

Should we worry about trace pesticides on fruits and vegetables?

Many Americans have concerns about pesticide residues on food – particularly for fruits and vegetables. In contrast with that oft-communicated perception, the safety of our food supply is well documented. One reason for this disconnect is that there are activist groups (non-governmental organizations) that consistently promote the idea that consumers should buy organic versions of certain crops in order to [avoid pesticides](#).

[A 2016 study](#) documented how that sort of message induces some lower income Americans to simply avoid fruits and vegetables all together. The truth is that our food supply is extremely safe because farmers are careful to use pesticides in ways that don't lead to residue problems at the consumer level and because of rigorous regulation followed by farmers over the last several decades.

The common perception of organic as a safer option in this regard is also at odds with reality. The United States Department of Agriculture (USDA), which oversees organic certification, clearly states on its [National Organic Program website](#): “Our regulations do not address food safety or nutrition.” Organic farmers can and do use pesticides from an approved list, but that list is not based on safety criteria. Organic growers are limited to natural chemicals and to a limited list of synthetic materials. As with any crop protection material, the EPA has the responsibility to evaluate and regulate their safe use. That oversight is why consumers can confidently enjoy both conventional and organic foods.

In this post I will describe the testing, regulatory and training systems that are in place in the US to protect consumers from risks associated with pesticide residues. I will also describe the intense monitoring system that demonstrates year-after-year that this system is working.

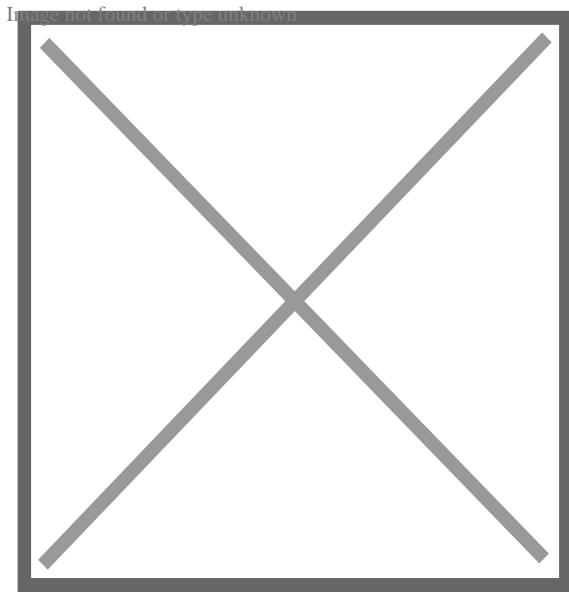
All farmers face challenges from a variety of pests and although they use a number of methods to manage those threats, pesticides are a critical part of that “toolbox.” The broad category “pesticide” includes certain chemicals that occur in nature as well as various synthetic chemicals. There are also pesticide products based on living biological agents. The responsibility for pesticide regulation is with the Environmental Protection Agency or EPA. It determines how pesticides can be used safely, based on their particular intrinsic properties, and by restrictions on how and when they can be used.

EPA risk assessments

Before any new pesticide product can be sold in the United States, an extensive list of toxicological tests must be performed and reported to the EPA. The company that makes or which will sell the product is responsible for the cost of this testing, but most of the work is performed in contract labs that are closely audited by EPA. The tests evaluate many facets of potential toxicity for human and environmental health, both in terms of short-term effects (acute toxicity via consumption, by skin exposure, by inhalation exposure...) and long-term effects on development, organ health, reproduction, and potential carcinogenicity. In addition, a great deal of data has to be generated to show what happens to the chemical over time on the food, and in the environment in terms of its persistence, movement, and breakdown into innocuous ingredients.

It costs on the order of \$286 million and can take more than 10 years to generate all of this required data. EPA then uses these data to conduct an extensive “risk assessment.” Based on that assessment, EPA develops “label requirements” specifying how, on which plants, when, and how much of the pesticide can be used. These risk assessments cover issues of worker safety, environmental impact and also what sort of residues might be left by the time the crop is harvested, and any potential risk to human health.

Pesticide tolerances (or MRLs)



Delicious apples ready for harvest in western Washington this summer.

With regard to pesticide residues at harvest, EPA designs the label requirements to make sure that any residues still present when the food gets to the consumer are below what is called a “tolerance.” (Outside the US this is called an MRL or maximum residue limit). The tolerance is set to insure that there is a substantial margin of safety (typically 100-fold) between the allowed residue and any level to establish reasonable certainty of no harm to humans. EPA then sets limits on how much of the pesticide can be applied and how close to when the crop is going to be harvested so that the tolerance is unlikely to be

exceeded when farmers use the product.

These tolerances are very conservative limits and represent such small amounts that they can be difficult to envision. For instance, a tolerance might be five (5) parts per million. That can be visualized as to two drops of water in a five (5) gallon carboy. Some tolerances are set as low as one part per billion (e.g. one drop in 528 carboys). In summary, tolerances are extremely small levels of pesticide residue, set as a conservative standard for human safety, and customized to the specific properties of each chemical.

Training

In order to be allowed to apply pesticides, farmers have to be trained and certified about how to comply with the chemical-specific label requirements. They have to maintain that training through on-going classes.

Is the system working?

Every year, as part of a USDA effort called the [Pesticide Data Program](#) (PDP), thousands of food samples are randomly gathered from normal food channels and consumer markets. The samples are taken to labs where each sample is screened for the presence of hundreds of different chemical residues. The data that the USDA generates is transparently published both in raw and summarized form. Year after year, [what the data show](#) is that [the system is working!](#) The vast majority of samples have either no detectable residues or residues that are below the assigned tolerances – mostly far below.

The fact that a small residue can be detected does not mean it is of concern. Modern analytical chemists have the ability to detect chemicals at very low levels. The reason that the numbers below tolerance are still published is not that they are of concern, but rather as transparent documentation that these products should be of little concern to consumers and regulators. Several governmental agencies evaluate this information each year and confirm that consumers can confidently enjoy their food supply without concern about pesticide residues.

[The FDA also has a residue testing program](#) from which it concludes, “Results in these reports continue to demonstrate that levels of pesticide residues in the U.S. food supply are well below established safety standards.” [California does its own residue testing](#) and concludes, “California tests show low or no pesticide levels in many fruits and vegetables.” Similar residue testing is conducted in [Canada](#) and the EU with equally encouraging results. With this overwhelming body of evidence, how can the fear of residues persist?

~~What about the~~ **What about the EWG “Dirty Dozen List?”**

Unfortunately, each year there is an organization called the Environmental Working Group (EWG)

a “Dirty Dozen List.” Instead of looking at how detections relate to carefully developed tolerances, EWG essentially treats all detections as significant – an approach that has been completely [rejected by independent experts in the field of toxicology](#). EWG then recommends that certain crops be sought out as organic. Similarly [misguided recommendations to purchase organic](#) are published in Consumer Reports. This makes no sense, since organic is not a safety certification. In fact, organic crops often have the same sort of low-level, detectable residues of pesticides as conventional (example data from the [US](#) and [Canada](#)). This point is conveniently ignored by these organizations.

In conclusion, we have a system in the US that both enables farmers to control pests and which protects consumers so that they can enjoy healthy foods without worrying about pesticide residues.

This article was originally published on Putting Pesticides in Perspective as “[Do You Need to Worry About Pesticide Residues on Your Food?](#)” and has been republished with permission.

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