UF UNIVERSITY of FLORIDA
IFAS Extension

FCS80004

Raw Milk: Fact or Fiction[1]

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The use of raw milk as a beverage for humans is a hotly debated topic. A simple Internet search using the term "raw milk" yields conflicting claims about its benefits and dangers. Many people base their opinions about raw milk on myths rather than facts. Not knowing the risks may lead people to drink raw milk and risk illness from harmful bacteria. If you are thinking about adding raw milk to your diet, or if you are curious about the debate, then this publication will help you sort through the myths and facts of the raw milk debate.

Milk Basics

To understand the debate about raw milk, it's important to learn the basic facts about milk and the process it goes through before it is purchased in the grocery store. Milk is a liquid food that provides many nutrients, including carbohydrates, protein, fat, vitamins, and minerals such as calcium. Milk is part of the dairy foods group, and dairy foods are recommended as part of a balanced diet.

Milk Processing

Before milk makes it to the grocery store, many things can affect its safety and quality. Certain steps can be taken to keep harmful bacteria out of milk, like keeping equipment clean and animals healthy, but these steps are not foolproof. The only proven method for making sure that milk is safe to drink is pasteurization.

During pasteurization, milk is heated to a specific temperature that kills or inactivates bacteria. After heating, the milk is cooled down and then refrigerated to maintain flavor and quality. Pasteurization kills disease-causing bacteria as well as bacteria that cause spoilage, so the process increases milk's shelf life and safety (Michigan State University Extension, n.d.).

Homogenization is another process that increases milk's shelf life and quality. When milk is raw, it contains a watery portion and a thicker, creamy portion that can separate and float to the top. By shaking a bottle of raw milk, the two portions can be combined for a short amount of time. Homogenization removes the need for shaking by applying heat and pressure. These forces push the creamy and watery portions of raw milk through a valve system, which

1. This document is FCS80004, one of a series of the Family, Youth and Community Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date March 2012. Visit the EDIS website at http://edis.ifas.ufl.edu.

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results in a liquid that will no longer separate (Oregon State University, 2009).

Raw Milk Contamination

The concern with raw milk is that it can contain harmful bacteria that can cause illness in humans. Between 1998 and 2008, the Centers for Disease Control and Prevention (CDC) reported 1,614 illnesses, 187 hospitalizations, and 2 deaths caused by raw milk (U.S. Food and Drug Administration [FDA], 2011). In theory, if an animal is healthy, then the milk that it produces should be sterile before it comes out of the udder. If milking occurs in a perfectly clean and bacteria-free environment, raw milk from the udder would not come into contact with any outside sources of dangerous bacteria. The reality is that even clean dairy farms with attentive farmers face contamination risk from many sources.

In a farming environment, there are many potential sources of bacteria. For example, an animal with an infection or disease can pass harmful organisms through the milk that can cause illness in humans. Even cows that appear healthy may secrete bacteria into the milk. Contamination may also come from the environment. If the animal's udder comes into contact with feces, bacteria in the feces may contaminate the outside of the udder and enter the milk, or they may reach the inside of the udder and grow. Bacteria in the udder can then enter the milk as it passes through. Sometimes unclean milking machinery or the farmer's hands can spread bacteria to the udder. Unsanitary water used for watering animals and cleaning may also spread harmful bacteria to the animal's udder or into fresh milk. The only way to prevent any bacterial growth in raw milk is to make sure that every one of these bacterial sources is controlled or removed, which can be a difficult task (Oliver, Boor, Murphy, & Murinda, 2009).

When many animals live together on farms, they are exposed to each other's waste and bacteria. This makes it difficult for farmers to keep the environment free of bacterial sources. Some people think that small, local dairy farms have less risk because they have fewer animals, but this is not true. Even smaller farms struggle to keep harmful bacteria under control, and food-borne illness outbreaks originating at such dairies have been reported (Oliver et al., 2009).

No matter what people claim, it is impossible to ensure that the milk from a certain farm will always be free of harmful bacteria. Even if the farm has never been connected to an outbreak, it does not mean that it will never experience a food-borne illness outbreak in the future. The only proven method for removing harmful bacteria is through processing.

Food-Borne Illness

Discussion about harmful bacteria may be too vague to convince consumers of raw milk's risks. Food-borne illnesses are often discussed in the media in connection with many different foods. Milk is especially prone to bacterial growth because of its nutrient content. For the same reason that milk can sustain a young animal or supplement the human diet, it can also provide the perfect conditions for bacterial growth. Raw milk has historically been found to spread brucellosis, tuberculosis, diphtheria, and scarlet fever, among other illnesses. The list below contains food-borne illness-causing bacteria that have been associated with illness from raw milk in recent years:

- ***Listeria monocytogenes*** may result in illness and may cause fetal death in pregnant women.
- ***Salmonella enterica*** may result in vomiting, diarrhea, and abdominal pain and may cause serious complications in vulnerable individuals.
- ***Yersinia enterocolitica*** may result in appendicitis-like symptoms
- ***Campylobacter jejuni*** may result in cramping, bloody diarrhea, vomiting, and abdominal pain and is associated with a nervous system disorder termed Guillan Barré Syndrome.
- ***Staphyloccus aureus*** may result in vomiting, abdominal pain, and diarrhea.

