

Urban gardeners can take simple precautions to avoid contaminants

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Visitors from the non-profit organization called Keeping Indianapolis Beautiful visiting the test plot.

Green thumbs, do not fret. Pockets of soil in urban areas are still available for the increasingly popular practice of urban gardening.

And while the proximity of these soils to pollution and industry can increase levels of contamination by harmful compounds, some scientists have found that the risks associated with gardening in these soils may not be as high as first thought.

Researchers at Kansas State University have looked into how [vegetables](#) take up different [soil contaminants](#). They also considered how different

gardening practices could reduce this uptake. They found that, in the majority of examples, eating vegetables grown in the contaminated soils studied was safe.

The researchers grew tomatoes, collard greens and carrots in the soils. Previously researchers looked at lead contamination in city soils. This time they also looked at arsenic and compounds called [polycyclic aromatic hydrocarbons](#), which are potentially cancer causing.

The group found that almost all of the vegetables grown in the soils had low levels of all of the contaminants. The safety of root crops, such as carrots, was less certain. Root crops can uptake levels of lead in their roots that are at or slightly above the United Nations' Food and Agriculture Organization and World Health Organization's joint safety standards.

However, Ganga Hettiarachchi, a scientist at Kansas State University, cautions against using these results as a reason not to grow an urban garden.

"It's important to know how these safety levels are calculated," she explained. "A person isn't going to be eating those carrots for every meal 365 days a year. In the grand scheme personally I wouldn't worry much about the possibility of contaminants in carrots because I know I'm not really eating that much carrot."

She added that, as a precaution, concerned gardeners could grow carrots in containers filled with clean soil.

The presence of lead in the soils is a result of leaded gasoline and lead-based paint use. Arsenic can get into soil from arsenic-based pesticides and wood preservatives. The burning of fossil fuels and creosote can cause buildup of the hydrocarbons that were studied.

Soil naturally contains these compounds but elevated levels are most likely due to these processes sources, Hettiarachchi added.

"Fruiting vegetables, leafy vegetables and root vegetables all take up nutrients and accumulate contaminants differently and that's why we tested three different types of plants," she said. "To those worried about possible soil contamination we say to get your soil tested and avoid directly ingesting it."

The study identified numerous ways to reduce the risk of this type of direct exposure to these specific contaminants.

First, researchers tested different cleaning methods on the vegetables to see which worked best to decrease the chance of consuming soil particles. While laboratory cleaning with a type of soap was most successful, thorough washing with water was also helpful.

"Thorough washing is definitely the key," Hettiarachchi said. "Soap isn't even really necessary if you wash all of the visible soil off with water in your kitchen. The main point is to make sure you're not intentionally eating soil."

They also tested the effectiveness of different composts in lowering the concentration of contaminants in these vegetables.

The researchers didn't find a specific compost type reduced the contamination best. Instead, the data showed adding any compost can dilute the soil's concentration of contaminants.

"It's easy to see how by simply adding compost to the [contaminated soil](#), you can increase the volume and dilute the contaminant levels," she said. "Besides compost, an urban gardener can also bring in outside clean soil to help dilute the contaminant levels."

A last suggestion from Hettiarachchi is to be sure the nutrient levels in the [soil](#) are appropriate. Research shows plants are less likely to take up [contaminants](#) when they have ideal nutrients.

"Soil chemistry is complex and people need to understand that even though there may be contamination, there are countless factors, including plant factors, that determine whether it will be taken up by plants," she said. "The most important thing is that you test your soils to get to know your soils better. In the end the benefits really outweigh any possible contamination if testing is done and precautions are taken. Urban gardens give people access to fresh fruits and vegetables and are also good for physical, mental and community health."

More information: "Potential Bioavailability of Lead, Arsenic, and Polycyclic Aromatic Hydrocarbons in Compost-Amended Urban Soils." [DOI: 10.2134/jeq2014.09.0400](https://doi.org/10.2134/jeq2014.09.0400)

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