

Bt 10 Corn and the Food Supply

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Question: In 2005, Syngenta announced that an unapproved variety of Bt-corn was accidentally sold as seed in the USA. Does this pose any health risk to consumers?

Answer: The biotech company Syngenta reported that it had sold tiny amounts of an unapproved corn variety called Bt-10 in place of the nearly identical approved variety, Bt-11. The answer to the question is “*absolutely no health risk is posed to consumers by Bt-11.*” There are several reasons why this is so. The first is that only 37,000 acres of Bt-10 corn was grown out of a total crop of 114,000,000 acres. Since 70–80 percent of corn is used as feed and only 1 percent finds its way into food products as whole corn, the amount of consumption by humans to Bt10 would be infinitesimal.

The second reason Bt-10 corn can be considered safe, even though it is unapproved, is that it closely resembles an approved variety, Bt-11. The only significant difference is that Bt-10 contains a gene that encodes resistance to the antibiotic, ampicillin. Because the use of this marker gene is discouraged in the EU and variety Bt-11 has the same properties, Bt-10 was not submitted for approval.

The fact that Bt-10 is nearly identical to Bt-11 may also be the reason the two were inadvertently interchanged by Syngenta. The major concern in this case was not safety, but a violation of regulations that forbid the planting and sale of unapproved varieties.

Q: You say Bt-10 doesn't pose any health risk, but won't the use of the ampicillin resistance gene cause the spread of bacteria that are resistant to the antibiotic?

A: The ampicillin resistance gene is no different from the other marker genes discussed in my other paper on antibiotic resistance on this website. Such resistance is extraordinarily unlikely to transfer to bacteria in soil or animals. Moreover, since at least 10–40 percent of humans already carry bacteria that are resistant to ampicillin, even if the gene were to transfer to bacteria in our gut, the few additional organisms would add little to the millions or even billions of resistant microbes normally present in our gastrointestinal systems. It's also worth repeating that the problem of antibiotic resistance is misuse of antibiotics that leads to selection or enrichment of the percent of resistant bacteria.

Although the European Food Safety Agency (EFSA) guidelines discourage the use of the ampicillin resistance gene, no sound scientific reason is given. In fact, when asked about the safety of Bt-10, an EFSA expert panel responded after pointing out its use was discouraged:

“However, the Panel also concluded that the presence of the ampicillin resistance marker gene in a GM crop is unlikely to alter the existing pool of bacteria resistant to this antibiotic significantly which, in itself, is an important consideration with regard to any risk posed by the use of the ampicillin resistance gene as marker genes. This is further supported by the fact that no gene transfer from transgenic maize carrying the ampicillin resistance marker gene to culturable bacteria has been detected under field conditions.”

Q: But isn't ampicillin a clinically important antibiotic? Isn't it risky to use a resistance marker for a front line drug that's widely used in treating disease?

A: Yes, ampicillin certainly is the frontline drug of choice for many infections. But remember, ampicillin resistant bacteria are all around us, in the soil, on the food we eat, on our skin, and in our bodies. It is likely everyone of us already has resistant bacteria on our bodies. Moreover, in some cases ampicillin cannot be used to treat diseases that responded well to it 20 years ago. It is exactly because resistance is so common and growing, along with the fact that resistance genes have never been observed to transfer from plants to disease-causing organisms, that makes it prudent to use the ampicillin marker gene. In fact, the reason it isn't used is because of negative consumer perceptions of risk, not scientific evidence of risk.

References

Opinion of the Scientific Panel on Genetically Modified Organisms on the use of antibiotic resistance genes as marker genes in genetically modified plants, The EFSA Journal (2004) 48, 1–18. http://www.efsa.eu.int/science/gmo/gmo_opinions/384_en.html

EFSA provides scientific support to the European Commission on issues related to the safety of Bt10 maize. http://www.efsa.eu.int/EFSA/efsa_locale-1178620753812_1178620855200.htm