- ***Escherichia coli 0157:H7*** may result in vomiting, cramping, and diarrhea and is associated with serious kidney problems in children or brain problems in the elderly.

While many food-borne illnesses resolve within a few days to a week, not all populations are able to recover. Pregnant women, children, older adults, and those with compromised immune systems are especially vulnerable to food-borne illness that may even result in death. Even if you and your family are not part of an at-risk population, it is still critical to weigh the possible negative health effects of raw milk. If you or anyone you know experiences any of the listed symptoms after consuming raw milk or raw milk products, contact a doctor immediately for help (Michigan State University Extension, n.d.).

Raw Milk Supporters

After becoming familiar with the ways that milk processing improves safety and quality, it may seem strange that some people are interested in drinking raw milk. Many authorities are opposed to the sale of raw milk as a beverage and create laws to forbid it. In spite of this, raw milk supporters have strong opinions on the subject and are working to lift the ban on raw milk. Raw milk farmers and consumers stress the need for the legal sale of raw milk for reasons related to health, economics, and personal preference.

Many radical health claims are made about the beneficial effects of raw milk. Raw milk supporters consider it to be a "living" food and believe that it has healing properties. A common false claim is that the beneficial parts of milk are either damaged or removed by processing, resulting in a "dead" food with fewer health benefits. Raw milk supporters insist that uncontaminated raw milk hosts only neutral and helpful bacteria, which may aid in digestion and immunity. Advocates believe that raw milk contains substances that kill most harmful bacteria and claim that the benefits of "healthy" bacteria outweigh the risk of any harmful bacteria that may be present. Raw milk supporters criticize pasteurized milk and claim that drinking it can result in lactose intolerance and milk allergies. These supporters believe that processing is not necessary as long as the dairy farm has sanitary milking conditions to prevent bacteria from entering into milk. While personal stories are used to encourage the use of raw milk to treat allergies, asthma, and digestive issues, there is little scientific evidence to support these claims (U.S. Food and Drug Administration [FDA], 2006).

Small dairy farmers want to sell raw milk for a number of reasons. Farmers often drink raw milk from their animals and use their own experience as "proof" that their product is safe for sale. These farmers insist that their products are safe to consume because they work hard to keep their animals and equipment free of bacterial growth. From an economic stance, farmers wish to sell raw milk to meet consumer demand and make money. With processed milk, farmers must first meet stringent farm inspection requirements prior to sending the raw product to a processing facility, where the milk is pasteurized and homogenized. The direct sale of raw milk increases profits because this product is usually sold for a higher price than milk destined for processing (Oliver et al., 2009).

Perceived (but unproven) health claims and economics are just two of the reasons that raw milk is in demand. Some people say that they prefer the taste and consistency of raw milk to processed milk. Although there are scientifically proven risks, raw milk supporters want the right to make their own decisions about raw milk.

Raw Milk Regulations

The U.S. Department of Agriculture (USDA), the U.S. Food and Drug Administration (FDA), and many state agencies are the government authorities that ensure the safety and quality of food products sold in the United States. The federal agencies oppose the "right" to purchase raw milk, stating that products sold to consumers in the American marketplace should be inspected and processed to improve safety and quality. The federal government's stance is that milk processing is the only way to protect consumers from the threat of food-borne infections and disease (FDA, 2006).

Despite government agencies' opinions, raw milk is still sold in many areas of the country. By federal law, the sale of raw milk is illegal across state lines, but the legality of selling it within the state varies from state to state. The state of Florida only permits the sale of pasteurized milk for human consumption, but raw milk can be sold as animal feed, provided that it is labeled as such (Florida Legislature, 2011). The sale of raw milk is allowed in different forms in 29 states. A few states offer raw milk in grocery stores as long as a warning label is featured on the product. Many other states allow for cow-sharing programs, cow leasing, or direct sale from farmers for either human consumption or as pet food. The availability of raw milk may lead some consumers to overlook its risks. Before making a purchase, gaining a firm grasp of the facts is the best way to avoid raw milk hype and make a decision based on safety (Oliver et al., 2009).

The FDA has researched many of the health claims as well as a statement about pasteurized milk made by raw milk advocates and has found many of them to be dramatic and unproven. According to the FDA, pasteurization does not decrease the nutrient value of milk. The FDA also states that raw milk does not contain enzymes that kill harmful bacteria, and it does not cure or prevent lactose intolerance. Furthermore, pasteurized milk has not been shown to cause lactose intolerance or milk allergy. Raw milk advocates claim that the USDA and FDA are working to suppress the farmers of America, but evidence shows that the government is simply at work to protect consumers (FDA, 2006).

