

# Antibiotic-resistant bacteria in ready-to-eat foods

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Research presented at the ASM Microbe 2017 meeting by Bryan Sanchez of California State University-Northridge in Northridge, Calif., show that antibiotic-resistant bacteria are present in many ready-to-eat foods such as fresh produce and dairy products and may serve as a source of human exposure to antibiotic-resistant bacteria. About 2 million people become infected with antibiotic resistant-bacteria annually in the United States, resulting in over \$35 billion in additional health care costs. Examining potential ways that humans can be exposed to antibiotic-resistant bacteria can help in understanding how to counter the threat.

Approximately 80% of antibiotics in the U.S. are used by the agricultural industry, mostly for [food](#) production. Ready-to-eat foods, such as [dairy](#) products and [fresh produce](#), do not undergo a "kill" step such as cooking during preparation, so [antibiotic-resistant bacteria](#) can either be directly consumed or can contaminate kitchen surfaces or other foods.

The study, conducted by a team of undergraduate student researchers lead by a graduate student (Tabitha Bayangos) in Dr. Kerry Cooper's research laboratory at California State University-Northridge in Northridge, Calif., was a preliminary surveillance aimed at quantifying the antibiotic-resistant bacteria commonly present in ready-to-eat foods. Organic or conventional fresh produce and dairy products were purchased from local grocery stores throughout the San Fernando Valley, Calif. The amounts of total bacteria and of bacteria resistant to eight

different antibiotics (ciprofloxacin, tetracycline, erythromycin, chloramphenicol, gentamicin, ampicillin, cefotaxime, and colistin) were quantified "Dairy products were found to have very low levels of antibiotic-resistant bacteria, with yogurt samples tending to have the highest amount," said Sanchez. The highest level of resistance in dairy products was found to be against cefotaxime, a broad-spectrum antibiotic used to treat numerous bacterial infections.

Both organic and conventional produce were found to have on average 10,000 times more antibiotic-resistant bacteria than did dairy products. The highest levels of resistance were again found to be against cefotaxime, as well as the last-resort antibiotic colistin. "Since antibiotics are not commonly used by the produce industry," said Sanchez, "the fruits and vegetables are most likely contaminated with soil, a natural source of antibiotic-resistant bacteria." Sequencing of the 16S rRNA gene for resistant bacterial identification found a variety of genera resistant to each antibiotic, including many that are known to be naturally resistant to those particular antibiotics. "However, we also identified a number of naturally sensitive bacteria that were found to be resistant to the different antibiotics tested. Our study shows that antibiotic-resistant bacteria are naturally present in many ready-to-eat foods such as fresh produce, but even [dairy products](#) with lower levels are directly consumed. These foods are potential sources of [human exposure](#) to antibiotic-resistant [bacteria](#)," said Sanchez.

Results of the study were presented on June 4 at the American Society for Microbiology (ASM) Microbe conference in New Orleans.

Provided by American Society for Microbiology

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