

Hazardous Chemicals and Your Body

Eating Right for a Healthier You

Lisa Gaetke, Carolyn Hofe, Anna Goodman Hoover, Stephanie Jenkins, and Lindell Ormsbee, University of Kentucky Superfund Research Center; and Ashley Osborne, University of Kentucky Cooperative Extension Service

It's no secret that good nutrition can have a positive impact on health. Poor nutrition over time can lead to an increased risk for certain chronic illnesses, including type 2 diabetes, heart disease, high blood pressure and/or stroke, and certain cancers. Environmental contaminants, such as persistent organic pollutants, may contribute to an increased risk for chronic disease if they occur for long enough or at high enough levels. Research has shown that some hazardous chemicals may even cause the body to be more vulnerable to such medical conditions as cancer, poor immune system response, altered nervous system function, and cardiovascular disease. The good news is that certain dietary strategies may provide a defense for combating the effects of these contaminants while improving your overall health.



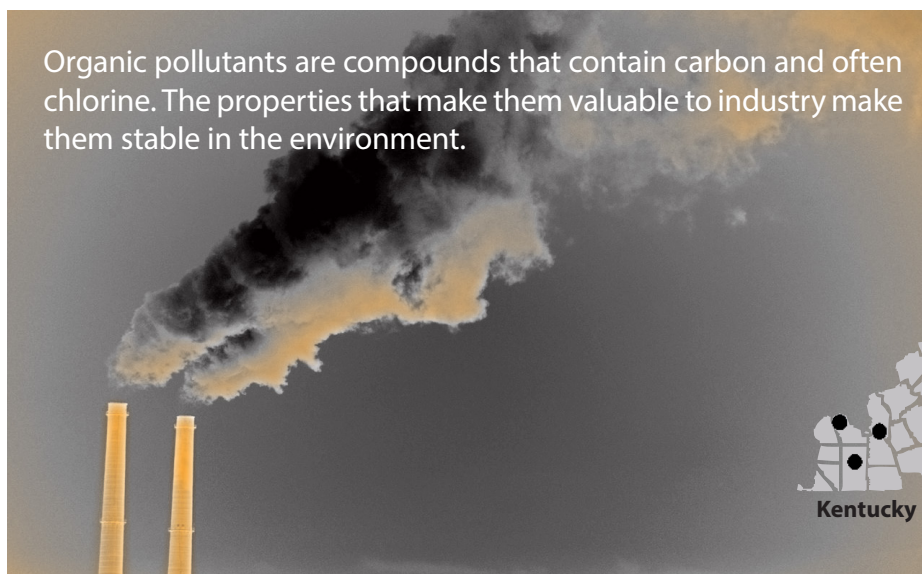
What Is Hazardous Waste?

Hazardous wastes are toxic chemicals, metals, and even radioactive materials that may be present in the environment due to improper disposal methods, an industrial accident, or natural movement through air, water, and soil. These items are hazardous because they can be harmful to health if breathed, swallowed in food or water, or absorbed directly through the skin. More than 70,000 chemicals are manufactured in the production of items that we depend on in everyday life. Such products include plastic, paper, electronics, steel, and much more. Communities can be at risk when these chemicals are stored, transported, or disposed of inappropriately. Proper management of this waste can reduce the risk to communities and human health.

Household Hazardous Waste

Although we tend to associate hazardous waste with chemicals used by industries and businesses, many are routinely found in our households. Examples of household hazardous wastes include batteries, bug spray, weed killer, rust remover, and paint thinner, among others. Hazardous waste has the potential to damage health and the environment if disposed of incorrectly.

Organic pollutants are compounds that contain carbon and often chlorine. The properties that make them valuable to industry make them stable in the environment.



Kentucky National Priority List (NPL) Superfund sites.

What Are Superfund Sites and the Superfund Research Program?

Superfund sites, as defined by the United States Environmental Protection Agency, are uncontrolled or abandoned places where hazardous waste is located. The Superfund Amendments and Reauthorization Act (SARA) created the Superfund Research Program (SRP), which is overseen by the National Institute of Environmental Health Sciences. The SRP addresses scientific uncertainties related to Superfund sites and their impact on the environment and health. The SRP allows selected universities across the United States to set research goals that address the issue of hazardous waste by developing:

- Methods and technologies to detect hazardous substances present in the environment
- Advanced methods for identifying, assessing, and evaluating the effects of hazardous substances on human health
- Biological, chemical, and physical technologies to reduce the amount and toxicity of hazardous substances

The University of Kentucky Superfund Research Center (UK-SRC) coordinates a variety of research projects that address the adverse health effects associated with some of the more common pollutants found at Superfund sites. The program also addresses the academic development of graduate students through its Training Core. UK-SRC's Community Engagement and Research Translation Cores work together to get out the message that good nutrition is one of our best defenses for staying healthy, even in the presence of Superfund pollutants.

How Do I Dispose of Household Hazardous Waste?

