

GENE EDITING

EU regulators face CRISPR crop conundrum

Testing labs are struggling to enforce a court ruling on gene-edited foods.

BY HEIDI LEDFORD

A landmark European court ruling that made gene-edited crops subject to the same stringent regulations as other genetically modified (GM) organisms has created a conundrum for food-testing laboratories across Europe.

The ruling that the Court of Justice of the European Union delivered on 25 July 2018 requires these scattered laboratories — which already spot-check freighters and supermarkets for foods that contain unapproved GM organisms — to look for gene-edited crops. But there is no easy way to do this. Gene edits — made with tools such as CRISPR — often alter just a few DNA letters, whereas conventional genetic modifications often involve transplanting longer stretches of DNA from one species to another.

“Some of these [gene-editing] alterations are small enough that they are simply indistinguishable from naturally occurring organisms,” says Martin Wasmer, who studies the legal aspects of genome editing at the Leibniz University Hannover, Germany. “It will not be possible to enforce in those cases.”

The court’s decision startled many plant scientists who expected that gene-edited crops would be exempt from EU regulations that govern GM crops. The bloc’s strict regulatory approach also differs starkly from that of other agricultural powerhouses. In June, the US Department of Agriculture announced that it does not intend to regulate edited crops with mutations that could have occurred in nature. Brazil, Argentina and Australia have taken a similar tack.

Gene-edited crops are trickling into the market in some of these countries. In February, Calyxt, an agricultural biotechnology company in Roseville, Minnesota, announced the first US sale of high-oleic-acid oil made from its gene-edited soya beans. And last month, Intrexon of Germantown, Maryland, said that it was beginning commercial trials of non-browning gene-edited lettuce.

Such developments increase the risk that an unapproved gene-edited food could eventually reach Europe’s supermarket shelves. “If there is a product authorized or legally traded around the globe, there is some possibility that it will eventually show up in commodities,” says Michael Eckerstorfer, a senior scientific



INTREXON

Gene-edited lettuce developed by the biotechnology firm Intrexon resists browning.

officer at the Environment Agency Austria in Vienna. “But you can’t have traces of that stuff in there — you need some kind of a method to check on that.”

SUPERMARKET SWEEP

The relatively large altered DNA sequences in older GM crops — which often contain foreign DNA — lent themselves to detection using simple laboratory tests that amplify the DNA snippets that were inserted in the genome. Hunting down gene edits might be possible with broader DNA-sequencing technologies that analyse genomes for short deletions or insertions. But few EU labs tasked with enforcement of regulations on GM crops currently have the money, expertise or equipment to carry out such assays, says Hermann Broll, a researcher in the Department of Food Safety at the German Federal Institute for Risk Assessment in Berlin.

Even if they could find the edits, he says, regulators would struggle to prove that the DNA variant they’ve identified is the result of gene editing, rather than a natural mutation. “I do not have a clue as to the solution — and I have not seen anywhere any clue yet,” says Broll.

Researchers have historically relied on regulatory agencies for information about which GM crops have been approved for sale, and where. Such information has given scientists

the tools they need to design tests to detect GM organisms, and often provided a way to trace those products back to their producers. But with many countries deciding not to regulate gene-edited crops, tracking those that reach the market could be difficult.

Developing a system to fill that gap is crucial, the European Network of GMO Laboratories — a consortium of testing labs — said in March. “It is highly improbable for enforcement laboratories to be able to detect the presence of unauthorized genome-edited plant products in food or feed entering the EU market without prior information on the altered DNA sequences,” the group concluded.

European regulators might need to rely on companies to voluntarily share that data, says Jennifer Kuzma, a science-policy researcher at North Carolina State University in Raleigh. She suspects that some firms would be willing to do so, to avoid the public scepticism that has plagued GM crops.

Eckerstorfer has proposed a similar solution: a registry of gene-edited crops developed in different countries. In the meantime, he hopes that scientists and regulators will seek better tests to evaluate new crops and base the process on relative risk. “There are a load of problems out there,” he says. “Detection is one of those and probably not one of the easiest to solve. But it’s not the only one.” ■