



## **GM 2.0: Gene Editing and New Plant Breeding Techniques**

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The European legislation on Genetically Modified Organisms (GMOs) that was adopted in 1990 (Directive 220/90/ECC) and then modified in 2001 (Directive 2001/18) covered the techniques of genetic modification that had been developed at the time. Since then, new techniques of genetic modification have been developed. There has been considerable debate around the new genetic engineering techniques, referred to as NPBT, gene-splicing and gene-editing. Whilst technologies such as CRISPR have been touted as a revolutionary new process, the legal standing of the technologies is contested.

Agribusiness says that they are new technologies that differ from conventional, genetic engineering. In the past, GM has employed transgenesis to take a gene from one species and transplant it into another (i.e. mixing genes from bacteria, viruses, animals or plants). NPBTs instead manipulate the genes within a single genome by activating or silencing genes. However, the outcome is still to manipulate and alter the genome in a laboratory to make a new organism, which is the very definition of genetic engineering, and introduces similar uncertainties and unintended consequences as other GM technologies. This new approach (dubbed GM 2.0) has led to a legal question over whether NPBTs are covered by the current legislation on GMOs.

### **What is the current legislation on GMOs?**

Currently, the European Union states that GMOs must be regulated according to [Directive 2001/18 and Regulation 1829/2003](#). The GMO legislation must ensure a “high level of protection of human life and health, animal health and welfare, environment and consumer interests”. According to it, prior authorisation and risk assessment are required before GMOs are marketed in the European Union. When authorised, GMOs are also subject to mandatory traceability and labelling. To date, only one GM crop is currently authorised for cultivation (MON810, a maize variety with weevil resistance) and is only cultivated on significant scale in Spain and Portugal.

Since the 1990s [imported GM animal feed has been common in non-organic livestock systems across the EU](#), but the use of non-GM animal feed is now growing, especially in Germany and France, and increasingly in the UK for farmers. Under EU legislation, Member States and regions have the right to ban the growth of individual GM crops inside their territory ([Directive 2015/412](#)). [Northern Ireland, Scotland and Wales have done this for all GM crops](#) that are either permitted to be grown in the EU or in the process of gaining permission.

### **Does current GMOs legislation cover NPBTs?**

The Soil Association says yes. However, EU governments are divided on this, and the question is currently under legal review. The [European Court of Justice \(ECJ\) has been asked to consider the status](#) of NPBTs, and in particular mutagenesis, by France’s Conseil d’Etat in order to provide more clarity on the European legal framework. In February, the Advocate General published his [opinion](#) to the ECJ: he confirms that plants obtained from mutagenesis are GMOs but should be exempted from the requirement of the GMO legislation. He recalled a criterion already in the Directive to decide which techniques would fall into the existing exemption or not: [organisms obtained by mutagenesis](#) should be excluded from the scope of the GMO legislation unless they involved the use of recombinant nucleic acid molecules.

However, the Advocate General's opinion is itself open to different interpretations, as he failed to adequately define the criterion. Some scientists have said that most, if not all, NPBTs will give rise to recombinant nucleic acid molecules, and thus would fall under the EU definition of GMOs, by the standard set out in the Advocate General's legal opinion. The ECJ will, it is hoped, clarify the position in their decision, expected later in the spring of 2018. The debate on the legal status of this techniques is crucial: without legislation, it could mean that any potential negative impacts of GMOs produced using such techniques would go unchecked and European consumers, farmers and breeders would have no way to avoid GMOs.

### **Is the current European Union regulation on GMOs in line with the public's wishes?**

On the whole, yes. European consumers have consistently opposed GM technology in the food system. A 2014 [YouGov poll](#) found that 46% of British adults had negative views about GMOs and only 6% of the public were becoming "more positive" towards GM foods. It therefore seems unlikely that food produced using NBPT would find a sufficient market with the UK public who have soundly rejected GMOs. European law has consistently recognized the risks inherent in GMOs, and the public sentiment against them, and legislated accordingly.

### **What is Soil Association's stance on new genetic editing techniques?**

Organic agriculture is based on the four principles of: ecology, health, fairness and care. It focuses on promoting biodiversity, soil quality, closed production cycles and overall enhancing ecological processes based on care and respect of the health principle. It is a systemic and process oriented approach that acknowledges the importance of the precautionary principle. In line with our philosophy, the organic movement opposes the cultivation and release of GMOs into the environment and to their use in agriculture.

