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For more information,  
contact: Jesse Gilmore  
Horticulture Agent, Wildcat Extension District  
[jr637@ksu.edu](mailto:jr637@ksu.edu), (620) 724-8233

## **Soil & Heavy Metals – Are They a Problem?**

We recently had a soil test for some industrial topsoil come back high in lead levels. Care should be taken when acquiring topsoil from more urban or industrialized land because these soils could have higher levels of heavy metals. However, this is not *necessarily* a problem, depending on your exposure to the soil. Heavy metal is a general term for any element with a mass higher than iron, and overexposure to heavy metals can cause chronic health problems. The four heavy metals with the highest soil concentrations are arsenic, cadmium, chromium and lead. These metals all occur naturally in soil to some extent, but industrial applications that use these metals make contamination more likely.

Lead is by far the most significant of these four contaminants because of its health effects and widespread industrial application. Background levels of lead in Kansas soils can range anywhere from 50ppm to 200ppm. According to the Environmental Protection Agency (EPA), the allowable maximum of lead in soils is 2,000ppm. Any higher and the soil either needs to be decontaminated or removed. However, for children, the maximum lead exposure limit is 400ppm, since lead can cause developmental issues. Keep in mind that there is no “safe” amount of exposure – you always want to limit possible exposure if you can. Topsoil from nurseries and garden centers should not contain any extra contamination, but if you’re thinking of purchasing topsoil from more urban areas, it might be worth getting a test done through your extension office to see if any extra soil management will be needed.

If your soil does come back hot in heavy metals, you can still use the soil, but you need to exercise caution, especially when gardening in it. Contrary to popular belief, lead does not end up in the food you grow in contaminated soils in any excessive quantity. This is because lead is immobile in the soil. A minor amount of lead will be taken up, but the more likely exposure pathway is inhalation of dust for adults, and ingestion for kids. You can minimize the risk of exposure in the garden by following these tips:

- Grow “upstream” vegetables. The further the heavy metal has to travel in the plant, the less of it will end up in the parts you eat. Fruiting vegetables like tomatoes and peppers will have lower lead levels than leaf vegetables like lettuce or spinach.

- Grow vegetables that are easier to clean, and avoid growing root vegetables. Lettuce is again an example offender because dirt can end up trapped inside the head, where it is then ingested. Root vegetables are also discouraged because of the deep cleaning that they would require to prevent soil ingestion.
- Make sure your soil organic matter and pH levels are high. Studies in Toledo and Seattle have shown that soil lead concentrations fell by almost half when compost was incorporated into the soil. When purchasing topsoil, consider adding compost or manure to it.
- Sometimes residential soils will also have elevated lead levels thanks to lead-based paints. Don't leave bare soil in your landscape, where children can play and ingest it, or where the wind can kick up dust. Grow plants or turf in the soil, mulch the soil, or cover it with a tarp if the soil is going to serve as a foundation for a structure.
- Wash gardening clothes separate from other laundry, and clean all tools after use.
- Make sure that soil nutrient levels are where they need to be for a garden. The more nutrients, (especially phosphorus) a soil has, the less will be available to plants to take up into vegetative tissue.

Because soil fertility is an important part of keeping lead unavailable to plants, it's important to have regular soil samples. Extension offices can take soil samples for both plant nutrients and heavy metals if they are a concern. Get in touch with your county office for more info.

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