

'CRISPR Tomatoes' approved in Japan

Wide range of associated risks

3 Februar 2021 / Japan granted approval in January for the first 'CRISPR tomatoes' to be used in food production. There are plans to distribute the genetically engineered (GE) plants to home gardeners. The tomatoes contain a much higher concentration of a plant compound (GABA) compared to those derived from conventional breeding. This is an example of how it is possible to bring about major changes in the composition of food plants without inserting additional genes. The cultivation and consumption of the tomatoes are, however, associated with a wide range of risks.

GABA (γ -Aminobutyric acid) can diminish the transmission of specific signals in the central nervous system which may, amongst others, cause lower blood pressure. Therefore, the tomatoes will be introduced as a modern 'lifestyle' product. At the same time, it is known that GABA has a multifunctional role in tomato plants: it influences, amongst others, plant growth, resistance to plants pests and diseases as well as several other metabolic reactions. These findings were confirmed in previous experiments with CRISPR/Cas in which the concentrations of GABA were increased to a much higher level: this was found to lead to major disturbances in plant growth.

The concentration of GABA is naturally enhanced in plants attacked by pest organisms. However, all attempts to achieve a permanent higher level of GABA in the plants through conventional breeding have failed. Moreover, the screening of 4500 plants obtained from 'random mutagenesis' failed to reveal even one with the desired traits. Now, however, CRISPR/Cas has been used to disable the function of several genes that regulate GABA concentration and create increased levels.

Testbiotech sees this as a good example of why such genetically engineered plants need to be thoroughly investigated before any conclusions can be drawn on health and environmental risks or safety: the multifunctional role of GABA means that it has to be assumed the genetic intervention will affect plant metabolism on several levels. These changes also can cause unintended health effects at the stage of consumption. In addition, the plants can show unexpected reactions to environmental stress conditions, which can again have an impact on the safety of food products. This is also a problem if the plants are grown by home gardeners in very different growing conditions.

As a Japanese consumer organisation pointed out, there was no detailed examination of the associated risks. Instead, the authorities mostly seem to have relied on statements made by the Japanese company: Sanatech Seed was started by scientists who have in the past filed several patents on GE plants. However, arguments about patent rights may mean that the tomatoes are never marketed: there is already a patent application previously filed by other scientists which is very similar to the technology used by Sanatech. There are reports from Japan that the marketing of the tomatoes may well be obstructed due to intellectual property rights. This is possibly the reason why home gardeners will have to commit to growing the tomatoes for their own consumption and will not be allowed to distribute or market the fruits.

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Further information: [The publication on the GABA tomatoes](#) [2]

[Article about the approval of the GABA-tomatoe in Japan](#) [3]

[CRISPR tomatoes: Point mutations turning food into a sedative?](#) [4]

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[4] https://www.testbiotech.org/en/limits-to-biotech/crispr-tomatoes/basic_paper

