RSPCA CYMRU

Briefing document

Genome Editing of Farmed Animals: A Summary of Issues

MARCH 2021

Key Facts

Some within the farm animal breeding industry have lobbied for the 'smart and safe' use of genome editing in animal breeding and reform of legislation on Genetically Modified Organisms (GMOs).

The UK Government is consulting on allowing the gene editing of farm animals in England. Under the proposals, the production of gene edited farm animals could soon be permitted, and sold to consumers - because they would no longer be defined as GMOs.

RSPCA Cymru believes that any move to allow for the gene editing of farmed animals would be a serious step back for animal welfare and public confidence in food - with alternative approaches to the objectives of GE being available without threatening animal welfare standards and consumer choice.

We believe that genome editing techniques should not be used on farm animals for any reason, on ethical and animal welfare grounds. Indeed, the regulations on GMOs should not be relaxed and that the existing EU model of GE regulations should be retained in all nations of Great Britain, with no gene editing allowed outside the laboratory and mandatory labelling.

There is an increasing concern that should England approve the use of genome editing, even if the Welsh Government did not allow the production of gene edited foods, they would be unable to stop them appearing in shops in Wales due to new rules under the Internal Market Act - notably those principles of mutual recognition and non-discrimination.; This could mean GE-food could soon appear on shelves in Wales despite any devolved rules to the contrary.

Background

On 7 January 2021, the UK Government launched its consultation looking at genetic technologies within England, mainly focusing on the regulation of gene edited (GE) organisms possessing genetic changes which could have been introduced by traditional breeding.

Humans have been modifying animals for millenia, through selective breeding, surgical mutilations and administering drugs and hormones. However, gene editing enables rapid, instant, substantial and multiple changes to the genome - removing a number of technical barriers to modifying genomes. This raises some significant animal welfare concerns as well as ethical issues.

To date, the Welsh Government has not made any move to permit this practice - instead acknowledging "considerable debate in the scientific community" and favouring a precautionary approach based on science[1]. However, even if the Welsh Government did not allow the production of gene edited foods, they may be unable to stop them appearing in shops in Wales due to new rules under the Internal Market Act- and it may not even need to be labelled. RSPCA Cymru fear this could have damaging consequences for consumer choice and animal welfare - both of which should be hallmarks of Wales' approach to food production.

What Does Genome Editing Involve?

Genome editing (GE) is a group of technologies that enable an organism's DNA to be manipulated by adding, removing or altering genetic material at particular locations in the genome.

GE has been positioned as a viable tool to address challenges such as increasing human demands for animal protein, meats of specific qualities and animals resistant or resilient to infectious disease. It has also been suggested to help respond to animal welfare concerns and to global heating (e.g. by creating 'hornless cattle' and heat tolerant animals). However, there are alternative approaches to addressing all of these challenges, including improving animal husbandry and reducing food waste[2] - one third of the food produced in the world for human consumption every year is lost or wasted.

What Are the Issues with Genome Editing?

'Editing' an animal's genome involves procedures that potentially cause pain, suffering, distress and lasting harm. It is an inefficient process, using large numbers of animals to produce a single individual with the desired edit. Despite claims that these newer GE techniques are much more precise than previous methods, they still cause unpredictable and unintended changes to the genome, which are only just starting to be reported[3].

There are several important issues relating to consumer choice. There is little public appetite for genetically modified animals in food in the UK; regulations are inconsistent across international borders; and it is technically difficult to distinguish between naturally occurring and 'engineered' mutations. Recent consultations show that the public was "not convinced of the need" to use GE to develop faster growing animals for human consumption and that GE farm animals to increase efficiency/profitability was seen as less acceptable use of the technology[4].

There are legitimate public concerns around animal integrity and 'naturalness', but the use of GE is escalating without public consensus on whether it is right to manipulate animal genomes in this way, and for what purposes. It is imperative to ensure public trust and enable informed purchasing choices in any GE application in farmed livestock. RSPCA Cymru is concerned there is little public awareness both of the UK Government's ongoing consultation in England - nor the impact this could have in Wales due to the Internal Market Act. Any future developments must be transparent, accessible to, and acceptable to the public, with clear product labelling that does not use misleading euphemisms such as 'precision breeding' or 'smart breeding'.

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[1] Welsh Government news - Genetic editing in agriculture, 7 January 2021

[2] http://www.fao.org/save-food/resources/keyfindings/en/ (accessed -3/06/2020)

[3] See for example: Thomas, M., Burgio, G., Adams, D. J. & Iyer, V. *Collateral damage and CRISPR genome editing*. PLoS Genet. 15, e1007994 (2019); Kosicki, M., Tomberg, K. & Bradley, A. *Repair of double-strand breaks induced by CRISPR-Cas9 leads to large deletions and complex rearrangements*. Nat. Biotechnol. 36, 765–771 (2018); *FDA finds DNA of both GE polled calves contains antibiotic resistance genes, along with various other gene sequences of bacterial origin* https://www.biorxiv.org/content/10.1101/715482v1.full (accessed 03/06/2020)