According to Soil Association, new plant breeding techniques should be considered to be GMOs and therefore fall within the scope of the current GMO legislation. This position is shared in the organic sector at the European ([IFOAM EU](#)) and international level ([IFOAM Organics International](#)).

### **Could gene editing and other new plant breeding techniques ever fit into organic agriculture?**

No form of genetic-engineering or gene-editing has been permitted, nor would be permitted, within organic agriculture. [IFOAM EU](#) considers that all GM techniques fall under the scope of the GMO legislation. As a result, all products produced using gene-editing techniques have to remain traceable, labelled, subject to a risk assessment and to the precautionary principle.

Instead the organic movement allows for the traditional breeding of varieties to foster the development of suitable and efficient varieties that are GMO-free and patent-free. We recognize the important role that F1 hybrid seeds have in the current market to deliver commercially-viable crops. We will continue to encourage the cultivation of open pollination seeds, which can help farmers adapt to a changing climate by breeding all sorts of drought and pest tolerant plants. This type of plant breeding tends to be low-cost and low-tech with plenty of benefits. Breeding crops in this way has proven to be faster and more effective than GM, particularly when informed by new technologies like Marker Assisted Selection, based on our new knowledge of the genome, which the organic movement welcomes.

### **Does prohibiting NPBTs block innovation in the farming sector?**

No. If anything, over-concentration on GM research has severely hindered research into other more practical innovations, including for Marker Assisted Selection crop breeding. Innovation in food and farming doesn't implicitly mean GM techniques and agrichemicals. Exciting new research and development are happening in fields across the UK. Organic and agroecological farmers know, better than anyone, the problems they face and are great natural experimenters. The Soil Association supports ground-based research through its Innovative Farmers programme, which recognises that many of the best ideas in farming come from farmers. Through the network, groups of farmers, whether conventional or organic, can work directly with a researcher to make farm businesses more sustainable and resilient. Right now, there are over 50 [field labs](#) on topics including herbal leys, potato blight and mineral deficiencies in calves, which run at a cost significantly less than GM research facilities.

### **Can we feed the world without these new genetic engineering technologies?**

Yes. Organic agriculture is best placed to help farmers to produce food for healthy diets (with more fruit and vegetables, less processed food, less but better quality dairy and meat), while protecting the environment and building resilience to climate change. Our soil has [just sixty harvests left](#), largely as a result of years of chemical exploitation, and it is vital that we look to sustainable farming methods and adopt more regenerative agricultural practices. Organic agriculture has been shown to deliver a range of essential benefits, including out-producing non-organic by [70-90%](#) during extreme droughts and delivering a [more resilient food supply](#) and income for the farmers. The recent report "[FAO's Work on Agroecology: A pathway to achieving the SDGs](#)" highlighted the necessity of adopting agroecological techniques (such as organic) to achieve the UN's Sustainable Development Goals.

### **Does Brexit pose a potential threat to EU legislation on new genetic engineering techniques?**

There are still significant questions over the UK's position on NPBTs post-Brexit. The Department of Environment, Food and Rural Affairs has continued to emphasize a desire to [embrace new technologies and innovation](#), which could include GM 2.0. Similarly, future trade deals are being negotiated that threaten to open the UK market to GM products. This [potential risk](#) is particularly acute in a future transatlantic trade deals. It's critical that the British public continues to raise their rejection of GMOs to Government, and that those purchasing large quantities of food – multiple retailers and food service companies – continue to avoid GMOs in line with their customers views. GMOs has no place in the future of food and farming and should not be allowed into UK agriculture. It is the role of civil society to emphasize the potentially damaging impacts that GMOs could have on the environment, human health and small producers whilst remaining vigilant to any move to adopt them.

### **Conclusions:**

- NPBTs should be recognised as Genetically Modified Organisms and regulated accordingly
- The EU should continue to regulate GMOs and must include all NPBTs within legislation
- The UK must continue to exclude GMOs (including all NPBTs) from cultivation following Brexit
- No trade deal should be agreed that could allow GMOs to enter into UK agriculture or allow GMOs food into the UK market.