KENTUCKY SOILS

REDUCING EXPOSURE TO SOIL CONTAMINANTS IN KENTUCKY

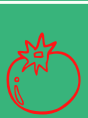
Gardening in Kentucky is a great activity for the whole family. It's also a budget-friendly way to increase your intake of nutritious vegetables and fruits. In general, there are a wide variety of benefits to growing your own food.

CONTAMINANTS IN SOIL?

Any substance in soil that is hazardous to human health is considered a contaminant. Kentucky soils may become contaminated from industrial mining runoff in groundwater, past land uses such as pesticide application or air pollution from coal fired power plants. Soil and well-water testing along with gathering information about how the land was previously used are simple ways to better understand the risk of having contaminated soil in your garden plot area. Once you assess the risks, implementing some best practices will allow you to enjoy year-round gardening.

THE POWER OF PRODUCE

Gardening in contaminated soils does require more precautions. However, the benefits of growing and consuming your own produce may outweigh the negative impacts of exposure to soil contaminants. A balanced diet and regular meals can reduce the body's absorption of contaminants. Vegetables and fruits also contain phytonutrients. Phytonutrients are substances in plant-based foods that may benefit health. There are thousands of phytonutrients, each specific to different fruits and vegetables, which results in a wide variety of colorful produce. Eating a variety of plant based foods such as fruits, vegetables, legumes and wholegrains supplies the body with vitamins, minerals, and phytonutrients to prevent cancer and other diseases.

	PHYTONUTRIENT	HEALTH BENEFITS
 Onion	Flavonoids	May protect against heart disease
 Tomato	Lycopene	May reduce inflammation, prevent heart disease, & control blood sugar

Find out more about the health benefits of these phytonutrients through the UK Cooperative Extension FCS 3-598 publication Body Balance: Protect Your Body from Pollution with a Healthy Lifestyle—Make Your Plate a Rainbow.

COMMON SOIL CONTAMINANTS AND SOURCES

Arsenic has been detected in foods such as rice, cereal, and fruit juice or in well water. Arsenic may occur naturally or may be a result of agricultural and industrial runoff. In some groundwater wells, arsenic should be removed prior to drinking. Testing options and additional resources may be found through the EPA.

Cadmium is a known carcinogen; long-term exposure can increase the risk of cancer. Sources include cigarette smoke, power plants, vehicle exhaust, and fertilizers. If levels are high in your soil, it is not recommended to plant leafy greens, which uptake cadmium from the soil.

Lead at higher levels has been linked to heart and kidney damage or miscarriages. Soils, particularly in urban areas, may contain traces of lead paint or leaded gasoline. Drinking water may also be contaminated with lead.

Mercury exposure may cause rashes, itchy skin, mood swings or memory and behavior changes. High levels may damage the kidneys, stomach, and intestines. Exposure is common in mining communities and near power plants. Paint, discarded fluorescent lightbulbs, and thermometers may be sources of mercury.

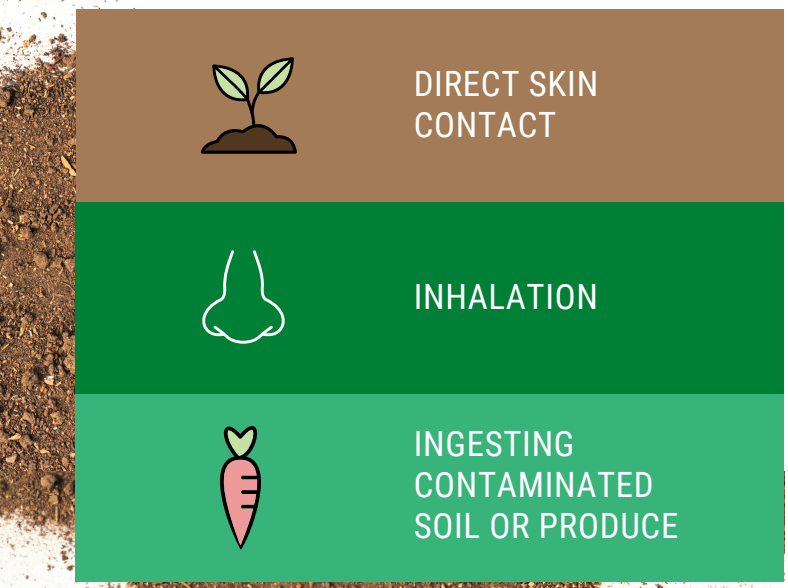
Polycyclic aromatic hydrocarbons (PAHs) occur naturally in coal, crude oil, and gasoline. Exposure may occur through burning of these materials, from runoff from coal deposits, or near hazardous waste sites. Cigarette smoke, diesel exhaust and grilled or smoked foods are also sources of PAHs.

