

Got Milk?

Make Sure It's Pasteurized

By Linda Bren

Pasteurization, since its adoption in the early 1900s, has been credited with dramatically reducing illness and death caused by contaminated milk. But today, some people are passing up pasteurized milk for what they claim is tastier and healthier "raw milk."

Public health officials couldn't disagree more.

Drinking raw (untreated) milk or eating raw milk products is "like playing Russian roulette with your health,"

says John Sheehan, director of the Food and Drug Administration's Division of Dairy and Egg Safety. "We see a number of cases of foodborne illness every year related to the consumption of raw milk."



Jack Lefkowitz

More than 300 people in the United States got sick from drinking raw milk or eating cheese made from raw milk in 2001, and nearly 200 became ill from these products in 2002, according to the Centers for Disease Control and Prevention.

Raw milk may harbor a host of disease-causing organisms (pathogens), such as the bacteria campylobacter, escherichia, listeria, salmonella, yersinia, and brucella. Common symptoms of foodborne illness from many

killing disease-causing bacteria, pasteurization destroys bacteria that cause spoilage, extending the shelf life of milk.

Milk can become contaminated on the farm when animals shed bacteria into the milk. Cows, goats, and sheep carry bacteria in their intestines that do not make them sick but can cause illness in people who consume their untreated milk or milk products.

But pathogens that are shed from animals aren't the only means of con-

is barely perceptible.

"Milk is a good source of the vitamins thiamine, folate, B-12, and riboflavin," adds Sheehan, "and pasteurization results in losses of anywhere from zero to 10 percent for each of these, which most would consider only a marginal reduction."

While the major nutrients are left unchanged by pasteurization, vitamin D, which enhances the body's absorption of calcium, is added to processed milk. Vitamin D is not found in signifi-

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of these types of bacteria include diarrhea, stomach cramps, fever, headache, vomiting, and exhaustion.

Most healthy people recover from foodborne illness within a short period of time, but others may have symptoms that are chronic, severe, or life-threatening.

People with weakened immune systems, such as elderly people, children, and those with certain diseases or conditions, are most at risk for severe infections from pathogens that may be present in raw milk. In pregnant women, *Listeria monocytogenes*-caused illness can result in miscarriage, fetal death, or illness or death of a newborn infant. And *Escherichia coli* infection has been linked to hemolytic uremic syndrome, a condition that can cause kidney failure and death.

Some of the diseases that pasteurization can prevent are tuberculosis, diphtheria, polio, salmonellosis, strep throat, scarlet fever, and typhoid fever.

Pasteurization and Contamination

The pasteurization process uses heat to destroy harmful bacteria without significantly changing milk's nutritional value or flavor. In addition to

tamination, says Tom Szalkucki, assistant director of the Wisconsin Center for Dairy Research at the University of Wisconsin-Madison. Cows can pick up pathogens from the environment just by lying down—giving germs the opportunity to collect on the udder, the organ from which milk is secreted. "Think about how many times a cow lays down in a field or the barn," says Szalkucki. "Even if the barn is cleaned thoroughly and regularly, it's not steamed. Contamination can take place because it's not a sterile environment."

The Health Hype

Raw milk advocates claim that unprocessed milk is healthier because pasteurization destroys nutrients and the enzymes necessary to absorb calcium. It also kills beneficial bacteria and is associated with allergies, arthritis, and other diseases, they say.

This is simply not the case, says Sheehan. Research has shown that there is no significant difference in the nutritional value of pasteurized and unpasteurized milk, he says. The caseins, the major family of milk proteins, are largely unaffected, and any modification in whey protein that might occur

cant levels in raw milk.

"Pasteurization will destroy some enzymes," says Barbara Ingham, Ph.D., associate professor and extension food scientist at the University of Wisconsin-Madison. "But the enzymes that are naturally present in milk are bovine enzymes. Our bodies don't use animal enzymes to help metabolize calcium and other nutrients."

"Enzymes in the food that we eat and drink are broken down in the human gastrointestinal tract," adds Ingham. "Human bodies rely on our own native enzymes to digest and metabolize food."

"Most of the native enzymes of milk survive pasteurization largely intact," says Sheehan, "including those thought to have natural antimicrobial properties and those that contribute to prolonging milk's shelf life." Other enzymes that survive are thought to play a role in cheese ripening.

Ingham says that pasteurization will destroy some bacteria that may be helpful in the fermentation of milk into products such as cheese and yogurt, "but the benefit of destroying the harmful bacteria vastly outweighs the supposed benefits of retaining those helpful microorganisms. Plus, by add-

ing the microorganisms that we need for fermentation, we can assure a consistently high quality product."

