

Interpreting Pesticide Residues in Food

Pesticides provide a useful tool to control insects, weeds, plant diseases, as well as other agricultural pests.

- The agricultural use of pesticides has enabled food producers to **increase their crop yields** significantly in the United States and throughout the world.
- One consequence of using pesticides in agriculture is that pesticide residues are **often detected on our foods**. The use of pesticides does not necessarily imply that residues will be encountered.

In the United States, pesticides are primarily regulated by the United States Environmental Protection Agency (EPA).

- The EPA will not permit specific uses of pesticides unless consumer exposure to the pesticide from all sources represents a **“reasonable certainty of no harm”**.
- The **calculation of a “reasonable certainty of no harm”** involves assessing realistic levels of human exposure through consideration of pesticide residue levels and food consumption patterns as well as comparisons of exposure estimates with toxicological criteria such as the reference or benchmark dose.



The U.S. Food and Drug Administration is the primary federal agency responsible for enforcing pesticide tolerances.

- The FDA found that a majority of samples contained **no detectable pesticide residues** while most of the detectable residues were within tolerance levels.
- Pesticide residue **violations can occur** when residue levels exceed the tolerance established for the specific pesticide/food combination, and when residue levels—at any level—are detected on foods for which a tolerance is not established.

The presence or absence of pesticide residues is not a valid indicator of health risk to the consumer.

- **“The dose makes the poison.”** It is the amount of exposure and not the presence or absence of a chemical that determines the potential for harm.
- In the **2004-2005 FDA Total Diet Study**, residues of 77 pesticides were detected and exposure estimates were compared to the chronic reference dose. Three pesticides exceeded 1% of the cRfD. Fourteen were between 0.1–1.0%. Nineteen were between 0.01–0.1%. Forty-one pesticides were below 0.01%. An exposure of 0.01% of the cRfD represents an exposure one million times lower than the highest dose that does not cause effects.

There remains the concern among some consumers that detectable exposures to pesticides may lead to certain diseases.

- Some epidemiological studies have shown correlations between **pesticides exposure and health effects** but none have established cause and effect. The types of health effects correlated with pesticide exposure include male adult reproductive effects and development and behavioral effects in infants and children.
- Six studies evaluated the **insecticide chlorpyrifos and intelligence**. Two of the six reported a statistically significant decrease in IQ with increased estimates of exposure but neither correlation was derived from food exposure. Four studies failed to correlate chlorpyrifos exposure with decreased IQ.

Since the 1970s, the trend in agriculture has been towards a more sustainable, integrated systems approach to the challenges of pest management.

- Pesticide products are often a key part of the integrated system and this is true for both conventional and organic production.
- The **trend over time** has been towards pesticides that are intrinsically much less toxic to humans or the environment than their predecessors.
- For **crops that are harvested by hand**, pest damage can greatly reduce the picking efficiency, meaning the pounds that can be collected per hour of effort.

Food security and a diverse, affordable, healthy food supply are key societal benefits enjoyed in the developed world in the modern era.

- For crops like apples and potatoes that go into long term storage, very high **pest control standards are needed** in the field to sustain storage life.
- Areas with more rainfall tend to have more **fungal pest issues**. Warmer climate tends to have more insect challenges.

Experts to Contact for More Information:

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