

Garlic doesn't just repel vampires

16 August 2011

The folk wisdom that eating garlic fights illness is ancient. In these more modern times, fruit and vegetable extracts that can inhibit the growth of pathogenic and spoilage microorganisms are actually being evaluated as food preservatives, in part because consumers are demanding fewer synthetic chemical food preservatives. Now, a team led by researchers from Washington State University, Pullman, has found, contrary to expectations, that a group of garlic-derived organosulfur compounds has greater antimicrobial activity than garlic-derived phenolic compounds. The research is published in the August 2011 issue of the journal *Applied and Environmental Microbiology*.

"The novelty of this paper is that we found that diallyl sulfides contribute more to antimicrobial activity of [garlic](#) extract than do phenolic compounds," says coauthor Xiaonan Lu. "We used biophysical techniques, namely infrared and Raman spectroscopy, to demonstrate that diallyl sulfide can freely penetrate bacterial membranes and combine with sulfur containing proteins and enzymes, which is the major antimicrobial mechanism of these organosulfur compounds."

"This is the first time researchers have combined infrared spectroscopy and Raman spectroscopy, which are complementary techniques, to study the mechanisms of bacterial injury and inactivation," says Lu. "While previous studies have validated that volatile thiosulfinates, a group of intermediate, unstable and volatile bioactive sulfur-containing compounds, have antimicrobial activity against *Helicobacter pylori*, our result demonstrated that the garlic-derived organosulfur compounds have the potential to be used as antimicrobial agents."

Campylobacter jejuni, the target microbe in this study, is thought to be the most prevalent cause of bacterial food-borne illness in the world, causing abdominal cramps, fever, and diarrhea accompanied by gross blood and leukocytes. There are no previous reported studies investigating the ability of allium species, including

garlic, to control the growth of *C. jejuni*.

The history of using garlic to fight disease goes back several thousand years, says Lu. That history probably contributed to the notion that garlic could repel vampires, which predates Bram Stoker's *Dracula*, according to the website [garlic-central.com](#). "In ancient society," says Lu, "people used garlic to cure diseases; however, they did not know why it worked." Now we are finding out.

More information: X. Lu, et al., 2011. Investigating antibacterial effects of garlic (*Allium sativum*) concentrate and garlic-derived organosulfur compounds on *Campylobacter jejuni* by using Fourier transform infrared spectroscopy, Raman spectroscopy, and electron microscopy. *Appl. Environ. Microbiol.* 77:5257-5269.

Provided by American Society for Microbiology

APA citation: Garlic doesn't just repel vampires (2011, August 16) retrieved 11 May 2021
from <https://phys.org/news/2011-08-garlic-doesnt-repel-vampires.html>

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