

# Greener Pastures

How grass-fed beef and milk contribute to healthy eating

KATE CLANCY

Union of Concerned Scientists

*March 2006*

© 2006 Union of Concerned Scientists

All rights reserved

**Kate Clancy**, senior scientist in the Union of Concerned Scientists (UCS) Food and Environment Program, received her doctorate in nutrition science from the University of California at Berkeley.

UCS is a nonprofit partnership of scientists and citizens combining rigorous scientific analysis, innovative policy development, and effective citizen advocacy to achieve practical environmental solutions.

The goal of the UCS Food and Environment Program is a food system that encourages innovative and environmentally sustainable ways to produce high-quality, safe, and affordable food, while ensuring that citizens have a voice in how their food is grown.

More information about UCS is available on its website at [www.ucsusa.org](http://www.ucsusa.org).

The full text of this report is available online at [www.ucsusa.org](http://www.ucsusa.org) or may be obtained from:

UCS Publications  
Two Brattle Square  
Cambridge, MA 02238-9105

Or, email [pubs@ucsusa.org](mailto:pubs@ucsusa.org) or call (617) 547-5552.

FRONT COVER PHOTOS: U.S. Department of Agriculture (*cows*); Adam Gillam, USDA (*girl*); iStockphoto (*steak*); iStockphoto (*milk*); Getty Images (*boy*)

BACK COVER PHOTO: Keith Miller, USDA

DESIGN: Catalano Design

*Printed on recycled paper with soy-based inks*

## EXECUTIVE SUMMARY

---



© iStockphoto

The production, sale, and consumption of beef and dairy products represent a significant segment of the American food system. In fact, the United States produces more beef than any other nation.

Conventional U.S. dairy and beef production relies heavily on the feeding of grain, primarily corn. More than 50 percent of the corn grown in this country goes to animal feed. Not only does grain production cause water and air pollution, but feeding it to cattle can reduce the levels of certain fats in beef and milk that may be beneficial to human health.

Conventional beef and dairy production also confines large numbers of animals in relatively small spaces, a practice that has serious consequences for the environment and the health of both animals and humans. Manure produced in feedlots, for example, pollutes the air and combines with the runoff from fertilizers and pesticides used in cornfields to contaminate ground and surface water. Furthermore, the practice of feeding cattle antibiotics to promote growth increases the risk of antibiotic resistance in humans, leading to potential complications from bacteria-caused diseases.

An alternative to conventional production systems allows cattle to roam on pastures, eating grass and other forages rather than grain. Pasture feeding can reduce environmental damage, improve animal health, and increase profits for beef and dairy producers. It may also improve human nutrition.

Meat from pasture-raised cattle, for example, contains less total fat than meat from conventionally raised animals, and both meat and milk from pasture-raised animals contain higher levels of certain fats that appear to provide health benefits. These nutrition differences arise from the chemical differences between forage and grains, and the complex ways in which ruminant animals such as cattle process these feeds.

The Union of Concerned Scientists (UCS) has reviewed and analyzed the scientific literature that compares differences in fat content between pasture-raised/grass-fed and conventionally raised dairy and beef cattle. The fats in which we were interested are:

- total fat
- saturated fat

- the omega-3 fatty acids alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA)
- conjugated linoleic acid (CLA)

The latter two fatty acid groups are the subject of intense interest in nutrition research. The three omega-3 fatty acids—the so-called beneficial fatty acids—have been shown in many studies to improve health and prevent disease in humans. CLA has attracted attention because it has demonstrated many beneficial effects in animal studies. We have focused on the levels of these fats in milk and meat from pasture-raised cattle because, beyond their intrinsic value, widespread interest in these substances among health-conscious consumers could help shift American agriculture from conventional to pasture-based feeding systems.

This report examines the scientific basis for health benefits associated with the fatty acids listed above and determines where the evidence is strong and where additional research is needed. We also explain how federal dietary recommendations would be established for these fats and what standards would have to be met before food purveyors could make a nutrient or health claim about these fats on product labels or in advertising. Based on the existing literature, certain claims could be made now and others might be permitted after additional research has been completed.

### **Health Benefits of Milk and Meat from Pasture-raised Cattle**

We reviewed all the studies published in English we could find that compare levels of fatty acids in pasture-raised milk and meat with levels in conventionally produced milk and meat, and converted these levels into amounts per serving of milk, steak, and ground beef. The resulting analysis found statistically significant

differences in fat content between pasture-raised and conventional products. Specifically:

- Steak and ground beef from grass-fed cattle are almost always lower in total fat than steak and ground beef from conventionally raised cattle.
- Steak from grass-fed cattle tends to have higher levels of the omega-3 fatty acid ALA.
- Steak from grass-fed cattle sometimes has higher levels of the omega-3 fatty acids EPA and DHA.
- Ground beef from grass-fed cattle usually has higher levels of CLA.
- Milk from pasture-raised cattle tends to have higher levels of ALA.
- Milk from pasture-raised cattle has consistently higher levels of CLA.

