

# Differences between Organic and Conventional Cow's Milk



When a consumer is presented with multiple milk varieties at the grocery store, all with different labeling and marketing strategies, the choice of what to purchase is not always clear. Many people purchase organic milk with the assumption that the milk is healthier and the cows are treated more humanely. While there is no sound evidence to support those claims, the similarities and differences between organic and conventional, or “normal,” milk are not always well understood by consumers. This publication provides a comparison of organic and conventional cow’s milk.

## Quality Assurance

All milk produced in the United States is regulated by the U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA). Together, dairy farmers, milk processors, and government agencies work to ensure consumers have access to a safe and high-quality product. This applies equally to organic and conventional products.

Dairy farms that sell milk using the “USDA Organic” seal must follow specific criteria:

- Cows are exclusively given feed grown without the use of pesticides or fertilizers.
- Cows are given periodic access to pasture.
- Cows are not treated with supplemental hormones.
- Cows are not given certain medications to treat illness.

Milk from both conventional and organic dairies undergoes an extremely rigorous evaluation by a USDA Pesticide Data Program, which ensures that all residue detections in milk are much lower than established tolerances. This testing occurs every few years, when loads of milk from all regions of the U.S. are evaluated for pesticide residues.

## Antibiotics

However, every time a load of milk is picked up from any dairy, a sample is collected to determine somatic cell count (a measure of milk quality) and antibiotic residue. The legal limit for somatic cell count is 400,000 cells per milliliter. The legal standard set by the FDA requires that milk contains no detectable antibiotic residue at all.

If a farm has milk that exceeds the legal limit for somatic cell count or tests positive for antibiotic residue, the entire tanker truck of milk must be dumped. The producer will pay for all the milk that was dumped, as well as any regulatory action taken against the farm. This can get very expensive, so producers work hard to ensure that milk from cows treated with antibiotics does not make it to the bulk tank.

Milk that tests positive for antibiotic residue will never make it to the store because it is checked on the farm and then checked again at the processing facility. Therefore, all milk is antibiotic-free.

Both organic and conventional dairy producers rely on preventive measures to keep cows as healthy as possible. However, despite a dairy producer’s best efforts, cows still get sick sometimes.

Conventional dairy producers can use antibiotics to treat bacterial infections in order to help the cow fight off the infection and recover more quickly. Cows that are being treated with antibiotics will have an antibiotic residue in their milk; therefore, the milk from the treated cow is discarded for a specified amount of time (a withholding period) that is identified on the label of the antibiotic (**Figure 1**). In this example, milk from a lactating dairy cow treated with Liquamycin would have to be dumped during treatment in addition to 96 hours after the last treatment.

The withdrawal period differs across products and is determined by research from the pharmaceutical company with government approval. Antibiotics and dumped milk cost the producer money, so they do not use antibiotics unless they are necessary to help the animal overcome an illness.

Organic milk producers are not allowed to use antibiotics unless they are necessary to save the life of an animal. For example, if a cow has an udder infection that is getting worse despite the producer’s best efforts to treat it naturally or let the cow’s immune system take care of it, a veterinarian must be called, and that animal must be treated with antibiotics to get rid of the infection. A producer cannot withhold the use of antibiotics only to maintain organic status.

If an organic producer uses antibiotics for a cow, they must record the event in their records, notify their organic certifier, segregate the animal to prevent contamination of organic products, and sell the animal to a non-organic market.

## Milk Production and Nutrition

The differences in milk production and main milk components (fat, protein, lactose) between conventionally and organically raised cows are not clear. Some researchers have reported that milk production of organically raised cows was, on average, 15 percent lower than that of conventionally raised cows. The amount of milk a cow produces depends on the quality and amount of feed the cow eats, as well as the animal's genetics. Many factors influence the quality of feed, including soil fertility and fertilization. Organic producers are not able to use the same fertilizers to improve forage quality that conventional producers use.

Milk fat and protein from organic and conventional herds are sometimes reported to differ, but the reports are contradictory. Some researchers report increased protein or fat concentrations in conventional milk, whereas others report greater protein or fat concentrations in organic milk. These two components are the result of many factors, some of which are not management-specific, like genetics.

