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Home Gardening in Lead-Contaminated Soil

The Issue

Lead is a toxic metal. While it occurs naturally in the environment, high soil lead levels in gardens usually result from contamination.

Understanding the sources and considering ways of reducing exposure allows home gardening to be enjoyed in affected areas.



Health Risks from Lead-Contaminated Soil

Recent scientific research suggests that human health may be influenced by lower levels of lead exposure than were previously studied. This is especially true for infants, young children, and pregnant women. Symptoms of regular low-level exposure can include anemia, nervous system damage, appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability and headache.

Lead Levels in Soil

Lead in surface soil in residential communities is commonly higher than 200 ppm. In older, urban residential areas lead in soil may range from 500 to 1000 ppm. Where historically there have been commercial or industrial operations alongside residences, lead levels around homes may be higher. Unfortunately, there are no reliable home test kits for estimating lead levels in soil. Samples need to be sent to an accredited commercial laboratory. At the time of publication of this fact sheet, the cost is between \$35 and \$100. For more information, call the Ministry of Environment office or the Public Health Department in your area.



Sources of Lead in Soil

Lead contamination usually originates from one or more of the following sources:

past and current industrial fallout, old external paint, past use of leaded gasoline and lead-containing pesticides, street dust and industrial waste disposal. Consequently, when planning a garden, closeness to the following lead sources should be taken into account.



- Industrial fallout from metal mining, smelting and refining operations, battery plants and other heavy industries.
- Lead-based paint, which was widely used in the 1940s, declined in the 1950s and was banned in Canada in 1976. Soil can be contaminated by flaking or scraped exterior paint and lead dust particles from sanded paint.
- Leaded gasoline was available until the mid 1980s and was banned in Canada in 1990. Combustion of leaded gasoline produced lead-rich exhaust particles. Contamination is highest adjacent to roadways, parking areas, and driveways.

Planning a Garden When You Suspect Lead Contamination

Choosing an Appropriate Site

It is important to have your soil tested if you suspect there is lead contamination. Areas of concern could be:

- within 5m of older buildings once painted with lead-based paints.
- within 30m of major roadways and parking areas which are more than 30 years old.
- within 2 km of existing or former industries identified under Sources of Lead in Soil, above.

Developing Garden Plots

Reducing the risk of exposure to contaminated soil can be accomplished in a number of ways. The measures taken depend somewhat on what type of gardening is intended. Perennial or ground cover plants will require different solutions than vegetable gardens. Some general guidelines can be suggested.

- Place a barrier such as plastic sheeting between contaminated and clean soil; provide for bed drainage.
- Build containers or raised beds, and fill with uncontaminated soil. Avoid pressure-treated wood to prevent leaching of preservative chemicals.
- Cover the soil of ornamental flowerbeds with mulch to minimize exposure to contamination.
- Increase soil organic matter by adding compost, manure, and other organic soil amendments. This will help reduce plant uptake of soil lead as other nutrients are more readily available.
- Add high calcium lime or dolomite to soil to neutralize pH levels and reduce lead uptake into plants.
- Lightly moisten contaminated soil while handling to minimize dust.
- Replace contaminated soil with clean fill.

Choosing Plants for Your Garden

The plants you select for your garden can affect how much soil exposure you face. Perennials and ground covers require less regular soil preparation than most annual plants. Some vegetables are less suited for contaminated soil than others. With the results of a soil test, you can determine the relative safety of consuming homegrown produce. Some rough guidelines on vegetable selection can be helpful and are outlined below.

- Seeds and fruits typically have lower lead concentrations than do leaves, stems or roots.
- Roots and tubers usually have the highest lead concentrations (the skins having higher lead concentrations than the inner flesh).
- Fruit crops such as tomatoes, berries, apples and cucumbers present a lower risk because they take up and store very little lead.
- Leafy greens can be prone to higher external contamination uptake and storage.

Cleaning Vegetables to Minimize Exposure

It is important to clean vegetables thoroughly before eating in order to minimize exposure to contaminated soil. Remembering a few basic guidelines is important.

- While gardening, do not eat unwashed produce or any other foods.
- Wash garden crops with water before bringing them into the house.
- Wash fruit and vegetables with a produce soap or spray, a scrub brush, and plenty of fresh water before serving or preparing.
- Root crops should be peeled to remove skins.
- Rough-surfaced crops like broccoli and lettuce can trap dust and must be washed thoroughly.



Other Guidelines for Healthy Gardening Practices

Gardening can be a wonderful and safe activity when proper attention is paid to precautions.

- Wash hands and all other exposed body surfaces after gardening.
- Keep young children away from soil contaminated with lead.
- Wash soil from gardening tools and supplies outside after each use, and store tools outside.
- Designate certain clothing, including footwear for gardening use and store outside.
- Remove gardening footwear before entering the house.
- Be aware of pets, particularly dogs, and their exposure to soil dust—regularly brush them outside.

Sources

- Gardening on Lead- and Arsenic- Contaminated Soils, Frank Peryea, Washington State University, 2001.
- Effects of Lead on Human Health: It's Your Health, Health Canada (available online).
- Frequently Asked Questions About Lead Contamination: Fact Sheet, Ontario Ministry of the Environment, March 2001 (available online).
- Lead in Your Home. Canada Mortgage and Housing Corporation. Revised and reprinted 2004 (available online).

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