Safe Substitutions

Despite the lack of scientific evidence or FDA support, some of the health claims made by raw milk advocates may be interesting to some people. Nowadays, grocery stores sell pasteurized products that can enhance immunity and digestion without the risk of food-borne illness. Many dairy products now contain probiotics and enzymes that are scientifically proven to have positive health effects. Probiotics are "healthy" bacteria that may aid in digestion and immunity. These bacteria will not result in food-borne illness and are proven to be safe. Probiotics can be found in dairy food products such as yogurt and kefir (fermented dairy beverage). Rather than risking illness with raw milk, these may be good options if you are interested in products that have healthy bacteria added to them (FDA, 2006). Not all yogurts contain probiotics, so make sure that the label clearly states that probiotics have been added.

There are many unsupported claims that raw milk may cure lactose intolerance. Lactose intolerance occurs when the body lacks the enzyme needed to digest lactose, the sugar in milk. Raw milk also contains lactose. When someone with lactose intolerance drinks milk, abdominal distress such as bloating and gas can result. The enzyme needed to digest milk sugar is called lactase, and it is now added to many dairy products, such as milk and cheese. These products are a good choice for people with lactose intolerance. When buying these foods, read the label to make sure that the product has been treated with the lactase enzyme.

Raw Milk Reality

Although raw milk has been touted as having healing powers, drinking it has many risks. Even with trusted farmers, bacterial growth in raw milk is a constant threat to consumers and their families. Until scientific evidence proves that raw milk is safe and more nutritious than pasteurized milk, consumers should be wary of its risks. If you decide to drink raw milk in spite of the dangers it presents, be aware of the signs of illness and contact a physician immediately if you show symptoms.

Learn More

Cooperative Extension Family and Consumer Sciences (FCS) Educator (look in the blue pages of your telephone book). Florida Extension offices are listed online by UF/IFAS at http://solutionsforyourlife.ufl.edu or http://SolutionsForYourLife.com/map.

Recommended Websites

- For more information about dairy products, refer to the EDIS publication *The Skinny on Low-fat and Fat-free Milk and Milk Products* (http://edis.ifas.ufl.edu/pdffiles/FY/FY122000.pdf).
- For information about dairy group foods and recommendations, visit www.chooseMyPlate.gov.
- For a better understanding of key health and safety issues associated with consuming unpasteurized dairy products, visit http://www.realrawmilkfacts.com.
- For the FDA stance on raw milk, visit http://www.fda.gov/downloads/Food/ResourcesForYou/Consumers/UCM239493.pdf.
- For USDA information on food-borne illness, visit http://www.fsis.usda.gov/factsheets/foodborne_illness_what_consumers_need_to_know/index.asp.

References

Florida Legislature. (2011). *The 2011 Florida Statutes (including Special Session A): 502.091 Milk and milk products which may be sold.* Retrieved from http://www.leg.state.fl.us/statutes/index.cfm?mode=View%20Statutes&SubMenu=1&App_mode=Display_Statute&Search_String=raw+milk&URL=0500-0599/0502/Sections/0502.091.html

Michigan State University Extension. (n.d.). *Furthering families: Milk pasteurization*. Retrieved from http://www.flavours.asia/uploads/7/9/8/9/7989988/milk_pasturization.pdf

Oliver, S. P., Boor, K. J., Murphy, S. C., & Murinda, S. E. (2009). Food safety hazards associated with consumption of raw milk. *Foodborne Pathogens and Disease, 6*, 793–807.

Oregon State University. (2009). *Food resource: Milk.* Retrieved from http://food.oregonstate.edu/learn/milk.html

U. S. Food and Drug Administration (FDA). (2006). *Food facts from the U.S. Food and Drug Administration: The dangers of raw milk*. Retrieved from http://www.fda.gov/downloads/Food/ResourcesForYou/Consumers/UCM239493.pdf

U.S. Food and Drug Administration (FDA). (2011). *Questions and answers: Raw milk.* Retrieved from http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/ucm122062.htm

Additional Resources

Schmidt, R. H., & Davidson, P. M. (2008). *Milk pasteurization and the consumption of raw milk in the United States.* International Association for Food Protection (IAFP) Position Statement. Retrieved from http://www.foodprotection.org/files/general-interests/Milk_Pasteurization_Paper.pdf

American Veterinary Medical Association. (2011). *Raw milk.* Retrieved from http://www.avma.org/issues/policy/milk.asp

Langer, A. J., Ayers, T., Grass, J., Lynch, M., Angulo, F. J., & Mahon, B. E. (2012). Nonpasteurized dairy products, disease outbreaks, and state laws: United States, 1993–2006. *Emerging Infectious Diseases, 18*(3), 385–391.