HUMAN HEALTH IMPACT

When people are exposed to low levels of contaminants over a long period of time, such as those in contaminated soil, they can lead to negative health impacts later in life. Some of these illnesses may take years to develop, resulting in cell damage and inflammation. Inflammation is how the body's immune system responds to contaminants. The phytonutrients found in plant-based foods may be protective against these illnesses.

Exposure can harm developing brains, placing children and pregnant persons at a higher risk to environmental contaminants. Some children may eat soil on purpose. It is important to limit exposure as early in life as possible to prevent potential harm.

HOW WE ARE WE EXPOSED



HOW TO LIMIT EXPOSURE TO CONTAMINANTS IN SOIL

- **Reduce dust particles**
  - Keep soil moist by watering the garden
  - Apply mulch to soil surface
- **Keep soil outside and off hands**
  - Remove shoes before entering home
  - Change out of gardening clothes to avoid spreading soil throughout home
  - Wear gardening gloves
  - Wash hands regularly with soap and water
  - Wear a filtered dust mask while handling soil, compost, or potting mix
- **Decrease contaminants on produce**
  - Peel and remove outer layer of root vegetables
  - Wash produce thoroughly with water. Try adding some vinegar to remove soil from vegetables
  - Use a vegetable brush on thicker skinned produce
  - Consider building raised garden beds with landscape fabric between the ground and new soil
  - Organic matter from compost can bind to some contaminants and reduce their absorption by plants
- **Learn about your soil**
  - Contact your Cooperative Extension office to test the nutrients and pH levels in your soil or your local Conservation District to learn about land use history
  - Check out the *Additional Resources* section on the next page
- **Consume a healthy diet that includes a variety of plant-based foods!**
  - The Dietary Guidelines for Americans recommends to make half of your plate vegetables and fruit
  - Locally grown seasonal produce contains higher amounts of micronutrients and flavor

ADDITIONAL RESOURCES

Conservation Districts of Kentucky

- Contact your county Conservation District for best management practices, equipment loans, scholarships, land use history, etc
  - https://kyconservation.com/

Soil Contaminant Testing

- National testing and analytic lab for environmental testing
  - https://www.microbac.com
- Prism Laboratories
  - www.prismlabs.com/soil
- Waters Agricultural Laboratories, Inc
  - https://watersag.com/

Agency for Toxic Substances & Disease Registry

- Information about toxic substances and their impact on our health
  - https://www.atsdr.cdc.gov/substances/index.asp

University of Kentucky Cooperative Extension

- Kentucky residents may obtain soil nutrient testing through their county extension office. Some offices will test for heavy metals as well.
  - https://extension.ca.uky.edu/
- Home vegetable gardening resource
  - http://www2.ca.uky.edu/agcomm/pubs/id/id128/id128.pdf

University of Kentucky Superfund Research Center (UKSRC)

- Conducts research on the health risks posed by exposure to environmental pollutants with funding from the National Institute of Environmental Health Sciences (NIEHS)
- UKSRC Community Engagement Core
  - Supports the work of UKSRC through community partnership
  - http://superfund.engr.uky.edu/

Well Water Testing & Information

- https://eec.ky.gov/Environmental-Protection/Water/GW/Pages/GWOwnerAssist.aspx
- https://www.epa.gov/privatewells

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