Forbes

Yes, You Are Definitely Ingesting Pesticides. Here's Why It's Not A Problem

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If food is sprayed a lot, is that bad for your digestive health ?!?! *originally appeared on Quora — the place to gain and share knowledge, empowering people to learn from others and better understand the world*.

Answer by Matan Shelomi, Entomology, Biology, Evolution, on Quora —

If food is sprayed a lot, is that bad for your digestive health ?!?! I assume you are worried about pesticides. **There is no link between pesticide residues on food and disease.** Period. You will find lots of people claiming the links exist. You won't find their evidence, because there is none. Anyone who says otherwise is trying to sell you expensive organic food that uses pesticides, instead of cheaper non-organic food that also uses pesticides.

Here is what you need to know —

- **Organic uses pesticides.** Sometimes they are indeed less toxic. Sometimes they are 100 per cent identical to non-organic — the organic farmers just paid more for the organic certification that lets them charge higher prices. Sometimes they are far, *FAR* more toxic ! The organic alternative to the herbicide glyphosate, for example, is highly corrosive and is known to burn the eyes and mouths of farmers who use it without protective measures, and its vapors can cause headaches, lung problems, and death. Glyphosate is less toxic than salt (technically it's almost half as toxic *) — you could eat it out of the box and have zero short term or long term problems (to a point), while the organic alternative (appropriately called BurnOut) would burn out your mouth and throat immediately. Then there is the organic, plant-derived insecticide, Rotenone, which is about fifty times *MORE* toxic than salt, *HAS* caused human deaths, and is linked to Parkinson's disease in farmers.

- **Not all pesticides are toxic at all.** That includes synthetic, organic, etc ... Not everything is as nasty as BurnOut or Rotenone, but not everything is as effective.

- **Less effective sprays may need to be sprayed more often and/or in higher doses.** Which is better ?!?! It is not easy to tell.

- **Many pesticides degrade over time.** By the time the food reaches you, there is often no pesticide left. Water, heat, or sunlight can wash off or destroy many such compounds — Rotenone vanishes within three days, and has never harmed any consumer from its use on food (the deaths were from deliberate drinking of it straight from the bottle).

- **Many pesticides are not sprayed on the edible parts of food.** Using an herbicide on the soil before planting won't affect the fruits growing above years later. Dabbing some pesticide on the stems won't affect the roots or fruits, etc ...

- **Toxicity is delivery and dose dependent ... and no pesticide on earth is present on food in toxic doses.** Recall I said certain organic pesticides are corrosive or cause Parkinson's. That applies to the farmers who use them ... not to you. Some sprays are dangerous if inhaled, but harmless when eaten. Even if edible parts of a food are heavily sprayed with a non-degrading pesticide that is dangerous if eaten and more toxic than salt (and therefore much more toxic than glyphosate), in practice you would never suffer any ill effects from it, digestive or otherwise. Why ?!?! Assuming it was used according to regulations, in terms of when and how much was sprayed, and passed inspections before being sold or imported, the dose is far too small. You'd be ingesting nanograms of

pesticide, maybe less, when the dosage needed to make you sick is in the tens or thousands of grams. Even water is lethal if you drink too much, but nobody fears spraying water on crops will lead to water intoxication.

- **Pesticides are more than their active ingredient.** Sometimes the most dangerous part of a pesticide (organic or conventional) to humans (farmers or consumers) is not the active ingredient that gets all the negative press, but a different component of the pesticide that serves another function, and which is present in a greater percentage. Of course, again, the inert ingredients of a pesticide can also be nontoxic (many are edible).

- **Humans are not insects or plants.** What is deadly to insects or weeds can be totally harmless to mammals, and vice versa. Different groups of organisms react to different ingredients in different pesticides differently, so to assume something that kills insects will have the same or any effect on humans is not guaranteed. Where things get complicated is that aquatic animals like fish and frogs are not humans either, and are differently affected than us. They also will get exposed to different doses in different ways — an aphid sprayed by insecticide, a frog absorbing field runoff through its skin, and a human who eating almost none of it will all get a different dose.

