



STOP FOOD IRRADIATION PROJECT

ORGANIC CONSUMERS ASSOCIATION

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[Stop Food Irradiation Project HOME](#)

Alternatives to Food Irradiation

- [General treatments](#)
- [Current situation in meat plants](#)
- [Spices](#)
- [Fresh juices](#)
- [Fresh fruits](#)
- [Meat and poultry](#)
- [Change in cattle diets](#)
- [Miscellaneous and background](#)

Why we have a problem... May 13, 2000: [The USDA has "given away the shop" to the meat industry](#), says head of meat inspectors union. "In the 1950s we condemned carcasses with fecal contamination, in the 1970s it was cut off, in the 1980s it was washed off and in the 1990s it is eaten."

General treatments for contaminated or infested foods

- [Technical report](#) summarizes the status of and problems with a variety of food preservation technologies. These include ultraviolet (which damages DNA just like irradiation), x-rays (same), high pressure, pulsed light, and others. From the Institute of Food Technologists.
- A new [ultra-high pressure technology](#) destroys the cell structure of bacteria. It is currently being used in the United States and abroad by manufacturers of juices, sauces, meats, and seafood. This technology can replace traditional food safety systems such as pasteurization, irradiation, or chemicals.
- June 26, 2001: [Article on alternatives](#) to irradiation.
- Research is under way on a variety of promising approaches, including pulsed energy, bright light, high pressure, and other nonthermal technologies, but few are ready for immediate application (13,14; Fed Reg 61:42381-83, 1997).

Current situation in meat plants

As detailed in the "Fact Sheet: New Technologies" from the [American Meat Institute](#), a variety of technologies are being used in 50-90% of American meat plants. Carcass rinsing

with hot water, organic acids and trisodium phosphate are being tested. Ozonation uses water infused with [ozone](#) molecules to reduce/eliminate bacterial contamination. Steam pasteurization (a burst of superheated steam for less than one second) "effectively pasteurizes the exterior of the carcass just before it enters the cooler." Steam and hot water vacuums remove visible dirt or debris aseptically (this replaces the previous practice of trimming off the contamination).

Spices

Heat treatment seems to be the least toxic alternative. **Ethylene oxide (ETO)** has been used, but is a probable carcinogen and, like methyl bromide, depletes ozone. Irradiation is widely used.

Frontier Coop, a company that sells nonirradiated spices, says "There are several chemical alternatives to ETO sterilization. Irradiation and exposure to methyl bromide are the most common. Unfortunately, these sterilization methods pose as many, if not more, threats than ETO does. There are currently very few natural alternatives to ETO. Heat sterilization, although useful in some spices, is not suitable for treating all spices because of the sensitivity of their aroma and flavor components. Natural fumigation methods, like the use of CO2 chambers, will kill bugs and their eggs but won't sterilize." ([source](#)) **Frontier uses heat treatment and a rigorous testing program.**

Sulphur Dioxide Gas Fumigation.

A sterilization trial on contaminated desiccated coconut was quite successful, giving reductions in bacteria of up 1000 times. Levels of SO2 added were typically 50 ppm based on weight of material. After allowing product to outgas after a few days, treatment residues were negligible. SO2 gas fumigation may be an option for some spices. Contact R.H.Molony <molab@ww.co.nz>.

Fresh juices

[Cinnamon](#) is a lethal weapon against *E. coli* in unpasteurized juice.

Food extracts of highly flavored foods, including vanilla, cinnamon, pepper and almond, contain compounds that inhibit growth of bacteria. The technology is under investigation at the U.S. Department of Agriculture.

Fresh fruits

January 9, 2005: [New coating for fruits and vegetables](#)

September 26, 2002: [Chlorine Dioxide Gas Kills Bacteria on Fruits and Vegetables](#)

[Alternatives to methyl bromide](#), from the US EPA.

A page of resources on [alternatives to methyl bromide](#), from Pesticide Action Network.

- 1) Prevention by keeping facilities clean and culling out infested fruits and vegetables
- 2) Heat treatments
- 3) Cold treatments (These treatments increase or decrease the temperature of the fruit or vegetable for short periods of time, killing the pests)
- 4) Controlling the atmospheres of shipping containers (where CO₂ or nitrogen is kept high and oxygen is kept low, suffocating pests)
- 5) Treatment with other toxic chemicals including sulfuryl fluoride methyl iodide, and carbonyl sulfide

July 3, 2002: [Ozone](#) is a very promising alternative to irradiation.

