Experts confirm differences between genome editing and mutation breeding

Joint publication of experts from German regulatory authority and biotech industry

2 July 2018 / In a recent publication jointly prepared by experts from the German regulatory authority (BVL) and US corporation DowDuPont, the experts have explicitly confirmed significant differences between new methods of genetic engineering and conventional plant breeding. According to the publication, plants manipulated with methods known as genome editing can be identified and traced in most cases. This position is in contradiction to previous BVL statements denying such differences.

The experts state that relevant differences between methods using tools such as CRISPR-Cas and conventional breeding can also be observed in cases where no additional genes are inserted:

(1) Unlike conventional breeding, genome editing always changes all the copies of a gene at the same time. Conventional breeding, however, usually means that there are still some backup copies present in the genome that can compensate the effect of random mutations. With genome editing there is a specific pattern of change in the plant genome. The publication states: *“(…) genome editing can be targeted to a specific gene. However, few plant genes are found as single genes. (…) genome editing is adept at knocking out genes present in multiple copies. Thus, whenever a crop is found with multiple copies of the same gene knocked out, it will be almost certain that genome editing was used.”*

(2) In conventional plant breeding, changes in the genome are not purely random but are influenced by natural gene regulation. If, for example, plants are cross-bred, some regions in the genome will be more frequently affected by new re-combinations than others. However, the application of CRISPR-Cas can change genes in ways that would not be expected to happen under natural gene regulation. The publication states: *“One important difference is that some crop genes lie in low or non-recombinogenic regions of the chromosome. (…) Genome editing ensures all genes are amenable to allele replacement.”*

These findings are in accordance with the analysis provided by Testbiotech. However, Testbiotech has in addition drawn attention to connected risks. The use of this technology means that plants can be created with changes not only in their genetic structure but also with unintended biological effects that are clearly different to conventionally bred plants. Therefore, Testbiotech is strongly calling for these plants to be subjected to mandatory risk assessment before a decision is taken on agricultural usage or release into the environment.

In the current publication, the biotech industry and the BVL take the view that new methods of genetic engineering should not come under genetic engineering regulation as long as no additional genes are inserted. One reason cited is that this regulation might affect international trade. At the same time, there is no in-depth discussion of the risks.

There is a further surprising correlation with the Testbiotech analysis: plants changed through genome editing can usually be very clearly distinguished from other plants. The publication states: *“For most products of genome editing, there is a clear signature in the DNA, for instance the exact stretch of nucleotides erased. If that signature is revealed by the developer, the same PCR technology used for detecting GMOs can be applied to the detection and monitoring of genome-edited products in most cases.”*

This joint publication of the BVL – an authority committed to independence – and the biotech

industry raises serious questions about conflicts of interest. The starting point for this specific collaboration between industry and competent authorities was a conference organised by the “International Society for Biosafety Research” (ISBR) in 2017 in Mexico. There is very little information available on how the ISBR is funded. The only published information is that its conferences (such as the IBGMO) are regularly sponsored by biotech corporations such as Monsanto, Bayer, DowDuPont and Syngenta, as well as the international federation of the genetic engineering industry, CropLife International. It appears that the conclusions in this recent publication were very much influenced from within this framework. For many years now, Testbiotech has demanded higher standards in safeguarding the independence of the authorities from being influenced by regulated industries.

Contact:
Christoph Then, info@testbiotech.org [1], Tel 0049 151 54638040

Weitere Informationen: The joint publication of German authority and industry [2]
Tabled overview on differences between CRISPR-Cas and plant breeding [3]

Links
[1] mailto:info@testbiotech.org [2] http://www.frontiersin.org/articles/10.3389/fbioe.2018.00079/full
[3] http://www.testbiotech.org/node/2198