

New bacteria discovered in raw milk

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Raw milk is illegal in many countries as it can be contaminated with potentially harmful microbes. Contamination can also spoil the milk, making it taste bitter and turn thick and sticky. Now scientists have discovered new species of bacteria that can grow at low temperatures, spoiling raw milk even when it is refrigerated. According to research published in the November issue of the *International Journal of Systematic and Evolutionary Microbiology*, the microbial population of raw milk is much more complex than previously thought.

"When we looked at the bacteria living in raw milk, we found that many of them had not been identified before," said Dr Malka Halpern from the University of Haifa, Israel. "We have now identified and described one of these bacteria, *Chryseobacterium oranimense*, which can grow at cold temperatures and secretes enzymes that have the potential to spoil milk."

New technologies are being developed to reduce the initial bacterial counts of pasteurized milk to very low levels. Most enzymes will be denatured at the high temperatures used during pasteurisation, which means they will stop working. However, the heat-stable enzymes made by cold-tolerant bacteria will still affect the flavour quality of fluid milk and its products. Because of this, research into cold-tolerant bacteria and the spoilage enzymes they produce is vital.

"Milk can be contaminated with many different bacteria from the teat of the cow, the udder, milking equipment and the milking environment," said Dr Halpern. "Milk is refrigerated after collection to limit the growth

of microbes. During refrigeration, cold-tolerant, or psychrotolerant, bacteria that can grow at 7°C dominate the milk flora and play a leading role in milk spoilage. Although we have not yet determined the impact on milk quality of *C. oranimense* and two other novel species (*C. haifense* and *C. bovis*) that were also identified from raw milk samples, the discovery will contribute to our understanding the physiology of these organisms and of the complex environmental processes in which they are involved. There is still a lot to learn about the psychrotolerant bacterial flora of raw milk."

There is an ongoing debate about the benefits and risks of drinking unpasteurised milk. Some people believe the health benefits resulting from the extra nutrient content of raw milk outweigh the risk of ingesting potentially dangerous microbes, such as *Mycobacterium bovis*, which can cause tuberculosis, and *Salmonella* species. Because of these risks, many countries have made the sale of unpasteurised milk illegal. Pasteurisation involves heating milk to around 72°C for 15-20 seconds in order to reduce the number of microbes in the liquid so they are unlikely to cause disease. Some bacteria produce extracellular enzymes that are remarkably heat tolerant and can resist pasteurisation. Lipase enzymes cause flavour defects and proteases can lead to bitterness and reduced yields of soft cheese.

Raw milk is consumed in rural areas of Europe and is also available in large cities. Distribution of unpasteurised milk is legal in England, Wales and Northern Ireland but illegal in Scotland. There are around 275 establishments in England that are approved by the Food Standards Agency to sell raw milk. However, the green-top bottles must display a warning that indicates the content has not been heat-treated and may contain harmful organisms. Furthermore, farmers are not allowed to sell unpasteurised dairy products if their herd is suspected to be infected with bovine tuberculosis.

"In Israel, dairy companies estimate that cold-tolerant bacteria can cause a 10% loss of milk fats and proteins. When researchers looked at these bacterial communities, they found that 20% of the bacteria isolated were found to be novel species and 5% of these were members of the genus *Chryseobacterium*," said Dr Halpern. "Because of their effect on milk quality, it is important that we develop sensitive and efficient tools to monitor the presence of these cold-tolerant bacteria."

Source: Society for General Microbiology

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