[4] *Potential uses for genetic technologies: dialogue and engagement research conducted on behalf of the Royal Society* https://royalsociety.org/-/media/policy/projects/gene-tech/genetic-technologies-public-dialogue-hvm-full-report.pdf (accessed 03/06/2020)

The RSPCA has numerous serious concerns about the GE process, namely:

- **There is no history of safe and reliable use**
- **Genetic technologies can cause unpredictable and unintended changes to the genome;**
- **Not enough is known about the medium to long term effects on animal health and welfare;**
- **The current rules and regulations around GMOs are still essential for regulating GEs until there is greater scientific evidence available;**
- **There are alternative approaches to achieving the proposed benefits of genetic technologies e.g reducing food waste, with 12% of all meat and animal products produced globally lost or wasted every year, and improving animal husbandry;**
- **GE products have been withdrawn from approval in the USA following the Regulator's concerns on the transfer of other genes during the GE process;**
- **GE produced food could be forced onto supermarket shelves in Scotland and Wales despite those countries objecting to its production and sale.**

How is Genome Editing Currently Regulated?

Editing the genomes of animals is regulated by legislation controlling animal research and testing such as the UK Animals (Scientific Procedures) Act 1986, EU Directive 2010/63, and legislation controlling GMOs such as Genetically Modified Organisms (Contained Use) Regulations 2014. GE is subject to strict rules on authorisation, release, use in feed and food and labelling.

These rules were set up to ensure a high level of protection of human life and health, animal health and welfare, environment and consumer interests in relation to genetically modified food and feed, whilst ensuring a high level of protection of animal health and welfare.

Genome Editing and the Internal Market Bill 2020

The UK Internal Market (UKIM) Act puts the principles of mutual recognition and non-discrimination in law to ensure there are no new barriers for businesses trading across the UK - which has raised some concerns, including from within the environmental and animal welfare sector in Wales that the Bill will result in a 'race to the bottom' on standards within food production; resulting in lower standards of animal welfare, labelling and consumer choice.

In relation to GE, if England were to move forward with its proposals to allow the GE of farm animals, under the principles of mutual recognition and non-discrimination, Wales may also be indirectly subject to such a decline in standards in terms of the food that appears on shelves. Essentially, it could lead to unlabelled, gene-edited food being sold in Wales even if domestic legislation does not allow its production because of the UKIM's creation. This would remove the ability for consumers to make an informed choice - which is particularly concerning for those who wish to shop responsibly and promote better animal welfare through their purchasing decisions. 80 percent of adults in an RSPCA Cymru poll said that the welfare standards of the animals reared is important in their purchasing decisions[5]. At a UK level, some 72 percent would pay more for products from animal welfare-friendly production systems[6].

The RSPCA is opposed to the application of GE techniques to farm animals and believes there should be a moratorium on their use. In our view, more acceptable alternative approaches to improving farm animal health and welfare, which will also protect the environment and ensure access to affordable and

[5] YouGov Plc. Total sample size was 1,001 Welsh adults (aged 18+). Fieldwork was undertaken between 4th - 8th September 2014. The survey was carried out online. The figures have been weighted and are representative of all Welsh adults (aged 18+).
[6] European Commission, 2016. Attitudes of Europeans towards animal welfare. Special Eurobarometer 442.

nutritious food for all, are already available.

RSPCA Cymru's view

RSPCA Cymru is deeply concerned that the drive to use GE is outstripping the public debate regarding acceptable innovations. The technology is unproven and causes unintended changes to the genome. Alternatives to genome editing farmed animals are neither properly explored nor implemented. The drivers to alter farmed animals do not account for legitimate animal welfare, ethical and public concerns.

The RSPCA believes that all UK nations must seek to maintain the global lead in animal welfare. GE animals for all applied purposes should stop until the risks have been rigorously characterised and assessed and there has been a fully informed public consultation, including risks, harms, ethical issues and alternative approaches. Troublingly, Wales may be powerless to prevent GE food appearing on shelves despite any devolved laws to the contrary concerning production. This could mean consumers unwittingly purchasing this unlabelled food - despite many people being more conscious than ever about their purchasing decisions and animal welfare in food production.

At a time when human impacts on other animals and the environment are under unprecedented scrutiny, this is potentially a watershed moment for farmed animals. Rather than obtaining ever more productivity and profit from individual animals, who are sentient and have intrinsic worth, it is time for human behaviour change to drive sustainable agriculture that respects farmed animals and their welfare needs.

There is also great public concern around 'naturalness', and little public appetite for GE animal products. This means that animals could suffer unnecessarily to develop food products which will be rejected by the public.

Questions to Consider
1) What protections can the Welsh Government offer against the presence of gene edited food in Welsh supermarkets, should GE production be permitted in England by the UK Government?
***2)* What discussions has the Welsh Government had with the Agricultural Sector in Wales, regarding gene editing of farmed animals and the impact of this practice on animal welfare?**
3) Can the Welsh outline its position on Gene Editing of farmed animals, in light of the ongoing consultation by the UK Government on this issue?