January 9, 2001: [Fruit coating technology](#) from Planet Polymer Technologies Inc. to extend the shelf life of fruit and vegetables and also helps lengthen the growing/harvest season for produce products. It controls the respiration rate of the fruit and is commercially available for mangoes and cantaloupe. In addition, the technology is being tested for papaya, limes avocados, bananas and pineapples.'

For disinfestation of fruit flies: Hot forced air, hot and cold treatments.

Meat and Poultry

See [detailed article about cetylpyridinium chloride, lactoferrin, acidified sodium chlorite, and vaccines](#). (November 2000)

May 31, 2002: [Quick Pasteurization Kills Listeria in Lunch Meats](#)

May 1, 2001: Company develops [fast test for E. coli](#) (which is caused by fecal contamination).

Antimicrobial

Jan 10, 2002: The U.S. Department of Agriculture (USDA) has approved the use of **activated lactoferrin on fresh beef**. Activated lactoferrin is an all-natural protein found in milk and dairy products. It has been shown to protect fresh beef against E. coli O157:H7 and more than 30 different types of pathogenic bacteria, including Salmonella and Campylobacter. The technology is unique in that it prevents pathogenic bacteria from attaching to meat surfaces, in addition to preventing growth.

September 19, /2001-The Food and Drug Administration (FDA) will permit a **mixture of peroxyacetic acid, octanoic acid, acetic acid, hydrogen peroxide, peroxyoctanoic acid, and 1-hydroxyethylidene-1,1-diphosphonic acid** as an antimicrobial agent on poultry carcasses, poultry parts, and organs. The action is in response to a petition filed by Ecolab, Inc. Details of the ruling were published in the Federal Register of September 19, 2001

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June 14, 2001: FDA and USDA approved **SANOVA antimicrobial** for control of bacteria in comminuted and formed meat products (principally hot dogs and ready-to-eat sausages) as well as fruits and vegetables. It is now in use in 30 plants to disinfect more than five billion pounds of chicken on an annual basis.

January 11, 2001: Nymox Pharmaceutical Corp. announced that tests conducted at the Department of Food Science at the University of Manitoba demonstrated that the company's novel proprietary **antibacterial agent, NXC 4720, completely eliminated E. coli O157:H7** in a laboratory model of a livestock gut.

Plant oils kill pathogens. In laboratory experiments, the essential oils carvacrol and thymol, available from common herbal plants, in quantities as low as 1 gram in one-half-liter slurries of cattle feces and urine completely blocked formations of foul-smelling volatile fatty acids. E. coli and other potentially harmful bacteria were also reduced in the manure. Scientists are now taking their research to manure in the feedlot to field test against E. coli O157:H7 and other pathogens. From the USDA Agricultural Research Service

ARS develops new method to reduce farm pathogens - feeding sodium chlorate

March 6, 2001-Agricultural Research Service (ARS) researchers have developed a new approach to reducing Salmonella typhimurium and E. coli O157:H7 in pigs and cows. The scientists report that sodium chlorate, fed in low doses to pigs and cows before slaughter, selectively kills these pathogens. The scientists in the ARS Food and Feed Safety Research Unit in College Station developed an animal model showing that sodium chlorate reduces these bacteria in the animal intestinal tract. The USDA has applied for a patent on behalf of the inventors, ARS microbiologists Robin C. Anderson and David J. Nisbet in College Station and Larry H. Stanker in Albany, Calif. The researchers are seeking a cooperative research partner to further develop the work for commercial meat processing. Besides adding the chlorate to feed, the researchers suggest adding chlorate to drinking water for the animals upon arrival at the processing facility. However, the FDA would need to approve any wide-scale use of the technique in food processing facilities. For more details, see the March issue of Agricultural Research online at: www.ars.usda.gov.

Improving farming practices

At a government-sponsored conference on food safety, federal officials said improving farming practices was the most promising way to prevent foodborne illnesses. It is "one of the areas that gets the least amount of attention and one that is the most important to improving food safety," said Stephen Sundlof, director of the Food and Drug Administration's Center for Veterinary Medicine. Research is under way on vaccines that would prevent cattle from carrying the bacteria, on feed additives that would eliminate it from the animals, and new methods of composting manure so it can be used as fertilizer without contaminating crops or ground water.

