

## Garlic Compound Fights Source of Food-Borne Illness Better Than Antibiotics

Source: *ScienceDaily*

Researchers at Washington State University have found that a compound in garlic is 100 times more effective than two popular antibiotics at fighting the *Campylobacter* bacterium, one of the most common causes of intestinal illness.

Their work was published recently in the *Journal of Antimicrobial Chemotherapy*.

The discovery opens the door to new treatments for raw and processed meats and food preparation surfaces.

"This work is very exciting to me because it shows that this compound has the potential to reduce disease-causing bacteria in the environment and in our food supply," said Xiaonan Lu, a postdoctoral researcher and lead author of the paper.

"This is the first step in developing or thinking about new intervention strategies," said Michael Konkel, a co-author who has been researching *Campylobacter jejuni* for 25 years.

"*Campylobacter* is simply the most common bacterial cause of food-borne illness in the United States and probably the world," Konkel said. Some 2.4 million Americans are affected every year, according to the U.S. Centers for Disease Control and Prevention, with symptoms including diarrhea, cramping, abdominal pain and fever.

The bacteria also are responsible for triggering nearly one-third of the cases of a rare paralyzing disorder known as Guillain-Barré syndrome.

Most infections stem from eating raw or undercooked poultry or foods that have been cross-contaminated via surfaces or utensils used to prepare poultry.

Lu and his colleagues looked at the ability of the garlic-derived compound, diallyl sulfide, to kill the bacterium when it is protected by a slimy biofilm that makes it 1,000 times more resistant to antibiotics than the free floating bacterial cell. They found the compound can easily penetrate the protective biofilm and kill bacterial cells by combining with a sulfur-containing enzyme, subsequently changing the enzyme's function and effectively shutting down cell metabolism.

The researchers found the diallyl sulfide was as effective as 100 times as much of the antibiotics erythromycin and ciprofloxacin and often would work in a fraction of the time.

Two previous works published last year by Lu and WSU colleagues in *Applied and Environmental Microbiology* and *Analytical Chemistry* found diallyl sulfide and other organosulfur compounds effectively kill important food-borne pathogens, such as *Listeria monocytogenes* and *Escherichia coli* O157:H7.

Konkel cautioned that the recent work is still at the basic stage, well removed from an actual application. While eating garlic is a generally healthy practice, it is unlikely to prevent Campylobacter-related food poisoning.

However, "diallyl sulfide may be useful in reducing the levels of the Campylobacter in the environment and to clean industrial food processing equipment, as the bacterium is found in a biofilm in both settings," he said.

"Diallyl sulfide could make many foods safer to eat," said Barbara Rasco, a co-author on all three recent papers and Lu's advisor for his doctorate in food science. "It can be used to clean food preparation surfaces and as a preservative in packaged foods like potato and pasta salads, coleslaw and deli meats."

"This would not only extend shelf life but it would also reduce the growth of potentially bad bacteria," she said.