At this point, the evidence supporting the health benefits of omega-3 fatty acids and CLA is mixed; the data are stronger for some fatty acids than for others. The strongest evidence, encompassing animal studies as well as experimental and observational studies of humans, supports the effects of EPA/DHA on reducing the risk of heart disease. ALA also appears to reduce the risk of fatal and acute heart attacks, but no other beneficial effects have been shown conclusively. Finally, animal research on CLA has shown many positive effects on heart disease, cancer, and the immune system, but these results have yet to be duplicated in human studies.

### **Implications for Dietary Recommendations and Nutrient and Health Claims**

Consumers get useful information about the nutrient content and health benefits of foods in the form of claims made on product labels and in advertising. The fact that studies of the health benefits of omega-3 fatty acids and CLA have had mixed results is reflected in the limited number

of claims that can be made for pasture-raised dairy and beef products. Until scientists agree on the role fatty acids play in maintaining health, the Food and Nutrition Board of the Institute of Medicine cannot recommend a specific dietary intake. And until such a recommendation is made, the U.S. Food and Drug Administration and U.S. Department of Agriculture (USDA) cannot propose standards governing whether a nutrient content claim can be made.

**CLAIMS THAT CAN BE MADE TODAY.** Based on existing standards, our analysis found sufficient evidence for some claims about the health benefits of grass-fed beef that could be made now:

- Steak and ground beef from grass-fed cattle can be labeled “lean” or “extra lean.”
- Some steak from grass-fed cattle can be labeled “lower in total fat” than steak from conventionally raised cattle.
- Steak from grass-fed cattle can carry the health claim that foods low in total fat may reduce the risk of cancer.
- Steak and ground beef from grass-fed cattle can carry the “qualified” health claim that foods containing the omega-3 fatty acids EPA or DHA may reduce the risk of heart disease.

**CLAIMS THAT MIGHT BE MADE IN THE FUTURE.** No nutrient content claims about the omega-3 fatty acids or CLA can be made today. However, as more is learned about the health effects of these substances, new standards may be issued that would allow food purveyors to make labeling and advertising claims:

- Steak from grass-fed cattle might be labeled a “source” or “good source” of EPA/DHA.
- Some milk and cheese from pasture-raised cattle might be labeled a “source” of ALA.

## Environmental Benefits of Pasture-based Production Systems

The nutrition advantage that pasture-raised meat and milk may have over conventional products is only one reason to support this emerging industry. Our review of the relevant literature finds general agreement among scientists that raising cattle on well-managed pastures will provide significant environmental and other benefits:

- Decreased soil erosion and increased soil fertility
- Improved water quality (due to decreased pollution)
- Improved human health (due to reduced antibiotic use)
- Improved farmer and farm worker health
- Improved animal health and welfare
- More profit per animal for producers

## Challenges for Pasture-based Dairy and Beef Producers

Research shows that well-managed pasture-based production systems can be profitable. But implementing such systems will not be easy in the United States, which lags behind Argentina, Ireland, and New Zealand.

The literature shows that U.S. pasture-based dairy producers are still figuring out what feeding regimens will maintain good body condition and adequate milk yields. They are also learning (along with grass-fed beef producers) how to produce and manage the best mix of grasses and legumes in terms of a cow’s nutrition and the potential to produce the highest possible levels of beneficial fatty acids and CLA. The most serious questions facing U.S. producers are what to feed in the winter (when cows are not kept on pasture) and in seasons when cows can graze but the pasture is not high-quality.

## Recommendations

Existing data on the possible health benefits of the omega-3 fatty acids and CLA are promising and important. Nevertheless, UCS recognizes the need for more research before pasture-based dairy and beef production systems can be widely adopted and economically viable in the United States. Specifically, we recommend:

- Beef and dairy producers interested in optimizing levels of omega-3 fatty acids and CLA should strive for pasture-based feeding regimens that maximize the number of days their cows spend on grass.
- Pasture-based beef and dairy producers might consider seasonal production as a way of improving profits and ensuring higher nutrient levels in areas where high-quality pasture cannot be produced year-round.

In addition, we recommend the following research to help advance this promising new agricultural sector:

- In line with the recommendations of the Dietary Guidelines Advisory Committee, we believe the National Institutes of Health, the National Science Foundation, and other appropriate organizations should support increased basic, clinical, and epidemiological research on the health effects of omega-3 fatty acids and CLA.
  - ▶ More epidemiological research is needed on the effect of these fat substances on the incidence of heart disease, cancer, and immune system disorders.
  - ▶ More clinical research should be conducted on the human health effects of the CLA isomer (c9,t11) most prevalent in ruminant milk and meat.

- Government and industry should provide funding for scientists to conduct extensive sampling of pasture-raised dairy and beef products and analyze the content of fatty acids such as ALA, EPA/DHA, CLA, and vaccenic acid (a precursor to CLA).
- The USDA should support more research to identify pasture management strategies that will produce an optimal fat composition in milk and meat from different regions of the United States.
- The USDA (through the Agricultural Research Service, the Sustainable Agriculture Research and Education grants program, and the competitive grants program called the National Research Initiative) should fund more research on different types of U.S. pasture systems and their effects on nutrient levels.
  - ▶ This should include studies comparing fully pasture-raised cattle and cattle fed pasture/supplement mixtures with conventionally raised cattle.
- The USDA and the Environmental Protection Agency should encourage and fund more research on the environmental benefits of pasture-based production systems.