

## ALLEA Symposium Report ["Genome Editing for Crop Improvement"](#)

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The European Court of Justice (ECJ) ruling of 25 July 2018 establishes that organisms produced by directed mutagenesis are considered as genetically modified organisms (GMOs). Therefore, plants obtained using genome editing techniques (e.g. CRISPR/Cas9) are supposed to be regulated in the EU as GMOs (under the GMO Directive 2001/18). Since then the scientific community has made efforts to explain that such ruling is not beneficial for EU citizens. Consequently, on November 2019 the EU Council requested the Commission a study to clarify the situation to be submitted by 30 April 2021. The report of the European Federation of Academies of Sciences and Humanities (ALLEA) and the Royal Flemish Academy of Belgium for Science and the Arts (KVAB) joint symposium (November 2019) explains how genome-edited crops are obtained, how these crops impact society, what is the legal framework in the EU for those crops, and presents traceability and risk assessment issues as well as patenting problems. Finally, policy options for these crops are suggested. Different stakeholders' opinions were taken into account.

Agriculture is *per se* opened to innovation. Domestication of plants has always meant making use of genetic diversity and selection of the desirable traits. Spontaneous mutations always occur in nature and humans have used radiation or chemicals to generate random mutations for more than 80 years. Thanks to mutation breeding, many crops with useful traits have been obtained. Nowadays, there is a better understanding of molecular processes and thus, mutations can be induced in a very precise manner. It is evident, that mutations that are targeted to one specific sequence in the genome, are safer compared to randomly produced mutations. However, the current regulatory framework is not in line with these facts, since crops obtained using directed mutagenesis are considered GMOs while the ones obtained via random mutations are not.

The Nobel Prize in Chemistry 2020 was awarded to E. Charpentier and J. A. Doudna who discovered the CRISPR/Cas9 technique. Editing plant genomes with this powerful and simple tool - or with other similar new plant breeding techniques - allows introducing very small and undetectable changes in the genome that can convert food systems more resilient to climate change and with reduced environmental footprint. Scientists hope that a limited change to the EU GMO legislation will be introduced after the requested study, so that small genome alterations obtained through new plant breeding techniques are outside the legislative scope, as such modifications could happen in nature or using classical breeding techniques.

It is of utmost importance to pave the way for sustainable agriculture in Europe. Therefore, regulations should follow scientific knowledge and an open dialogue among stakeholders. Public has the right and need to be correctly informed, also in Estonia.