Chemical Contaminants & Pesticides

The FDA helps to safeguard the U.S. food supply (domestic and imports) by monitoring chemical contaminants and pesticides in food. For chemical contaminants, we assess the potential exposure and risk they pose when detected by our testing. For pesticides, we enforce the tolerances established by the Environmental Protection Agency (EPA) for the amounts of pesticide residues that may legally remain on food.

Chemical Contaminants

Chemical contaminants include a broad range of chemicals that may be present in food and that have the potential to cause harm. The FDA monitors the food supply by testing foods through several different programs. By law, food manufacturers have a responsibility to implement preventative controls as needed to significantly minimize or prevent exposure to chemicals in foods that are hazardous to human health. If the agency finds that the level of a contaminant causes the food to be unsafe, we take action, which may include working with the manufacturer to resolve the issue and taking steps to prevent the product from entering, or remaining in, the U.S. market.

Environmental Contaminants

Environmental contaminants (/food/chemical-contaminants-pesticides/environmental-contaminants-food) enter food from contaminated soil, water, or air where food is grown or cultivated, and include:

- Arsenic (/food/environmental-contaminants-food/arsenic-food), Lead (/food/environmental-contaminants-food/lead-food-and-foodwares), Mercury (/food/environmental-contaminants-food/mercury-food), and Cadmium (/food/environmental-contaminants-food/cadmium-food-and-foodwares) may occur naturally in the environment where foods are grown, raised, or processed and are often at higher levels from past industrial uses and pollution. These contaminants have been prioritized due to their potential for harm during times of active brain development—in the womb through early childhood. Learn more at: Closer to Zero (/food/environmental-contaminants-food/closer-zero-reducing-childhood-exposure-contaminants-foods) and Advice About Eating Fish (/food/consumers/advice-about-eating-fish).
- Perchlorate (/food/environmental-contaminants-food/perchlorate) is manufactured for use in industrial chemicals and can also occur naturally in the environment.

- Radionuclides (/food/environmental-contaminants-food/radionuclides-domestic-and-imported-foods) (radioactive forms of elements) may occur naturally in the environment or may be present when radioactive materials are discharged into the environment from nuclear operations.
- Human-made chemicals formed from or used in manufacturing industrial and consumer products including: Benzene (/food/environmental-contaminants-food/benzene), Dioxins and PCBs (/food/environmental-contaminants-food/dioxins-pcbs), and Per- and Polyfluoroalkyl Substances (PFAS) (/food/environmental-contaminants-food/and-polyfluoroalkyl-substances-pfas).

Process Contaminants

Process contaminants (/food/chemical-contaminants-pesticides/process-contaminants-food) form when heating or processing food, and include:

- 3-Monochloropropane-1,2-diol (3-MCPD) Esters and Glycidyl Esters (GE) (/food/process-contaminants-food/3-monochloropropane-12-diol-mcpd-esters-and-glycidyl-esters)
- 4-Methylimidazole (4-MEI) (/food/food-additives-petitions/questions-answers-about-4-mei)
- Acrylamide (/food/process-contaminants-food/acrylamide)
- Ethyl Carbamate (/food/process-contaminants-food/ethyl-carbamate)
- Furan (/food/process-contaminants-food/furan)

Toxins

Toxins (/food/chemical-contaminants-pesticides/natural-toxins-food) are produced by plants, fungi, bacteria, algae, and animals, and include:

- Mycotoxins (/food/natural-toxins-food/mycotoxins): aflatoxins (/food/natural-toxins-food/mycotoxins#Aflatoxins), deoxynivalenol (/food/natural-toxins-food/mycotoxins#Deoxynivalenol), fumonisins (/food/natural-toxins-food/mycotoxins#Fumonisins), patulin (/food/natural-toxins-food/mycotoxins#Patulin), and ochratoxin A (/food/natural-toxins-food/mycotoxins#OchratoxinA)
- Blue-Green Algae Products and Microcystins (/food/natural-toxins-food/blue-green-algae-products-and-microcystins)
- Hypoglycin A and Ackee Fruit (/food/natural-toxins-food/hypoglycin-and-ackee-fruit)
- Algal and Bacterial Toxins found in Seafood (/food/resources-you-food/seafood)

Pesticides

Pesticides (/food/chemical-contaminants-pesticides/pesticides) are used by growers to protect their products from insects, weeds, fungi, and other pests, and their residues sometimes remain on food. Environmental Protection Agency regulations govern how they are used and the amount of residue that is allowed to remain on crops.

Related Content

- Food Chemical Safety (/food/food-ingredients-packaging/food-chemical-safety)
- Laboratory Flexible Funding Model Cooperative Agreement Program (/federal-state-local-tribal-and-territorial-officials/grants-and-cooperative-agreements/laboratory-flexible-funding-model-cooperative-agreement-program)
- FDA Code of Federal Regulation Online Inventory (https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm)
- Chemicals, Metals, Natural Toxins & Pesticides Guidance Documents & Regulations (/food/guidance-documents-regulatory-information-topic-food-and-dietary-supplements/chemical-metals-natural-toxins-pesticides-guidance-documents-regulations)
- Closer to Zero: Action Plan for Baby Foods (/food/environmental-contaminants-food/closer-zero-reducing-childhood-exposure-contaminants-foods)
- New Era of Smarter Food Safety (/food/new-era-smarter-food-safety)
- Healthy People Initiative (/food/food-labeling-nutrition/healthy-people-national-initiative)
- Food Defense (/food/food-defense)
- Import Alerts (/industry/actions-enforcement/import-alerts)
- Total Diet Study (/food/reference-databases-and-monitoring-programs-food/fda-total-diet-study-tds)
- Toxic Elements in Foods and Foodware (/food/chemical-contaminants-pesticides/toxic-elements-foods-and-foodware)
- Environmental Assessments from Foodborne Illness or Contamination Events (/food/outbreaks-foodborne-illness/outbreak-investigation-reports)
- Bad Bug Book (/food/foodborne-pathogens/bad-bug-book-second-edition)
- Environmental Protection Agency: Pesticides (https://www.epa.gov/pesticides)

- World Health Organization (https://www.who.int/) (http://www.fda.gov/about-fda/website-policies/website-disclaimer)
- Codex Alimentarius Commission (https://www.fao.org/fao-who-codexalimentarius/en/) (http://www.fda.gov/about-fda/website-policies/website-disclaimer) (Codex)
- Safe Practices for Food Processes (/food/chemical-contaminants-pesticides/safe-practices-food-processes)