

Genetically engineered bacteria put food safety at risk

GE microbes often remain undetected

18 November 2021 / Genetically engineered (GE) bacteria are used, amongst other things, in the production of enzymes and vitamins. As an unintended consequence, genetically engineered bacteria have repeatedly found their way into the production processes of food and feed. EU member states have discovered more than a dozen such cases in last years, concerning more than 20 countries. The GE bacteria carry genes conferring antibiotic resistance which may be transferred to gut bacteria. More detailed examinations have found substantial risks to food safety.

In another instance, viable GE bacteria were found in samples of so-called proteases used as enzymes in the processing of food and feed. In this case, the products were imported from China and found in countries such as Germany and Italy; registered in the EU Rapid Alert System for Food and Feed (RASFF) as case 2019.3332. It was discovered, amongst other things, that the genomes of the bacteria carried gene constructs with resistance to several antibiotics. The EU has a zero tolerance policy towards GE organisms for use in enzyme production. Contamination with DNA from GE bacteria is also not allowed.

A recent paper published by Belgian researchers (referencing case RASFF 2019.3332) has now shown there is a high probability of gene transfer, for example, from the GE bacteria to pathogenic microorganisms. In addition, the genome organisation of the GE bacteria appears to be disturbed: additional gene constructs and new variants of gene copies were found at unexpected sites in the microbial genomes. The authors conclude: "These findings raise serious food safety and public health concerns...".

The European Food Safety Authority (EFSA) already established in 2018 that there were health risks in another case of contamination with GE bacteria. In this case, viable microbes were found several times in animal feed substances used in the production of vitamins (B2). Furthermore, in 2020, traces of GE bacteria were identified in multiple samples of so-called amylase enzymes. Amylases are used in baked products and can effectively make the products appear fresh even after a longer period of time. Many of the contaminated products originated in Germany.

The countries listed in the RASFF where genetically engineered bacteria have been found is long and includes, amongst others, Austria, Belgium, Bulgaria, Canada, Denmark, Estonia, Finland, France, Germany, Great Britain, Ireland, Luxembourg, New Zealand, Netherlands, Norway, Poland, Portugal, Slovakia, South Africa, Sweden, Switzerland, Turkey and the US.

The Belgian public health research institution, Sciensano, has provided many of the recent findings. Researchers at the institute have developed methods of detection and identification. These are, however, only suitable for some of the relevant products, and it is very difficult to estimate the real number of incidents. The Belgian researchers are therefore demanding that adequate methods of detection and identification are made available for every approval.

Besides contamination with GE bacteria, there are further open questions in relation to the enzymes: even though they have been subject to mandatory risk assessment for some years now, this still does not cover all the relevant issues. For example, it is not clear whether the enzymes remain active in the finished end products, such as baked goods. Furthermore, there is no declaration on food labels.

In August 2021, Testbiotech approached the EU Commission in regard to the absence of detection and identification methods as well as open questions in risk assessment. However, the EU Commission has so far failed to respond or take any action. Testbiotech warns that, if the EU Commission were to ease respective legal requirements, the current problems regarding a lack of detection and identification methods, will become even more acute with the possible introduction of

organisms obtained from New GE.

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Further information: [Recent publication from Belgium \(Fraiture et al., 2020\)](#) [2]

[Recent publication from Belgium \(D'aes et al., 2021\)](#) [3]

[Earlier Testbiotech information regarding bacteria in feed](#) [4]

[Letter to the EU Commission](#) [5]

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Links

[1] <mailto:info@testbiotech.org>

[2] <https://www.nature.com/articles/s41598-020-63987-5>

[3] <https://www.mdpi.com/2304-8158/10/11/2637>

[4] <https://www.testbiotech.org/en/press-release/genetically-engineered-bacteria-animal-feed-products-are-spreading-resistance>

[5] <https://www.testbiotech.org/content/testbiotech-letter-eu-commission-regarding-guidance-risk-assessment-food-enzymes-august-2021>