Conventional and organic milk are both great sources of nutrients and full of these essential vitamins and minerals:

- calcium
- phosphorus
- potassium
- vitamins A, D, and B12
- riboflavin
- niacin

One 8-ounce glass of conventional or organic milk provides 8 grams of protein. And, when following FDA guidelines, that 8-ounce glass provides the daily recommended values for calcium, riboflavin, phosphorus, vitamin D, pantothenic acid, potassium, vitamin A, and niacin (Figure 2). All these nutrients help your body perform everyday tasks, from building and maintaining strong bones and teeth to promoting proper blood circulation. Currently, no research shows that organic or conventional milk is healthier than the other.

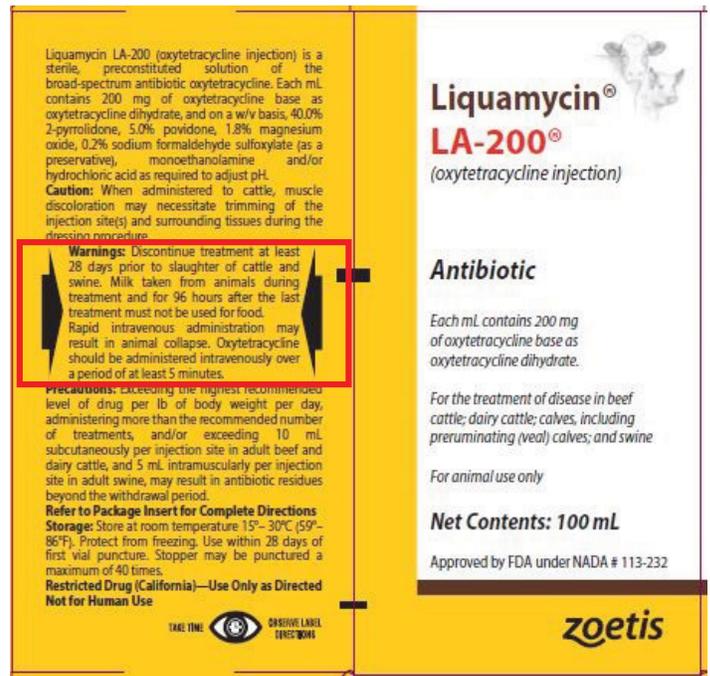


Figure 1. Antibiotic labels include warnings to inform producers how long milk must be dumped from a treated animal before the milk is clear to put into the bulk tank, known as the withdrawal period.



Figure 2. Labels of conventional (left) and organic (right) milk indicate very similar amounts of vitamins and minerals.

## Shelf Life

Consumers may wonder why organic milk stays fresh so much longer than conventional milk. The expiration date is not related to whether the product is organic or conventional, but instead is a result of the processing procedures before the milk is distributed to grocery stores.

Organic milk is pasteurized through a process called ultra-high-temperature (UHT) pasteurization, where milk is heated to 280°F for 2–4 seconds. This process kills any bacteria that may be present in the milk. Organic milk often travels farther to reach store shelves compared to conventional milk, so organic milk processors use UHT pasteurization to extend its shelf life.

Conventional milk is pasteurized through two standard pasteurization procedures, low-temperature-long-time (LTLT) or the more commonly used high-temperature-short-time (HTST). For the LTLT procedure, milk is heated to 145°F for at least 30 minutes. For the HTST procedure, milk is heated to 160°F for at least 15 seconds. Both of these procedures effectively kill spoilage microorganisms in the milk.

## Price

Organic milk costs more than conventional milk because organic production is more expensive for the producer (increased animal feed prices, certification costs, and lowered milk yields). In 2018, organic food and beverages cost an average of 7.5 percent more than conventional food and beverages, which is down from 9 percent in 2014. The price premium has been decreasing due to increasing consumer demand for organic products.

## Summary

Although organic and conventional milk are produced in different management systems, neither can be considered better than the other from a nutrient standpoint. Both are great sources of protein, calcium, and vitamins for people in all stages of life. Consumers can feel confident that all milk is safe and nutritious, and they should buy the type of milk they feel is the best choice for their family.

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