

Consumer Reports, anti-GMOers bizarre attack on Bt pesticide used by organic farmers

Anti-GMO activists are aggressively trying to expand a familiar front in their ongoing attack against GM foods. In its recently [released](#) Pesticides and Produce report, *Consumer Reports* suggests that Bt toxin, a natural pesticide derived from the bacterium *Bacillus thuringiensis* and widely used in genetic engineered seeds as well as in organic farming, is dangerous in its GE form.

In genetic engineering, the Bt proteins are expressed by genes inserted into plants by recombinant techniques. CR claims that produces unique dangers:

Some crops are genetically engineered to produce their own pesticides instead of having the pesticides sprayed onto crops or into the soil where they are planted. This type of genetic engineering incorporates a 'natural' pesticide from bacteria into the genetic makeup of a crop. And because it is secreted by the plant, it cannot be washed off.

“Cannot be washed off”? Did someone with a science background actually write that? (Answer: No)

Other anti-GMO groups such as [GM Watch](#) are similarly playing the fear card, claiming that the genes for Bt toxin inserted into plants create a completely different and more dangerous toxin than the relatively benign version used by organic farmers. In his self-published book, [Genetic Roulette](#), activist and former Natural Law politician, Jeffrey Smith makes a similar claim, saying that the Bt in crops is more toxic than Bt toxins sprayed on organic farms, invoking the same “washing off” imagery.

That’s just silly, says Bruce Chassy, University of Illinois at Urbana-Champaign Professor Emeritus of Food Safety and Nutritional Sciences in the Department of Food Science and Human Nutrition and a trained biochemist. The ‘Bt will not wash off’ scare claim may sound a ring of truth to the scientifically illiterate, but it just doesn’t pass the science smell test.

“Bt is very toxic—to insects,” Chassy said. But for humans, “there’s absolutely [no evidence of any harm](#),” even if the proteins are consumed. The human gut, he says, does not have the receptors necessary to process it. In fact, the Bt engineered into the plants is more targeted—it’s not sprayed widely so there is less potential collateral environmental damage—and it’s perfectly safe.

The claim that Bt protein-coding genes can’t be ‘washed away’ does not make sense, agrees Karl Haro von Mogel, geneticist and chair of [Biology Fortified](#), a University of Wisconsin-based non-profit and website dedicated to life science information. “Bt has been rigorously tested for health effects and none has been found from eating it.”

The distinction that somehow spraying Bt is safe while having Bt expressed in plants is particularly absurd, he adds, considering that even organic applications of Bt are not limited to spraying. Organic squashes, for example, are injected with live Bt (as in, the bacteria), which multiply in the tissues of the

plant, including fruit.

“Bt produce more compounds than just the crystal proteins engineered into so-called Bt crops; some of which we do not know if they are safe to eat,” he says. In fact, a [few studies](#) have identified toxins in the Bt bacteria used by organic farmers, which conceivably could cause virulence in mammals.

Genetically engineered Bt protein, on the other hand, simply involves taking the gene for the cry endotoxin and splicing it into the body of the plant. Cells in the plant (but not every one) can then express the protein, which, when ingested by an insect, breaks down into the toxin and kills the targeted insect host. The endotoxin, once in its active form, binds specifically to an intestinal receptor found only in certain orders of insects. We do not possess this receptor.

In the GM Watch article, writer Susan Bardocz repeated the alarmist “can’t be washed off” statement. She also tried to pump up the so-called benefits of organic Bt versus genetically engineered Bt endotoxin. Let’s examine GM Watch’s claims point by point.

- GMWatch: Bt bacteria degrade in sunlight in less than a day. The chances of pests developing resistance to it are very low indeed, since all the pests which are exposed to the toxin are affected by it.
- RESPONSE: Actually, Bt bacteria can persist on plants. And some Bt formulations use isolated Cry endotoxin proteins, while others use the bacterial strains themselves. And resistance by certain insects has been reported.
- GM Watch: The bacterium is only ever present only the surface of the plant, and if there were any remaining bacteria on the crop, it could be easily washed off.
- RESPONSE: As mentioned earlier, bacteria does persist, some plants (like honeydews) are more easily washed than others (like cantaloupe), and some applications call for injections.
- GMWatch: Active toxins are only in the insect gut, while genetically engineered Bt endotoxin is in every plant cell.
- RESPONSE: This is inaccurate. In all cases, the endotoxin only achieves its active form once found to a receptor in the target insect gut. The endotoxin expressed by Bt plants is not active, and isn’t even necessarily in every cell and tissue of the plant.
- GM Watch: Bt toxin is in the soil, in the plant, in the pollen in the nectar.
- RESPONSE: So is water. Being “everywhere” does not make a substance dangerous.
- GMWatch: Bt toxin is a lectin, and therefore might be able to bind to other intestinal tissues, such as human.
- RESPONSE: A lectin is a specific type of protein that was discovered for its ability to clump proteins and cells together in the human gut. Lectins do in fact bind to the human gut. Unfortunately, as von Mogel points out, Bt toxin is not a lectin. Instead of clumping together in the gut, Bt endotoxin works by binding to a specific receptor, and then carving a pore in the membranes of intestinal cells. GMWatch is using the name “lectin” to imply (it’s hard to do much more without any evidence) that

the Bt toxin can impact human intestines.

The safety of Bt and its expressed proteins and activated endotoxin have been extensively studied on humans. It's limitations as a pesticide—in both organic agriculture in sprays and in conventional farming through the use of Bt seeds—are related to its effectiveness as a pesticide. It only targets certain insects and not other. Its specificity limits its use on infestations of several classes of insects.

Claims by *Consumer Reports* and other knee jerk anti-GMO groups that sprayed Bt is safer and more effective than the genetically engineered version are just not scientific. Bt is Bt is Bt.

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