German Federal Institute for Risk Assessment

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Pasteurisation makes milk a safe food

Consumption of untreated raw milk can cause infections

Untreated milk, so-called raw milk, can be contaminated with bacteria such as *Salmonella*, *Escherichia coli* or *Campylobacter*. These can cause food-borne infections and pose a particular hazard to infants, young children or people with a weakened immune system. To reduce the risk of infection, raw milk should be heated before consumption (at a minimum of 72°C for 15 seconds). This is especially true if the milk has been purchased directly from the producer. Packaged, commercially purchased raw milk (so called “Vorzugsmilch”) is strictly controlled for bacteria during production and processing, which reduces the risk of infection. For particularly sensitive population groups, however, certified raw milk should also be heated before consumption.

Raw milk can come from cattle, sheep or goats and is characterised by the fact that it is sold untreated directly from the farm to consumers after milking, for example via so-called “milk vending machines.” It is therefore not homogenised before sale and - much more important -- not pasteurised like conventional fresh or UHT (ultra-high-temperature) milk. Without pasteurisation, in which the milk is heated for a certain period of time, potential pathogens survive in the milk.

It is almost impossible to avoid that milk contains germs – both harmless and pathogenic. After all, the animals do not live in a sterile environment, but in the open air or in a barn, where bacteria are naturally widespread. They can get into the milk during milking or processing. In addition, infected animals can excrete bacteria with the milk, even if they are not visibly ill themselves.

With regard to the health risks associated with the consumption of raw milk, intestinal germs such as *Campylobacter* or *Escherichia coli* (*E. coli*) are of particular importance. They can cause severe diarrhoea or intestinal inflammation in humans. Infections with Shiga toxin-producing *E. coli* (STEC), for example, can cause haemolytic uraemic syndrome (HUS), which can lead to kidney failure in children. According to the 2019 zoonosis monitoring programme, such bacteria were detected in just under 5 per cent of the raw milk samples

tested. The diarrhoea pathogen *Campylobacter* was found in 2.5 per cent of the samples. Subsequent tests, for example by the Lower Saxony State Office for Consumer Protection and Food Safety (LAVES), also regularly revealed the detection of various pathogenic bacteria. In principle, viruses such as the TBE virus (tick-borne encephalitis virus) can also enter milk from infected animals, even though human infections following the consumption of contaminated milk only occur in very rare cases.

To protect against these infections, the sale of raw milk is generally prohibited in Germany. There is an exception for the sale of milk "directly from the farm". Here, producers must inform consumers of the need to heat the milk before consumption[1].

The situation is different for so-called “Vorzugsmilch” - packaged raw milk from specially controlled farms that is also available in retail stores. Strict regulations apply to its production and treatment, such as microbiological controls of the milk. It can therefore be assumed that the probability of infection is reduced compared to raw milk from conventional farms. However, it cannot be ruled out. The German Federal Institute for Risk Assessment (BfR) therefore recommends that ”Vorzugsmilch” should also be heated (at a minimum of 72°C for 15 seconds) before consumption for particularly sensitive population groups. These include infants, young children, pregnant women, older people and people with certain underlying diseases (immunodeficiency).

The reason sometimes given for consuming raw milk is that it is healthier, for example because it has a higher vitamin content than pasteurised milk or because it contains health-promoting bacteria ("probiotics"). However, many of the supposed benefits have not been scientifically proven or refuted or, in the BfR's view, play a subordinate role at best in view of the health risks. The pasteurisation (heating at a minimum of 72°C for 15 seconds) of milk, for example, results in only a slight decrease in the B vitamins (approx. 10 %), minerals and milk fats remain unchanged. These small differences in vitamin content are insignificant for the vitamin supply due to the overall good nutrient supply in this country.

Important to know: According to the current state of knowledge, the BfR is not aware of any adverse health effects of pasteurisation - and even if the potentially pathogenic bacteria are killed off, pasteurised milk remains a natural food that is rich in natural and valuable ingredients.

[1] According to legal requirements, the notice ‘Raw milk, boil before consumption’ must be displayed at the point of sale.

Further information on the BfR website on raw milk:

FAQ: Avoiding infections - What should be considered when consuming raw milk?
https://www.bfr.bund.de/en/avoiding_infections___what_should_be_considered_when_consuming_raw_milk_-317046.html

FAQ: Campylobacter: The diarrhoea pathogen is often found on poultry meat
https://www.bfr.bund.de/en/campylobacter__the_diarrhoea_pathogen_is_often_found_on_poultry_meat-317843.html

Topic page on food hygiene
https://www.bfr.bund.de/en/food_hygiene-54339.html

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States ('Laender') on questions of food, chemicals and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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