Science has not shown a connection between drinking raw milk and disease prevention. "The small quantities of antibodies in milk are not absorbed in the human intestinal tract," says Ingham. "And there is no scientific evidence that raw milk contains an anti-arthritis factor or that it enhances resistance to other diseases."

Fans of raw milk often cite its creamy rich taste, says Szalkucki, who adds that it may be creamier because it is not made according to the standards for processed milk. "If you go to a grocery store and buy fluid milk, it's been standardized for a certain percentage of fat, such as 2 percent," he says. "Raw milk is potentially creamier because it has not been standardized and it has a higher fat content."

The Law

It is a violation of federal law enforced by the FDA to sell raw milk packaged for consumer use across state lines (interstate commerce). But each state regulates the sale of raw milk within the state (intrastate), and some states allow it to be sold. This means that in some states dairy operations may sell it to local retail food stores, or to consumers directly from the farm or at agricultural fairs or other community events, depending on the state law.

In states that prohibit intrastate sales of raw milk, some people have tried to circumvent the law by "cow sharing," or "cow leasing." They pay a fee to a farmer to lease or purchase part of a cow in exchange for raw milk, claiming that they are not actually buying the milk since they are part-owners of the cow. Wisconsin banned cow-leasing programs after 75 people became infected with *Campylobacter jejuni* bacteria in 2001 from drinking unpasteurized milk obtained through such a program.

Raw Milk Cheeses

The FDA allows the manufacture and interstate sale of raw milk cheeses that are aged for at least 60 days at a temperature not less than 35 degrees Fahrenheit. "However, recent research

A Sampling of Raw Milk Incidents

- **July 2004**—The Indiana Public Health Department advised consumers to check their refrigerators and freezers for raw milk cheese that may be contaminated with salmonella. Routine product sampling found the bacteria in lot number 139 of "Natural Raw Milk Cheese" made by Meadow Valley Farm after the cheese was distributed to farmers' markets and specialty food stores in parts of Indiana and Wisconsin.
- **2002–2003**—Two children were hospitalized in Ohio for infection with *Salmonella enterica* serotype Typhimurium. These children and 60 other people in Illinois, Indiana, Ohio, and Tennessee developed bloody diarrhea, cramps, fever, chills, and vomiting from *S. Typhimurium* tracked to consuming raw milk. The milk producer voluntarily relinquished its license for selling raw milk upon recommendation of the Ohio Department of Agriculture.
- **2000–2001**—In North Carolina, 12 adults were infected with *Listeria monocytogenes* linked to homemade, Mexican-style fresh soft cheese produced from contaminated raw milk sold by a local dairy farm. Ten of the 12 victims were pregnant women, and infection with the bacterium resulted in five stillbirths, three premature deliveries, and two infected newborns.
- **1998**—In Massachusetts, 66 people received injections to protect against potential exposure to rabies after drinking unpasteurized milk from a local dairy. A cow that died at the dairy was found to be infected with rabies. Transmission of the rabies virus through unpasteurized milk, although not the common route of infection, is theoretically possible, according to the Centers for Disease Control and Prevention. ■

Sources: CDC, Indiana State Board of Animal Health

calls into question the effectiveness of 60-day aging as a means of pathogen reduction," says Sheehan.

The FDA's Center for Food Safety and Applied Nutrition (CFSAN) is currently examining the safety of raw milk cheeses and plans to develop a risk profile for these cheeses. This information will help FDA risk managers make future decisions regarding the regulation of these products to protect public health.

Ensuring Milk Safety

The FDA provides oversight for the processing of raw milk into pasteurized milk, cottage cheese, yogurt, and sour cream under the National Conference on Interstate Milk Shipments "Grade A" milk program. This cooperative program between the FDA and the 50 states and Puerto Rico helps to ensure the uniformity of milk regulations and the safety of milk and milk products. The program is based on standards described in the FDA's Pasteurized Milk Ordinance (PMO), a model code

of regulations that can be adopted by the states in their own regulations.

Under the Grade A program, state personnel conduct inspections and assign ratings and FDA regional milk specialists audit these ratings, says Richard Eubanks, M.P.H., a senior milk sanitation officer on CFSAN's Milk Safety Team. "It's a rigorous process of inspection and auditing," he says, and "it covers from cow to carton," starting with the dairy farm and continuing through the processing and packaging of products at milk plants. Products that pass inspection may be labeled "Grade A."

The FDA Grade A milk program includes pasteurized milk from cows, goats, sheep, and horses. Raw milk and raw milk cheeses cannot be labeled Grade A, since they are not pasteurized and not covered under the program. ■