

Lead in Garden Soils

INTRODUCTION

We don't usually think of our gardens as dangerous or toxic, but unfortunately, some garden soils do contain moderate to very high levels of lead. Garden soils contaminated with lead pose a serious health risk. The risk is primarily from contaminated soil brought into the home on clothing, shoes and tools. The soil becomes mixed with housedust that is inhaled or ingested. This can result in dangerous increases in blood lead levels, particularly in infants and toddlers. Lead may also be ingested from contaminated soil clinging to vegetable crops. However, lead uptake by plant roots and deposition in edible plant parts is very low, even when soils have a very high lead content.

SOURCES OF LEAD

Chipping or peeling paint around older structures will raise the lead level in the soils directly adjacent to the building. Even today, when an old building is demolished, the soil can become contaminated with lead from old lead paint. In the 1950's, cheaper titanium pigments largely replaced lead pigments. Federal restrictions were not imposed until the late 1970's. Today paint companies are allowed to mix up to 0.05% lead in paints. However, the lead content of commercial and artist's paints is not restricted.

Soil can be contaminated with lead from several other sources - industrial sites, from leaded fuels, old lead plumbing pipes or even old orchard sites in production where lead arsenate was used. Lead accumulates in the upper 8 inches of the soil and is highly immobile. Contamination is long-term. Without remedial action, high soil lead levels will never return to normal.

HEALTH RISKS

We do not require lead in our diet or environment. At very low levels that naturally occur in soils (15-40ppm), no detrimental health effects have been noted. But higher soil lead levels can raise the body's lead level without producing any obvious physical symptoms. Young children under the age of 6 and pregnant women are at the greatest risk. As a group, children exposed to lead have lower IQs and may experience permanent learning disabilities and behavioral disorders when compared to children not exposed to lead.

SOIL TESTING

Testing for lead will help to evaluate the potential risk to health. The risk is based on exposure. Both private and university soil test labs can determine lead levels in soils. However, no legal regulations for soil lead levels are in effect.

Soil laboratory results will be returned listing the parts per million (ppm) of lead from either an extracted or total lead test, or both. Pay careful attention to the total lead values. The values in Table 1 will help you understand your test results.

Table 1.
Soil Lead Levels

Relative Soil Lead Levels	Total Lead (ppm)
Low	0 - 499
Medium	500 - 999
High	1000 - 3000
Very High	above 3000

Soil samples should be taken from several areas to determine the location of the contamination. The greatest lead concentration is in the top 1 to 2 inches of soil. Children's play areas or vegetable gardens should be sampled separately. Avoid mixing several sites into one sample.

REDUCING HEALTH RISKS

Gardeners can reduce the risk of lead poisoning from lead contaminated soils by following the methods listed below:

- Locate fruit and vegetable gardens away from old painted buildings, heavily traveled roads.
- Contaminated soil particles are more likely to cling to or become imbedded in leafy greens and root crops than on fruiting vegetables like tomatoes and cucumbers. Always wash all vegetables and peel all root crops before they are cooked and eaten. Remove the outer wrapper leaves of cabbage. Wash off excess soil from root and leaf crops outside the house, preferably at an outside hose bib, to prevent bringing contaminated soil into the home.

- Rinse and launder gardening clothing promptly. If possible, don't allow young children to play in contaminated soils. Frequent hand washing and rinsing outside toys will reduce the amount of soil ingested. Always wash hands before eating meals or snacks. Have family members leave outdoor shoes in a cardboard box at the door, to avoid spreading lead contaminated dust through the home. Mulch play areas with wood chips or other soft materials to reduce soil dust. Build a plastic lined sand box for a clean area to play.
- Parents of children under age 6 living in areas with contaminated soils should consult their physician. A blood test to monitor lead levels may be recommended.
- The amount of lead absorbed by plants is affected by the pH, organic matter and the phosphorus content of the soil. To reduce lead uptake by plants, adjust the pH of the soil with lime to a level of 6.5 to 7.0. Add organic matter such as compost, manure, leaf mold, or grass clippings to the gardening site. Add phosphorus to the soil as recommended by a soil test.
- In heavily contaminated soils adjacent to a residence, plant trees, shrubs or perennials and mulch the area to minimize annual tilling and cultivation operations. When the soil lead level is over 5000 ppm total lead, the garden soil should be removed and replaced with clean topsoil. Test the new topsoil for soluble salts, pH, and the standard nutrients (phosphorus, potassium and magnesium), before making a purchase. Testing for lead and other heavy metals is recommended especially if the topsoil is from an urban area.
- No food crops should be grown in a soil that is heavily contaminated. In these cases, container gardening or construction of raised beds filled with purchased soil is recommended.

We are increasingly concerned with environmental quality and the need to protect ourselves from toxins. Lead is another unwelcome environmental concern. For further information on lead in Maryland contact the Department of the Environment at 410-631-3820 or your local health department.

Soil Testing Labs

The following list of laboratories is by no means complete and is intended for reference only. Mention of businesses in this publication does not constitute an endorsement by the Cooperative Extension Service.

University of the District of Columbia
Cooperative Extension Service
901 Newton St. N.E.
Washington, DC 20017
Phone 202-274-6907

Soil and Plant Tissue Testing
West Experiment Station
University of Massachusetts Amherst, MA 01003
Phone 413-545-2311

Martel
1025 Cromwell Bridge Road
Baltimore, MD 21286
Phone 410-825-7790

A and L Eastern Agricultural Testing Laboratory
7621 White Pine Rd.
Richmond, VA 23237
Phone 804-743-9401

American Environmental Network
9151 Rumsey Road
Columbia, MD 21045
Phone 410-730-8525

Fredericktown Lab
Myersville, MD 21773
Phone 301-694-7133

American Medical Labs
14225 Newbrook Dr.
Chantilly, VA 22021
703-802-6900

Fees and soil preparation procedures vary. Contact the individual lab for their procedures and charges before sending the sample.

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