

## HEAVY METALS IN YOUR SOIL?<sup>1</sup>

Chaya, Networx<sup>©</sup>

Urban gardens have become a popular pastime for city dwellers looking to add a touch of beauty and homegrown vegetables into their lives. However, the chances of toxins lurking below your homegrown tomatoes and carrots are dangerously high. Unhealthy concentrations of heavy metals in urban gardening soil are becoming an increasing concern in metropolitan areas throughout the United States. Read on to learn more about where these toxins came from and what you can do about them.

### What Are Heavy Metals?

Heavy metals are a group of metals that are toxic to humans and animals if ingested in high quantities. Lead, mercury, copper, zinc, cadmium, nickel and iron are some of the more common heavy metals that present a danger to the food chain. These toxic metals can cause serious disorders in the human nervous system, as well as being detrimental to the blood system. Most heavy metals occur naturally in trace amounts in all earth. Lead, for example, can be found at an average rate of 10 parts per million (ppm) in all surface agricultural soil. It can range from as little as 7 ppm to as much as 20 ppm naturally. Lead levels above this amount are usually a result of industrial contamination from lead-based paint and auto emissions.

### Sources of Lead Exposure

Lead contamination in soil is highest around building foundations and near highly trafficked streets. “It comes mostly from past historical use. A lot of it is industrial and anything that has to do with heavy auto equipment,” says expert Allison Turner, who published a paper last year on Urban Agriculture and Soil Contamination through the Center for Environmental Policy and Management at the University of Louisville.

High concentrations of contaminants are usually due to gasoline auto emissions and lead-based paints from walls and windows that may have chipped over time and mixed with the surrounding soil. “Lead is a chemical element, so it can’t break down any further than it already is,” explains Extension Associate Hannah Shayler of the Cornell Waste Management Institute. Lead dust can also float through the air and land on people, plants, animals and water sources and is dangerous if inhaled or ingested. Another source of contamination comes from the remnants of old pesticides that were made with lead arsenate. “Syracuse, for example, used to be apple orchards and up until the 1940’s or so, they used to spray those orchards with lead arsenate pesticides. Therefore there’s high levels of lead in many areas of Syracuse,” says Venera Jouraeva, a visiting Assistant Professor at the State University of New York Oswego.

### Lead in Garden Plants

Luckily, most vegetable and fruit crops don’t absorb high levels of lead into themselves even if planted in areas with lead contamination. “Each plant has various degrees of absorbance,” says Jouraeva. “But lead is usually not transmitted through shoots.” The most danger with regard to lead poisoning comes instead through direct ingestion of contaminated soil. This usually

---

<sup>1</sup> Care2, healthy & green living, September 14, 2010

happens when children play in toxic soil and get it into their mouths or when people eat contaminated soil found on the exterior of unwashed produce. If children aren't a concern and you are vigilant about washing home grown produce, it is generally considered safe to do your gardening in soils that have a total lead level of less than 300 ppm, according to the U.S. Environmental Protection Agency. If, however, you have children playing in or near your garden, then the possibility of hand to mouth activity heightens the chances of lead ingestion. Children are also more vulnerable to lead poisoning because their nervous systems are not yet fully developed and their bodies offer higher absorption from the gastrointestinal tract than in adults. Therefore, if children play on or near your property, it's safest if you only do your gardening in land that tests out at lead levels of less than 100 ppm. As long as your soil's lead level meets the requirements as explained above, then all you have to do is simply wash away the unsafe dirt on the outside of crops like corn, beans, squash, tomatoes, strawberries and apples. You have to be a bit more careful with leafy vegetables and root crops that have the potential to absorb more toxins from contaminated soil. In these cases, you will need to remove the outer leaves of plants like lettuce or peel off the outer layer of vegetables like potatoes and carrots. In all cases, you should carefully wash any produce that may have been exposed to lead with water and vinegar or soap.

### **How to Deal with Contaminated Soil**

If your urban garden has high levels of heavy metals and you still want to be able to grow edible produce, Jouraeva says to start off by "growing away from the road and away from buildings where the quality of the soil is probably better." Then there are three solutions you can use to deal with contaminants in the soil there:

- **Physically remove the contaminated soil:** You will probably need to hire a professional contractor to do this, which Shayler says may be prohibitively expensive and "doesn't solve the problem, it only moves it."
- **Cover up and start over:** Clear the area of any visible paint chips and cover the contaminated soil with raised beds or landscape fabric and a new layer of fresh soil. Heavy metals do not move or seep upwards, so as long as the old and new soils don't mix, you can simply cover up the dangerous soil with good healthy soil and start over fresh. "This will actually allow you to grow your plants in a better environment," encourages Shayler.
- **Add a coating of organic matter to your soil:** "This will bind the contaminants and make them less available to the plant," says Shayler. You should add one-third as much organic matter as there is contaminated soil. Compost, non-acidic peat and manure are all good sources of organic matter. "Even just adding extra compost will dilute the concentration of contaminants and make the soil better off," she concludes.

Research is also currently being done on a process called bioremediation, which essentially grows the heavy metals out of the soil and into plants that can absorb the toxins. Then the heavy metal-ridden plants are harvested and removed so that only clean soil is left underneath. This process is thought to be useful for the removal of cadmium, zinc and copper, but is currently not viable for lead and is therefore not a great option for city dwellers. If you think your property might contain problematic soil, call your local environmental agency and ask where you can have your soil tested. "It's better to make informed decisions so you can remain proactive and don't have to be worried," says Shayler. Better to be safe than sorry. Good luck with your urban garden project, and let us know how it goes.