

Forage-based diets on dairy farms produce nutritionally enhanced milk

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Omega-6 and omega-3 fatty acids are essential human nutrients, yet consuming too much omega-6 and too little omega-3 can increase the risk of cardiovascular disease, obesity, and diabetes. Today, Americans consume 10 to 15 grams of omega-6 for every gram of omega-3.

Previous studies have shown that consuming organic beef or organic [dairy products](#) lowers dietary intakes of omega-6, while increasing intakes of omega-3 and conjugated linoleic [acid](#) (CLA), another valuable, heart-healthy fatty acid.

In a collaborative research project including the University of Minnesota, Johns Hopkins University, Newcastle University in England, Southern Cross University in Lismore, NSW Australia, and the Aarhus University Hospital in Denmark, researchers have found that cows fed a 100% organic grass and legume-based diet produce milk with elevated levels of omega-3 and CLA, and thus provides a markedly healthier balance of fatty acids. The improved fatty acid profile in grass-fed organic milk and dairy products (hereafter, "grassmilk") brings the omega-6/omega-3 ratio to a near 1 to 1, compared to 5.7 to 1 in conventional whole milk.

Co-author Dr. Bradley Heins, Associate Professor of Dairy Science at the University of Minnesota's West Central Research and Outreach Center points out that "With growing consumer demand for organic dairy products, producers may be able to expand their profitability and market share by converting to grass-based pasture and forage-feeding

systems."

Findings from the study "Enhancing the Fatty Acid Profile of Milk through Forage-Based Rations, with Nutrition Modeling of Dietary Outcomes," published in *Food Science and Nutrition*, compared the fatty acid profile of milk from cows managed under three systems in the United States:

1. "Grassmilk" cows receive an essentially 100% organic grass and legume forage-based diet, via pasture and stored feeds like hay and silage.
2. "Organic" cows receive, on average, about 80% of their daily Dry Matter Intake (DMI) from forage-based feeds and 20% from grain and concentrates.
3. "Conventional" cows are fed rations in which forage-based feeds account for an estimated 53% of daily DMI, with the other 47% coming from grains and concentrates. Conventional management accounts for over 90% of the milk cows on U.S. farms.

Grassmilk provides by far the highest level of omega-3s—0.05 grams per 100 grams of milk (g/100 g), compared to 0.02 g/100 g in conventional milk - a 147% increase in omega-3s. Grassmilk also contains 52% less omega-6 than conventional milk, and 36% less omega-6 than organic milk. In addition, the research team found that grassmilk has the highest average level of CLA—0.043 g/100 g of milk, compared to 0.019 g/ 100 g in conventional [milk](#) and 0.023 g/100 g in organic.

Implications for Public Health

Daily consumption of grassmilk dairy products could potentially improve U.S. health trends. In addition to the well-established metabolic and cardiovascular benefits of [omega-3 fatty acids](#) and CLA, there are

additional benefits for pregnant and lactating women, infants, and children. Various forms of omega-3 fatty acids play critical roles in the development of eyes, the brain, and the nervous system. Adequate omega-3 intakes can also slow the loss of cognitive function among the elderly.

In describing the [public health](#) implications of the study's main findings, co-author Charles Benbrook, a Visiting Scholar at the Bloomberg School of Public Health at Johns Hopkins University, points out that "The near-perfect balance of omega-6 and omega-3 fatty acids in grassmilk dairy products will help consumers looking for simple, lifestyle options to reduce the risk of cardiovascular and other metabolic diseases."

Source of Samples and Funding

The team analyzed over 1,160 samples of whole grassmilk taken over three years from on-farm bulk tanks prior to any processing. All samples came from farmer members of CROPP Cooperative and were tested by an independent laboratory.

More information: Charles M. Benbrook et al, Enhancing the fatty acid profile of milk through forage-based rations, with nutrition modeling of diet outcomes, *Food Science & Nutrition* (2018). [DOI: 10.1002/fsn3.610](https://doi.org/10.1002/fsn3.610)

Provided by University of Minnesota

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