Ozone

September 24, 2001: The FDA approved ozone for use in all food processing activities in June 2001. Cyclopp Corporation announced today that following the recent FDA approval of ozone that it has successfully completed its first contract for an in-plant test of its Eco Pure(TM) Food Safety System for poultry processing. Plans are also being discussed with this processor to test an Eco Pure(TM) System in a separate plant that produces other poultry products.

Ozone does not have the problem of ever-increasing costs associated with disposing of chlorine laden post-processing wastewater. Because ozone converts back into oxygen during the act of killing microorganisms, it produces far less polluted wastewater for the processor to deal with.

Gamma rays and electron-beams are not the only things that can kill disease-causing organisms in food: chlorine, steam, pressure, laser light and ozone. Ozone is an unstable, three-atom form of oxygen. When ozone comes unstuck, it forms one two-atom oxygen molecule and one lone oxygen atom. This atom is highly reactive, and it can burst the cell wall of a bacterium rapidly. For this reason, it is a better disinfectant than chlorine, a tried-and-true microbe killer that's used throughout the food industry. The Food and Drug Administration has put ozone in the "generally recognized as safe" category, allowing it to skip regulatory hurdles that would otherwise keep it out of the food industry. Treatment with ozone-bearing water kills upwards of 90 percent of pathogens on surfaces. Ozone can be retrofitted almost immediately into a plant that uses water in its processing.

Change in cattle diets

Scientists discover that [simple change in cattle diets before slaughter effectively eliminates E. coli O157:H7](#).

Miscellaneous

- November 14, 2002-**Technological interventions in the immersion-chill tanks used in turkey processing** resulted in a 50 % reduction of Salmonella bacteria on turkeys, according to a study conducted by Texas A&M University. The National Turkey Federation and its members voluntarily worked with Texas A&M to conduct research to find the best food safety procedures to control bacteria on turkeys produced in our plants," said NTF President Alice L. Johnson, D.V.M. The 2002 "Chiller Study" also found post-chiller pathogen levels reduced by two-thirds from the original study conducted two years ago. The 2002 will now be used to prepare industry "Best Management Practices for Immersion Chilling," an important step in pathogen control.
- March 11, 2001 - U. Wisconsin researcher F. Denes is applying his pioneering work with plasmas to a variety of food safety issues. Denes has a patent through WARF that employs **cold plasma technology to modify the surfaces of food-industry**

materials, such as processing machines, preparation surfaces and packaging, to prevent bacterial attachment and biofilm formation. Techniques change the surface of materials to incorporate anti-microbial agents in extremely thin layers. Also, a protective film can be fused over the surface to make bacteria incapable of sticking and forming colonies.

- September 15, 2000 -According to a recent Associated Press report, federal officials said **improving farming practices** was the most promising way to prevent foodborne illnesses. Research is underway on vaccines that would prevent cattle from carrying the bacteria, on feed additives that would eliminate it from the animals, and new methods of composting manure so it can be used as fertilizer without contaminating crops or ground water. The new feed additives contain good bacteria that are supposed to drive the *E. coli* out of a cow's digestive system, a process known as "competitive exclusion." But cost-conscious farmers won't change farming practices unless the government forces them to do so. (USDA, which regulates meat and poultry processors, doesn't have the authority to regulate how farmers raise their animals.)
- September 12, 2000: [Copper and brass outperform stainless steel in reducing bacteria](#). At room temperatures it takes 34 days for *E. coli* O157:H7 bacteria to die on stainless steel tiles, 4 days to die on brass tiles, and just 4 hours to die on copper tiles. At chill temperatures typical of food storage, the study found that 10% of the bacteria were still alive on stainless steel tiles after 34 days, whereas bacteria were completely eradicated on brass tiles within 12 days and on copper tiles in just 14 hours. "It may be possible to achieve important public health benefits just by changing the surface material commonly used in food processing," said a study author.
- May 12, 2000: Kansas State University tests suggest that [99.99% of Listeria bacteria can be removed from processed meats](#) by steam treatment.
- April 4, 2000: [Processors can reduce E. coli contamination to 2% of beef carcasses--without irradiation](#).
- March 1, 2000: [An estimated 89% of U.S. beef ground into patties is contaminated with E. coli O157H:7](#).
- November 17, 1999 - [E. coli bacteria is in half of all US cattle](#).
- May 13, 2000: "Schools get tainted chicken." "Beef industry says: 'Let them eat Salmonella.'" What the meat industry *isn't* telling you, from the [Government Accountability Project](#).

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