

The detoxifying effect of microbes

September 20 2012

Heavy metals and other toxins frequently contaminate food and water. The culprits read like a litany of bad actors—lead, cadmium, mercury, arsenic, chromium—but their numbers run into the thousands. Microbes have long been enlisted for bioremediation, but they also have the potential to protect us from toxins, according to a minireview in the September *Applied and Environmental Microbiology*. "Beneficial bacteria are indeed capable of degrading pesticides and sequestering toxic chemicals," says coauthor Gregor Reid of the Lawson Health Research Institute, London, Ontario.

Indeed, 40 to 60 percent of metals ingested by humans into the gastrointestinal (GI) tract do not breach the intestinal barrier, and host microbiota play an important role in preventing their entry, says coauthor Jeremy Burton, of Lawson. Lactobacilli are prominent denizens of the GI and vaginal tract, and are also frequently used in fermentation, says Burton. That raises the possibility of applying them to other foods to sweep [harmful compounds](#) from the gut, and even decontaminating environmental sites. "If the metal is trapped in or on a bacterial cell, it can pass harmlessly from the body via feces," he explains.

The concept grew out of Reid's group's interest in how lactobacilli can improve urogenital health in women. "We realized that lives could be improved by the relatively simple approach of using probiotics that pass through the gut and ascend to the vagina," says Reid. That led to development of several probiotic yogurts, one of which was transferred to local community kitchens in Tanzania, Kenya, and Rwanda, where it has been shown to help people infected with HIV who were

malnourished and suffering from diarrhea.

"As large parts of the world, including Africa's [Lake Victoria](#) [the world's second largest freshwater lake by surface area], are contaminated by a host of [toxic compounds](#), we thought it would be worth seeing if lactobacilli could counter the toxins," says Reid.

The researchers hope their minireview will spur discussion of these ideas, and further experimentation. "We are testing this theory in several studies, and would welcome collaborations to explore just how much of a detox effect can be achieved through microbes and food," says Burton.

More information: M. Monachese, J.P. Burton, and G. Reid, 2012. Bioremediation and tolerance of humans to heavy metals through microbial processes: a potential role for probiotics. *Appl. Environ. Microbiol.* 78:6397-6404. [DOI:10.1128/AEM.01665-12](https://doi.org/10.1128/AEM.01665-12)

Provided by American Society for Microbiology

Citation: The detoxifying effect of microbes (2012, September 20) retrieved 19 April 2024 from <https://phys.org/news/2012-09-detoxifying-effect-microbes.html>

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