

Heavy Metals in the Garden

Gardeners have become more aware of the health risks of eating vegetables grown where there are high levels of heavy metals. (They aren't all "heavy," and scientists think this is a misnomer.) Lead, cadmium and arsenic can be present in our environment from many different sources.

High lead levels can usually be traced to lead paint, lead pipes and motor vehicle exhaust. If the site once held a building, fence or other painted structure, paint flakes may have entered the soil. Our common use of wood here in the Northwest means that painted surfaces are also more common than in some regions.

The worst cadmium contamination in our area is near or downwind from the old Tacoma smelter. Cadmium in soil may also have come from car exhaust, commercial fertilizers, and other sources.

Arsenic is another by-product of smelting metals. It also may accumulate where coal was burned or where arsenic-containing pesticides have been sprayed.

Now that we realize the danger, much less heavy metal contamination is happening. New paint and pipes don't contain lead. Unleaded gas is widely used. The Tacoma smelter is history, and factories and coal-burning power plants are carefully engineered and closely monitored to minimize pollution. Fertilizers and pesticides don't add to the problem the way they did in the past.

Even sewage sludge, which often contained high levels of heavy metals, is now relatively free of heavy metals. Now called

"bio-solids," sludge is being used as fertilizer in agriculture and home gardens.

Unfortunately, heavy metals contaminating soils from past activities don't break down or go away. If they are there, we need to learn how to deal with them.

What locations are most likely to have heavy metal problems?

- > Site of a pre-World War II painted building, which has since been demolished.
- > Site near a heavily traveled highway or main arterial.
- > Site where cars were repaired or where a garage was located.
- > Site of a former orchard or truck-farm.
- > North Tacoma, South Vashon and Maury Islands and, to a lesser extent, the Gig Harbor and Brown's/Dash Point areas.

Heavy metals are found naturally in all soils. They are only a problem where they are present in concentrations far exceeding normal background levels. Ingestion of small amounts of heavy metals over a long period of time can build up to toxic levels.

Arsenic is less of a problem than cadmium and lead. It is not readily absorbed by plants. Dust stirred up from high arsenic soils may settle on plants. Careful washing, especially of leafy vegetables, and peeling root vegetables will protect you.

Cadmium is taken up by vegetables, but it is likely to be a problem only in areas affected by the smelter. In these sites it is best to build tall, framed, raised beds for your edible crops. Fill them with soil brought in from outside the smelter fallout area. You

can also grow the crops that are least likely to take up cadmium, such as squash, tomatoes, peppers, beans, corn and peas and some root vegetables, such as beets, turnips and radishes. Leafy crops should be avoided, and carrots and potatoes have also been shown to absorb cadmium.

Lead is the heavy metal that has been written about most, because it is the most likely to be present at elevated levels in garden soils. Before you develop a new food garden site, it would be wise to have your soil tested. **See Fact Sheet #6 Soil Testing and Soil Improvement.** Unless the lead level is very high, you can still grow vegetables if you reduce your risk in the following ways:

Locate your vegetable garden at least ten feet away from heavily traveled roads and old painted structures. It appears that past high levels of air-borne lead may have settled on building surfaces and been washed off with rain. Consequently, all soil near foundations of old buildings in large cities should be suspected of having high lead levels.

Lime your soil to keep the pH between 6.5 and 7.0. The soil acidity common in our region magnifies the problem, since a low pH (acidic) makes lead more available to plants.

Add lots of organic matter, such as composted yard wastes and composted manure.

Grow mostly fruiting crops such as peas, beans, tomatoes, peppers, eggplant, squash, cucumbers, and corn.

Discard old, outer leaves of vegetables before eating, peel root crops, wash all produce thoroughly. Research at Cornell has shown that lead particles from dust on the surface of plants are easily removed with a

1% vinegar or dishwashing detergent solution. A 1% solution is approximately 1 tablespoon per 1 ½ quarts of water.

Wash hands well after gardening, especially before eating. Make sure small children do not eat garden soil.

Dig your beds deeply, so that more root growth can happen in the lower, less contaminated, levels of the soil.

Keep dust and dirt contamination down by using organic mulches around your vegetables.

Most fertilizers do not contain a significant amount of heavy metals. Nitrogen and potassium fertilizers are generally non-toxic. However, phosphate fertilizers often contain cadmium. Both synthetic and organic micronutrient fertilizers can contain toxic elements. This is due to the recycling of industrial byproducts into fertilizers.

According to the University of Massachusetts, a lead level of less than 33 ppm (parts per million) extracted (500 ppm estimated total lead) is low and no danger, if good gardening practices are followed. At 33-110 ppm extracted (500 to 999 ppm estimated total) the risk level is medium. Pregnant women and young children should avoid soil contact. If there is knowledge or suspicion of lead exposure and ingestion, contact your physician or local health department for guidance.

For high levels, 110-857 ppm extracted (1000-3000 ppm estimated total) do all of the above and grow only fruiting crops. Think about using containers or raised beds filled with clean topsoil mix.

5/10