

Beware the Myth of Grass-Fed: Beef Cows raised at pasture are not immune to deadly E. coli bacteria.

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On Monday, Huntington Meat Packing Inc. [recalled a whopping 864,000 pounds](#) of beef thought to contain a particularly nasty strain of E. coli bacteria called O157:H7. Coming shortly after the recall of [248,000 pounds of beef](#) by National Steak and Poultry on Christmas Eve—and [dozens of other scares](#) over contaminated beef and pork—this latest news reminds consumers yet again that the mass production of meat can be very dangerous indeed.

Consumers who still have an appetite for burgers and sirloins have been pushed toward alternative food sources. In particular, they've started to seek out more wholesome meat from animals raised in accordance with their natural inclinations and heritage. According to Patricia Whisnant, president of the American Grassfed Association, there's been a dramatic rise in demand for cattle reared on a pasture diet instead of an industrial feed lot. Grass-fed beef should account for 10 percent of America's beef consumption overall by 2016, she says—a more than threefold increase from 2006.

The comparative [health benefits of grass-fed beef](#) are well documented. Scores of studies indicate that it's higher in omega 3s and lower in saturated fat. But when it comes to E. coli O157:H7, the advantages of grass-fed beef are not so clear. In fact, exploring the connection between grass-fed beef and these dangerous bacteria offers a disturbing lesson in how culinary wisdom becomes foodie dogma and how foodie dogma can turn into a recipe for disaster.

Could grass-fed beef ever be afflicted with the sort of E. coli O157:H7 outbreak that led to the December recall? Not according to the conventional wisdom among culinary tastemakers. This idea rose to the top of the journalistic food chain in the fall of 2006, when food activist [Nina Planck](#) wrote about the bacteria strain on the op-ed page of the *New York Times*. At that time, people were getting sick from bad organic spinach, but the contamination seemed to have originated with herds of conventionally raised cattle that lived upstream. Not every animal excretes this nasty type of E. coli, she [argued](#). "It's not found in the intestinal tracts of cattle raised on their natural diet of grass, hay, and other fibrous forage. No, O157 thrives in a new—that is, recent in the history of animal diets—biological niche: the unnaturally acidic stomachs of beef and dairy cattle fed on grain, the typical ration on most industrial farms."

The *Times* speaks, the world listens. Planck's appraisal of grain- vs. grass-fed beef was highlighted on the Web sites for the [Organic Consumers Association](#), the [Center for a Livable Future](#), [Grist](#), and [Culinate.com](#), among other enviro-foodie venues. A few months later, Hannah Wallace of *Salon* warned

that "[a cow's corn diet can also make us sick](#)" on account of the acidic environment it creates for bacteria. Even Michael Pollan, perhaps the most widely read food writer on the planet, explained in a *New York Times Magazine* piece, "The lethal strain of E. coli known as O157:H7 ... was unknown before 1982; it is believed to have evolved in the gut of feedlot cattle." These animals, he added, "stand around in their manure all day long, eating a diet of grain that happens to turn a cow's rumen into an ideal habitat for E. coli O157:H7."

For many consumers, the case was closed: To avoid E. coli O157:H7, just eat grass-fed beef. Unfortunately, the scientific evidence tells a very different story. Planck's assertion seems to be based on a 1998 [report](#) published in the journal *Science*. In this study, the authors fed three cows a variety of diets in order to ascertain how feed type influenced intestinal acidity in cows and, in turn, how intestinal acidity influenced the concentration of acid-resistant strains of E. coli. They hypothesized that these strains would be especially dangerous to humans, since they could survive the low-pH environment of the human stomach. It turned out that grain-fed cattle did indeed have a much more acidic stomach than those fed grass or hay. And sure enough, they had *a million times* more acid-resistant E. coli in their colons.

This was good news for grass-fed beef: Eliminate grain from a cow's diet and you'll keep its intestines from getting too acidic and spawning dangerous, acid-resistant bacteria. There was only one catch. The authors of the *Science* piece never specifically tested for E. coli O157:H7. Instead, they guessed that the pattern of O157:H7 growth and induction of acid-resistance would mirror that of E. coli strains that are always living in the colons of cattle. If this assertion were true, E. coli O157:H7 would reach dangerous levels only in gastrointestinal tracts of grain-fed cows.

But between 2000 and 2006, scientists began to take a closer look at the effect of diet on E. coli O157:H7 specifically. A different set of findings emerged to indicate that this particular strain did not, in fact, behave like other strains of E. coli found in cattle guts. Most importantly (in terms of consumer safety), scientists showed in a half-dozen studies that [grass-fed cows do become colonized with E. coli O157:H7](#) at rates [nearly the same](#) as grain-fed cattle. An Australian study actually found a higher prevalence of O157:H7 in the feces of grass-fed rather than grain-fed cows. The effect postulated (and widely publicized) in the 1998 *Science* report—that grain-fed, acidic intestines induced the colonization of acid-resistant E. coli—did not apply to the very strain of bacteria that was triggering all the recalls. What might explain this discrepancy? Scientists wondered whether there could be two subtypes of E. coli O157:H7 with varying degrees of acid-resistance. By that logic, the microbes from the grass-fed guts would be less resilient—and therefore less dangerous—than the ones that were growing up in the cows reared on grain. So they started running tests to find out.

In 2003, a research team from the University of Idaho reported [no difference at all](#) in the levels of acid resistance between E. coli O157:H7 from grass- and grain-fed cattle. (In both cases resistance was high.) Their conclusion stands in direct contrast to the broad claims about grain diets that have been made in the popular press since 2006. It must be that some other factor or factors were responsible for the development of E. coli O157:H7.

We don't yet know what these might be. But four studies, published between 2003 and 2005, have developed an intriguing hypothesis. Maybe, some reasoned, E. coli O157:H7 behaves differently from other strains because it develops in a different part of the cow's intricate digestive system. Sure enough, O157:H7 turned out to have a strong tendency to congregate in the recto-anal junction, whereas most other E. coli tend to gather primarily in the colon. Given that, we might presume that the production of E. coli O157:H7 depends more on its unique location than on what its cow host happens to be eating.

The point in dredging up these studies—ones the media never covered—is not to play gotcha with advocates of grass-fed beef. (As mentioned above, grass-fed beef may be healthier than conventional beef over all, and kinder to the animals.) Instead, it's a warning that advocacy for a trendy food choice might result in a public health hazard. Such a fear is confirmed by consulting the cooking directions provided by many purveyors of grass-fed beef. The home page for one major producer explains that "cooking 'real food' is not the same as cooking concocted food. ... [Grass-fed meats are best when raw](#) (steak tartar), rare, or medium rare." Given that the FDA recommends cooking ground beef to 160 degrees to guarantee safety from E. coli, this eat-it-undercooked advice could be dangerous. When it comes to the intricacies of our food system—and especially the meat industry—what's true one day can be less true the next. A case in point involves the final FDA [report](#) (PDF) on the source of the 2006 E. coli O157:H7 outbreak that motivated Planck to write her seminal *Times* op-ed. Released in March 2007, it suggests that the spinach wasn't contaminated by grain-fed, industrial cattle. Rather, the culprits were more likely to have been wild pigs or pastured (i.e., grass-fed) cattle—animals that were, of course, doing nothing more than eating what they were meant to eat.