Recently, someone found traces of glyphosate in Ben and Jerry's ice cream. Scandal ?!?! No, because the amount found was so small that you'd need to eat nearly 200,000 pints of ice cream to get sick, if you were a small child. An adult would need a few times that. It is impossible to get sick from glyphosate on food without dying of overeating first.

The food you eat itself has more chemicals of higher toxicity and/or in a higher dose than any pesticides used on them. I am sure the aforementioned tub of ice cream had thousands of times more salt than glyphosate, and salt is twice as toxic. Other examples are the bergamottin in grapefruit juice, about five times more toxic than glyphosate and which shuts off your body's natural detoxification systems (which is why you should not take certain drugs with grapefruit juice), or the prussic acid found in almonds and cassava, about 3,700 times more toxic than glyphosate and better known as the chemical warfare agent and suicide pill ingredient hydrogen cyanide. Then there are nasty sounding chemicals like ascorbic acid, cholecalciferol, and tocotrienol ... also respectively known as vitamins C, D, and E. Despite all these chemicals, the food is safe, of course. Even you are made of chemicals — formaldehyde, about seven times more toxic than glyphosate (3.75 times worse than salt) is naturally produced by the human body and is essential in making some amino acids, the building blocks of life.

Note too that people who eat organic are no healthier than those who do not. They still get cancer and Crohn's and diabetes and food poisoning, and at the exact same rates. Eating organic doesn't save them. Likewise, people who eat Rotenone-free non-organic foods still can get Parkinson's disease. Pesticides, organic or otherwise, are a non-issue in terms of human health.

Now, whether certain individual pesticides are bad for the environment (frogs and fish in particular), that is another question. Certain pesticides may be too toxic to use, like DDT that is relatively non-toxic to people but had unexpected side effects on birds (it made their eggshells soft and easily squished) that led to a ban. Rotenone too has been banned in parts of Europe, though at time of writing is legal in organic farms in the US.

Remember again that organic uses pesticides ... sometimes much more than necessary. Here is another inconvenient truth for Big Organic — the use of Bt crops, a GMO that does not require insecticide spraying, has reduced global insecticide use nearly 42 per cent. That's great for the environment and for farmers (though not so great for the makers of Rotenone). The total effects of all GMOs as of 2014 are a 37 per cent *REDUCTION* in pesticide use, saving farmers 40 per cent on pesticide costs and raising yields by 22 per cent compared to non-GMOs, with these averages all higher in developing world farms **. If you still are worried about pesticides, then promote GMOs !

Likewise, for *CERTAIN* pests in *CERTAIN* crops and conditions, non-spray alternatives do exist and can be recommended. Bio-control with natural pests, physical control with mulching and weeding, etc ... Organic farmers are required to use these tools and/or organic pesticides — others can and do use them, but can also choose not to. Some use physical controls for one pest and sprays for another. They usually have valid reasons for their choices. They will do what is best according to the principles of *Integrated Pest Management,* which any farmer in a developed nation will use, as it reduces pest and pesticide levels and cuts costs by choosing the best methods and using them only as needed to prevent financial losses. No lost yields, no unnecessary spraying, and reduced environmental damage. Win-win !

Unfortunately, **there is no way to tell if a food is pesticide free, regardless of label.** Fortunately, **there is no need to, in terms of health**. Be it Rotenone or RoundUp, the risk to the consumers is effectively zero. Trust that farmers are doing what is best for their farm, not for the big « *corporations* » that Big Organic (and its own corporations) tries to scare you about. Trust too that no food provider on earth would *ever* knowingly release a product that could make people sick. That is bad for business.

Beware of fear-mongers trying to convince you that glyphosate is responsible for all disease ever, and other Big Organic funded fake news. For an example of an

honest look at glyphosate and alternatives, try sites like this — GreenCityBlueLake | Sustainability in Northeast Ohio at The Cleveland Museum of Natural History.

* Based on oral LD_{50} in rats, meaning the milligrams chemical per kilogram body weight that will kill 50 per cent of rats fed this in experiments. For obvious reasons, such data is not available for all compounds in humans.

** A Meta-Analysis of the Impacts of Genetically Modified Crops.