

Open letter

Dear Minister Eustice

Re: Amendment to Agricultural Bill

As scientists familiar with gene-editing technologies, we are concerned that an undemocratic and non-transparent attempt is being made to de-regulate gene-edited foods, crops and animals, thus enabling them to enter UK food and farming, in the form of an Amendment[1] to the Agriculture Bill proposed by Julian Sturdy MP and a cross-party group of MPs and Lords. The Amendment has not been debated in the Commons.

We respectfully ask you to reject this Amendment and not to table it before the Lords on 10 June or at any future date.

If gene editing were as beneficial to British food and farming as the Amendment's supporters claim, it would have been included in the original Agriculture Bill and enjoyed the benefit of a full, open, and transparent debate in the Commons. Attempting to introduce it at this relatively late stage via an Amendment appears underhand and constitutes a violation of the political process that is not acceptable in a parliamentary democracy.

Gene-editing technologies are new, and scientists are still trying to refine them and understand their effects. Worryingly, an increasing number of scientific studies (for example, see this list,[2] for which Dr Antoniou was technical advisor) show that gene editing is not precise and produces unintended DNA mutations, both at the intended editing site in the genome ("on-target effects") and at other sites ("off-target effects").

In the case of food plants, the effects of these unintended on-site and off-target mutations brought about by gene-editing tools, especially the CRISPR system, will result in an altered pattern in gene function. This in turn could result in a changed biochemistry leading to unexpected toxicity or allergenicity. As an example, one study showed that application of the CRISPR gene-editing tool resulted in the production of misshapen proteins.[3] While this study was conducted in mice, the lead authors correctly warned that their findings were relevant to gene editing across all kingdoms of life, from plants to human cells.[4]

The warnings of this study are further emphasised in a publication last week, which reported the use of CRISPR gene editing to modify various varieties of rice in a manner that is proposed to be de-regulated in the Amendment. Here the authors confirmed that the wide range of undesirable, unintended on-target and off-target mutations seen in edited animal/human cells also occur in plants.[5] Thus the likelihood of altered biochemistry in gene-edited food plants, with consequent health risks (toxicity, allergenicity) is very real. In this case, too, the study authors expressed a precautionary message: "understanding of uncertainties and risks regarding genome editing is necessary and critical before a new global policy for the new biotechnology is established".

Gene-edited animals can also pose risks. Attempts to market gene-edited cattle were shelved[6] after they were found by scientists at the US Food and Drug Administration (FDA), to unexpectedly contain genes conferring resistance to antibiotics, which were carried over from the gene-editing procedure.[7] This was in spite of the developer's claim that the animals were "free" from such unintended effects.[8] In this case, the risk lies in the possibility that the rogue genes could transfer to pathogenic bacteria, adding to the public health problem of antibiotic resistance in animals and/or humans. In response to this discovery, scientists at the FDA are arguing for strict regulation of gene-edited animals.[9]

Clearly, the developers of gene-edited products cannot be trusted to regulate themselves. Stringent regulation of gene editing in the food chain, including labelling of gene-edited products, must be maintained and enforced.

We conclude that de-regulating gene-editing in food, crops and livestock, particularly at this early stage of the technology's development, would be irresponsible and premature and would pose

unacceptable risks to public health and the environment, as well as risking our trading relationships with other nations and regions of the world.

We therefore urge you to reject the Amendment to the Agriculture Bill.

Sincerely

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References

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