New publication shows unexpected reactions in genetically engineered maize MON810 when exposed to environmental stress

Gene expression and content of insecticidal toxins cannot be reliably predicted
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Scientists from Switzerland and Norway have now published the results of an investigation into genetically engineered maize MON810, which produces an insecticidal protein, a so-called Bt toxin (Trtikova et al., 2015). In the investigation, two varieties of maize MON810 were grown in climate chambers and subjected to defined stress conditions i.e. cold/wet and hot/dry. According to the authors, this is the first study to report on whether there is a relationship between transgene expression and protein production in Bt maize under changing environmental conditions.

The results are surprising: In general, the Bt content was on average higher in one variety compared to the other. Under cold/wet conditions the content of Bt increased in one of the varieties, but not in the other. The activity of the DNA construct inserted into the plants was lowered significantly under hot/dry conditions in one variety, but this had no influence on the Bt content.

“These results show that the stress reactions of maize containing the DNA for the MON810 event are not predictable in reliable way. These findings are highly relevant for the risk assessment of MON810 or 1507 maize and other genetically engineered plants expressing single or several Bt proteins”, says Christoph Then for Testbiotech. “The paradigm applied in the current risk assessment of genetically plants has to be reviewed. We suggest that all further authorisations for genetically engineered plants producing insecticidal toxins are suspended.”

Currently, European Food Safety Authority (EFSA) risk assessment does not include any in-depth investigation of interactions between the transgenic plant genome and the environment. There are, for example, hardly any data at all on how genetically engineered plants could react to ongoing climate change. Reliable data on the Bt content are needed to assess potential toxicity in non-target organisms. For example, risks for non-target organisms such as soil organisms or the larvae of protected butterflies can be much higher than assumed if the Bt content shows a high range of variation. It should also be taken into account that immune reactions due to the consumption of food and feed derived from transgenic plants have been observed in several feeding studies. It is likely that these effects are dose-dependent and therefore the content of the Bt toxins also plays a decisive role in the risk assessment for food and feed.

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Further information: The publication [2]
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