- Reduce your purchase of items containing hazardous ingredients.
- Seek local permanent collection or exchange options, special collection days, and local collection sites.
- Read product labels for appropriate disposal instructions.

For more information, visit www.epa.gov/msw/hhw.htm

How Can Nutrition Minimize Negative Health Impacts of Chemical Exposure?

Phytonutrients

Phytonutrients, also called phytochemicals, are plant nutrients that have positive effects on health. They often function like antioxidants in the body by halting the damage caused by free radicals. Free radicals are formed when unfavorable changes occur to a cell in the body and may result from many causes, including UV light, cigarette smoke, fried foods, and toxic chemicals. We can't completely stop free radicals from forming, but antioxidants have the potential to diminish and neutralize the free radicals that are formed. Just as the name implies, phytochemicals are found in plant foods, including fruits, vegetables, whole grains, raw nuts, seeds, herbs, and spices. For more information on phytochemicals, visit <http://www.ca.uky.edu/HES/fcs/factshts/FN-SSB-052.PDF>



Fruits and Vegetables

Eating five to nine servings of fruits and vegetables every day may seem like a daunting task, but the health benefits are priceless. Fruits and vegetables are great sources of vitamins, minerals, fiber, and phytochemicals, and they are naturally low in calories. Supplements may be advisable in some circumstances, but it is better to get nutrients from nutritious foods such as fruits and vegetables. For example, think of the fuel in your car. Benzene is one of several chemicals in gasoline, but you would never consider fueling your car with benzene alone. In the same way, plant foods can be thought of as little bioactive factories of vitamins, minerals, fiber, and phytochemicals that work best together.

Reach for a Rainbow

Easy Steps to Getting Your Five-A-Day

- Take a cue from restaurants—“Soup or Salad?” Have one or the other every day. Salads are an easy way to add a rainbow of colors (and a variety of vegetables) to any meal! Try putting a chopped apple and/or toasted slivered almonds on top for an added boost. Soups can be made easily by mixing canned broth, tomato juice, and vegetables already on hand.
- Grab 100 percent juice instead of soda! Though not as nutritious as eating the fruit or vegetable, 100 percent juice is more nutritious than soda. Be careful with your juice serving sizes. To cut the calories, try mixing fruit juice with plain or sparkling (seltzer) water.
- Get creative! Add finely minced vegetables to pasta sauce, or top a baked potato with salsa instead of butter or sour cream.
- Play with your food! Try ants on a log (celery filled with peanut butter and topped with raisins) or funny faces from different slices of fruit.
- Make fruit your dessert! Fruit can make a wonderful and satisfying ending to any meal. If you’re still in a “sundae” kind of mood, try nonfat vanilla yogurt topped with crumbled dark chocolate and fresh or frozen raspberries.
- Be adventurous! Set a goal to try one new fruit or vegetable each month. Give your taste buds a chance to savor the flavor, and remember it takes a child at least three times to learn to like a new food. How many times might it take an adult?
- Have them washed and ready! If they’re ready to eat, everyone will be more likely to grab a handful—even on the go.
- Keep canned and frozen vegetables stocked! These make for quick additions to your favorite meals and keep much longer than fresh vegetables.
- Add some to your favorite foods! Try adding vegetables (carrots, mushrooms, broccoli, etc.) to your favorite canned soup, or make a smoothie using low fat milk or soymilk and whatever assortment of fresh and frozen fruit you have on hand.

Whole Grains

Foods that are made of whole grain contain the entire grain kernel. Refined grains go through a process called *milling* that removes the bran and germ portions of the kernel, leaving just the endosperm. Unfortunately, this process removes the B vitamins, iron, and fiber. Although refined grains are *enriched* by adding back some vitamins and minerals, they are still nutritionally inferior to the whole grain.

Many grain products have both whole and refined grains in them. Both will be listed on the label; however, this means the grain is not a complete whole-grain product. Look for terms such as 100 percent whole wheat, 100 percent whole grain, brown rice, whole wheat pasta, oatmeal, popcorn, stone ground cornmeal, bulgur, or buckwheat.

Terms such as 100 percent wheat, enriched flour, and cous-cous are not whole grain. Most ready-to-eat cereals are not whole grain. If the label states that one serving has five or more grams of fiber, then it is a good choice.

If you have been eating only refined grains, then you may want to change to 100 percent whole grains gradually. Give your taste buds and digestive system time to adjust. At first, try making the grains in one meal per day from whole-grain products. After two to four weeks, make 50 percent of your day's grains whole grain. Making half your grains whole is the current recommendation of the most recent *Dietary Guidelines for Americans*.

Examples of foods that are equivalent to one serving include 1 slice of bread, ½ hamburger or hotdog bun, 1 small roll or biscuit, 1 (6-8 inch) tortilla, ½ cup cooked cereal, rice, or pasta, 1 small waffle or pancake, 5-6 saltine crackers, or 3 cups of plain popcorn. Remember whole grain products must list a whole grain as the first ingredient. Wheat flour and enriched flour are NOT considered whole grains!

