such as ammonia, and nitrous oxide, a stronger greenhouse gas than carbon dioxide, end up in the atmosphere. [Nitrates](#) leach into groundwater, and into surface water, where it causes the stimulation of excessive plant growth that uses up oxygen, affecting [aquatic animals](#). Denitrification—whereby oxidation processes liberate nitrogen from nitrates and nitrites—makes natural nitrogen sources less available for sustaining crops.

An important factor in the project was to ensure that the reduced amount of nitrogen intake should not cause a loss in milk production. Therefore research focussed on improving the efficiency in nitrogen uptake by cows, reports Reynolds. "We improved the understanding of the effects of lower-nitrogen diets on the metabolism of cows," he adds "and we demonstrated that we could feed such diets without substantial losses of protein."

However, the researchers were surprised as they discovered that reducing nitrogen in forages could have a negative impact on the environment. Indeed, it increases the production of methane in their flatulences—a potent [greenhouse gas](#). "If you use less nitrogen fertiliser, you may produce forages that are less digestible, and therefore have a higher methane yield," says Reynolds. This complication requires further research. "We have to focus on a whole systems approach," he adds.

Experts agree that this research has to be encouraged further. "There are not many options to reduce nitrogen emission, and this is one of the

projects that appears to be promising," Peter Wizke, a researcher in Economic and Agricultural Policy at the University of Bonn, Germany, tells youris.com.

Ultimately, such research may contribute to influence agricultural policy. Project scientific coordinator Cledwyn Thomas, a member of the European Association for Animal Production (EAAP), based in Rome, Italy, expects that the results of REDNEX will influence policy in animal husbandry at the regional level. Michael Kreuzer, a researcher in animal nutrition at the ETH Zürich in Switzerland, agrees that there is still a need for guidelines for nitrogen management for dairy farming, but they will have to be adaptable to the different farming methods in different countries. "It would be good to have recommendations and each country would then develop their own guidelines," Kreuzer tells youris.com.

Provided by Youris.com

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