

Filtering out pesticides with *E. coli*

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Genetically modified bacteria could be used in air filters to extract pesticide vapors from polluted air thanks to work by researchers in China published this month in the *International Journal of Environment and Pollution*.

The bacteria *Escherichia coli* is perhaps best known as a [bacterium](#) that can cause food poisoning and in one form, the O157:H7, can damage the kidneys and even be lethal. However, [E coli](#), is commonly used in biological research as a model organism for a wide range of beneficial experiments. Now, researchers in China have discovered that a genetically modified form of the bacteria can be used in a biofilter to extract the toxic pesticides, parathion and methyl parathion from the air.

Junxin Liu of the Chinese Academy of Sciences in Beijing, and colleagues have demonstrated average removal efficiencies of 95.2% for parathion and 98.6% for methyl parathion using a biofilter based on the engineered bacteria *E. coli* BL21. Optimization of the system might allow up to 100% removal. The team explains that compared to conventional biofilters, their system was far more effective, especially in the initial stages of filtering. The pesticides are broken down to p-nitrophenol as well as nitrate and sulfate byproducts. These byproducts are then quickly "mineralized" by other naturally occurring microbes present in the biofilter.

Organophosphorus pesticides, including parathion and methyl parathion, are highly effective agrochemicals amounting to more than a third of [agricultural crop](#) protection worldwide. Unfortunately, they can

accumulate in the environment and pose a risk to human health under some conditions. Bioremediation of water and soil using [bacteria](#) that can break down these compounds is being developed. However, Liu and colleagues have focused on air purification using biofilters.

More information: "Simultaneous removal of parathion and methyl parathion by genetically engineered *Escherichia coli* in a biofilter treating polluted air" in *Int. J. Environ. Pollut.*, 2011, 45, 3-14

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