Beware

Watch out for phrases on food labels that do not mean whole grain! The following phrases do not necessarily mean the product is a whole-grain product:

- Made with whole grain
- Pumpernickel
- Stone ground
- 100% wheat
- Seven-Grain
- Multigrain
- Bran

Tips for Including Whole Grains in Your Daily Diet

- Eat whole-grain wheat bread instead of white bread.
- Try whole-wheat pasta in spaghetti or other pasta dishes.
- Add barley to vegetable soups or stews.
- Use rolled oats or crushed, unsweetened whole-grain cereal for breading for baked chicken or fish.
- Snack on popcorn or whole-grain cereals.

Spices

Herbs and spices are added to foods to enhance flavor and zest, but did you know they are also nutritional powerhouses?

Cinnamon, more precious than gold in ancient times, is rich in antioxidants. There are two varieties of cinnamon: Cassia (Chinese) and Verum (Ceylon). The Verum variety has a slightly sweeter taste than the Cassia variety and is more difficult to find locally. Recent studies have shown that small amounts of Cassia cinnamon may help individuals with type 2 diabetes. Active ingredients in cinnamon may reduce blood sugar levels.

Simple ways to add small amounts (¼ - ½ teaspoon) of cinnamon to your daily diet:

- Stir your coffee, tea, apple cider, or juice with a cinnamon stick.
- Sprinkle cinnamon on yogurt, baked apples, oatmeal, or whole-grain toast.

Cumin, commonly used in Tex-Mex and Mexican dishes as well as Middle Eastern and Indian cuisine, is available year-round in whole or ground form. Cumin has many health benefits. Cumin is a source of iron, is beneficial to the digestive system, and may defend against certain cancers.

Simple ways to add cumin to your daily diet:

- Combine cumin, black pepper, and honey as a seasoning for vegetables, chicken, or fish.
- When cooking with legumes, such as black beans, add cumin for a nutty, peppery flavor.
- Add cumin, apricots, and almonds to brown rice for a healthful side dish.

Black pepper, the most popular of all spices, is available year-round in whole and ground forms. Black pepper has antioxidant and antibacterial properties and may improve digestion.

Simple ways to add black pepper to your daily diet:

- Add to many dishes such as salad dressings and rubs for meats and vegetables.
- Keep a pepper mill in your kitchen and on your table to incorporate pepper during breakfast, lunch, and dinner.



Ginger, available year-round, is native to southeastern Asia and was historically treasured for its aromatic, culinary, and medicinal properties. Ginger aids gastrointestinal distress by relieving gas and preventing or reducing motion sickness. The spice also has anti-inflammatory effects. Ginger may help those with arthritis and may boost immune systems during cold and flu season.

Simple ways to add ginger to your daily diet:

- Add to many drinks and dishes, including lemonades, side dishes, sautéed vegetables, baked fruits, and much more.

Herbs Versus Spices

According to the Merriam-Webster Online Dictionary, a spice is “any of various aromatic vegetable products (such as pepper or nutmeg) used to season or flavor foods; something that gives zest or relish; a pungent or fragrant odor.” An herb is “a seed-producing annual, biennial, or perennial that does not develop persistent woody tissue but dies down at the end of a growing season; a plant or plant part valued for its medicinal, savory, or aromatic qualities.” Spices are obtained from the roots, flowers, fruits, seeds, or bark of herbaceous or woody plants; herbs are obtained from the leaves of herbaceous plants.

Need More Information About Hazardous Chemicals and How Good Nutrition Can Fight Them in Your Body?

Visit these websites:

Hazardous Chemicals and Superfund Sites

National Institute of Environmental Health Sciences
Superfund Research Program

<http://www.niehs.nih.gov/research/supported/srp/index.cfm>

University of Kentucky Superfund Research Center
www.uky.edu/Research/Superfund

US Environmental Protection Agency
<http://www.epa.gov/msw/hhw.htm>

Antioxidants and Nutrition

University of Kentucky College of Agriculture Family and Consumer Extension Nutrition Education
www.ca.uky.edu/hes/?p=146

United States Department of Agriculture ChooseMyPlate
<http://www.choosemyplate.gov/>

The World’s Healthiest Foods
<http://www.whfoods.com/>

Or contact the following:

University of Kentucky Superfund Research Center Community Engagement Core (CEC). The CEC works with communities impacted by hazardous waste and educates citizens about the health benefits of eating the right foods.

Attn: Dr. Dawn Brewer
Department of Dietetics and Human Nutrition
203 Funkhouser Building
Lexington, Kentucky 40506-0054

University of Kentucky Superfund Research Center Research Translation Core

Attn: Dr. Lindell Ormsbee
233 Mining and Mineral Resource Building
Lexington, Kentucky 40506-0107
859-257-1299

www.uky.edu/research/superfund

This publication is made possible in part by grant number P42 ES007380 from the National Institute of Environmental Health Sciences, NIH. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIEHS, NIH.