

Is my garden safe?

At this time, there are no definitive standards for soil contaminant levels safe for food production that reflect the soil site conditions and management practices common in community gardens. In the 1990s, the Environmental Protection Agency (EPA) established what are known as Soil Screening Levels (SSLs), which often serve as a general guide regarding levels of contaminants in soils. However, because these values were not developed for **Urban Community Gardens (UCGs)** specifically, they may not be able to address contaminants in UCGs that may impact gardeners.

Should I garden?

The possibility of contamination at a garden site should not keep you from gardening there!

By understanding the state of the environment in and around your garden site and by learning how contaminants arrive in and on different produce, it is possible to reduce the amount of contaminants you and your garden come in contact with while continuing to grow healthy, nutritious food.

Who is most at risk?

While contaminants in gardens can affect anyone who uses the garden, **young children** and the **elderly** are most at risk. In addition to other biological factors like **general health and lifestyle**, and **inherited family traits**, possible health effects of exposure to any contaminant depend on its particular **toxicity**, the **level** at which it is present, as well as **how long** and **how often the exposure occurs**.

What plants should I be concerned about?

Best plants to grow in contaminated soils:

- **Vegetable Fruits and Seeds:** tomatoes, eggplant, peppers, okra (seed pods only), squash (summer and winter), corn, cucumber, melons, peas and beans (shelled or cleaned very thoroughly), onions (bulb only)
- **Tree Fruits:** apples, pears
- **Berries:** blueberries, strawberries, raspberries, blackberries (if cleaned very thoroughly)

Less suitable for contaminated soils:

- **Green Leafy Vegetables:** lettuce, spinach, Swiss chard, beet leaves, cabbage, kale, collards
- **Herbs,** like basil and rosemary
- **Other Vegetables:** broccoli, cauliflower
- **Root Crops:** carrots, potatoes, turnips

Tips to Reduce Exposure:

- **Wear a bandana or face cover** when handling dust and soil
- **Supervise small children** in garden settings (indoor plants, too)
- **Wear gloves** as a barrier between your hands and soil and **avoid touching your face** while working with soil.
- **Wash your hands** after handling soil and produce.
- **Remove the outermost leaves of leafy greens**
- **Ask your garden manager** if past uses of your garden site are known or if your site has been tested before.

Resources

- EPA Urban Garden Fact Sheet." 2011. <https://www.epa.gov/brownfields>
- Augustsson, Anna. "Metal uptake by homegrown vegetables- The relative importance in human health risk assessments at contaminated sites." 2015.
- Turner, Allison. "Urban Agriculture and Soil Contamination: An Introduction to Urban Gardening." 2009.
- Shayler, Hannah et al. "Soil Contaminants and Best Practices for Healthy Gardens." 2009.



Garden Safe



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Why collect soil samples?

We are looking for potentially harmful chemicals in community gardens in order to help gardeners and their communities stay safe. Community gardens provide great benefits (and delicious food!) to the gardener, their families, and their communities, but often the places where community gardens are now have previously been **sites of industrial use**. These sites are not always cleaned up to the highest standard before they are repurposed into gardening spaces, meaning that the soil that gardeners previously used to grow their food could have potentially unsafe chemicals in it.

What is a soil background?

A **soil background** is kind of like a soil's "family history"- soil backgrounds focus on the concentrations of contaminants that are either naturally occurring or were a result of historical human activity that are not influenced by that area's current use.

How do I read the data about my garden?

This table is an example of what the **soil screening** results for your community garden might look like. This chart compares the actual amount of arsenic found in the samples to the maximum amount of arsenic you should be exposed to.

Each exposure pathway has different thresholds. For example, the arsenic levels in CS-3 are over for **ingestion** but not **dermal contact**.

Screening Levels versus Actual Detections											
Lab Results			Arsenic Results								
Sample Name	Arsenic (mg/kg)	Actual Detection	EPA RSL Arsenic Ingested (mg/kg) (1)	Actual Detection	EPA RSL Arsenic Dermal (mg/kg) (1)	Actual Detection	WA DOE Arsenic Cleanup Level (mg/kg) (2)	Actual Detection	ECO-SSL Arsenic (mg/kg) (3)	Actual Detection	Background Arsenic in Puget Sound in King County WA (mg/kg) (4)
Screening Levels			0.77		5.5		20		4.5		7
CS-1	-	-	0.77	-	5.5	-	20	-	4.5	-	7
CS-2	5.5	5.5	0.77	5.5	5.5	5.5	20	5.5	4.5	5.5	7
CS-3	5.1	5.1	0.77	5.1	5.5	5.1	20	5.1	4.5	5.1	7
CS-4	4.5	4.5	0.77	4.5	5.5	4.5	20	4.5	4.5	4.5	7
CS-5	4.9	4.9	0.77	4.9	5.5	4.9	20	4.9	4.5	4.9	7
CS-6	6.5	6.5	0.77	6.5	5.5	6.5	20	6.5	4.5	6.5	7
CS-7	9.4	9.4	0.77	9.4	5.5	9.4	20	9.4	4.5	9.4	7
CS-8	8.2	8.2	0.77	8.2	5.5	8.2	20	8.2	4.5	8.2	7
CS-9	5.9	5.9	0.77	5.9	5.5	5.9	20	5.9	4.5	5.9	7
CS-10	4.3	4.3	0.77	4.3	5.5	4.3	20	4.3	4.5	4.3	7
CS-11	5.4	5.4	0.77	5.4	5.5	5.4	20	5.4	4.5	5.4	7
CS-12	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-13	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-14	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-15	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-16	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-17	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-18	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-19	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-20	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7
CS-21	NC	NC	0.77	NC	5.5	NC	20	NC	4.5	NC	7

CS-1	-	-	0.77
CS-2	5.5	5.5	0.77
CS-3	5.1	5.1	0.77
CS-4	4.5	4.5	0.77
CS-5	4.9	4.9	0.77
CS-6	6.5	6.5	0.77
CS-7	9.4	9.4	0.77
CS-8	8.2	8.2	0.77
CS-9	5.9	5.9	0.77
CS-10	4.3	4.3	0.77
CS-11	5.4	5.4	0.77

The highlighted red cells show when a sample has exceeded the recommended safe level (the next number to the right).

Note: This is an example of the screening tables used for contaminants. This only shows arsenic levels, but tests in your community garden include multiple contaminants besides arsenic.

Exposure pathways

Exposure pathways (also called **contamination routes**) are ways in which contaminants enter gardeners and their communities. For soils, the three general ways contaminants enter our bodies are **dermal contact**, **ingestion**, and **inhalation**.

DERMAL CONTACT



Skin contact with soil amendments or contaminated water, sediment, soil or dust.

INGESTION



Eating or drinking contaminated food, water and other liquids. Contamination can accumulate in soil or water via sources like poor irrigation or manure from livestock raised on contaminated feed.

INHALATION



Breathing in contaminated dust or soil.