Veille citoyenne d'information sur les OGM et les semences

A showcase for « new genomic techniques » in Europe

Par

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In an article published in April 2025, *Euronews* highlights "*new genomic techniques*" using the example of a wheat genetically modified by Crispr/Cas9 in the UK. This wheat, developed by a team of biologists from Rothamsted Research at the University of Bristol, has been tested in a field north of London since October 2021. Although this trial is being carried out without any environmental, agricultural or health precautions, it does provide a good showcase for potential investors.

Rothamsted Research - Le réseau numérique de caméras, de scanners laser et de capteurs du "Field Scanalyzer" fournit des données en continu sur les performances des cultures expérimentales...une véritable vitrine pour les blés issus de NTG donc.

This wheat, which is expected to be on the market within the next 5 to 10 years, has been genetically modified using Crispr to extinguish the expression of a gene coding for a protein involved in the synthesis of an amino acid, asparagine. When this amino acid is cooked above 120°C, it generates the carcinogen acrylamine.

An essential technology?

In an article published in 2021[i], *Inf'OGM* already questioned the relevance of this genetic modification of wheat. In it, we described simple alternatives for growing, baking and eating wheat that would produce little of the potentially carcinogenic acrylamine. In that article, *Inf'OGM* reported that for Dr Jacques Fradin, of the Paris Environmental Institute, the quantity of acrylamide finally found is proportional to the quantity of gluten in the cereals, because "*it is therefore* a priori *in the gluten proteins that the excesses of the amino acid asparagine reside*". This position is open to debate, but it does raise questions about the strategy of the British researchers.

Particularly as other articles show that asparagine is broken down to a greater extent in sourdough-based bread-making. *Inf'OGM* reported the work of Claire Micheaux, an engineer at Lesaffre, who indicated that the reduction in asparagine "*can be 20 to 70% depending on the micro-organisms living in the sourdough*".

Manipulating semantics to avoid GMO regulatory status

In their presentation, the researchers explained that they had first carried out transgenesis for the Crispr part (the guide RNA) and the Cas part (the enzyme). This transgenesis step, which is very common when the Crispr/Cas tool is used for genetic modification, makes this wheat a regulated GMO.

In order to avoid this GMO regulatory status and pass this wheat under the possible future new status of "*NTG1*", the researchers state: "*once the modification is complete, the genetically modified elements are eliminated by selection, resulting in a plant whose genome has been modified but which is not GMO*".

This is consistent with the distinction they make between GMOs and *NTGs*: "*whereas GMOs involve the insertion of genes from one organism into another, whatever their origin, NTGs do not introduce DNA from sexually incompatible organisms*". Is it still necessary to point out that restricting the definition of a GMO to transgenesis alone is nothing more than a semantic ploy on the part of the pro-GMOs? In fact, current legislation on GMOs has never been limited to transgenesis and covers any genetic modification carried out in a non-natural way. Need we also point out that NTGs are techniques that produce GMOs?

The erroneous position taken by the researchers is all the more problematic given that they themselves acknowledge in their presentation that "*the elimination of genetically modified elements has, however, proved difficult*". So we won't know whether this elimination is complete.

Uncontrolled genetic modification?

In addition to the lack of control over European legislation on GMOs, it would appear that the genetic modifications carried out are not totally under control either. The authorisation for this field trial, issued by the UK government in 2021, was amended, suggesting that the authorisation obtained should be extended to cover all existing genetic modifications.

In August 2021, the authorisation issued[ii] stated that the field trial could be conducted on "Triticum aestivum *wheat plants that have been genetically modified by Crispr-Cas9 to contain mutations in the asparagine synthesis gene TaASN2*". But a year later, in October 2022, without any new application being made public, the authorisation was changed[iii]. This time, the new authorisation specified that the field trial could be conducted on "Triticum aestivum *wheat plants that have been genetically modified by Crispr-Cas9 to contain mutations (including changes, insertions and/or deletions of one or more DNA bases) in one or more asparagine synthesis genes, TaASN1 and TaASN2*".

This means that both the targeted genetic sequences and the nature of the genetic modifications have been changed in the authorisation granted.

What about undesirable effects?

It has also been observed that Crispr/Cas9 can cause DNA damage and uncontrolled genotoxic effects, some of which are thought to be carcinogenic[iv]. Crispr/Cas that prevents cancer or Crispr/Cas that generates cancer? The *Euronews* presentation[v] cannot answer this question, as it makes no mention of genotoxic effects.

No matter! These crisped wheats, which are genuinely genetically modified, are already being grown in open fields without any study of their potential consequences, as a German researcher deplores at the very end of this article. For Katja Tielbörger, from the University of Tübingen (Germany), the proposed deregulation of GMOs raises particular concerns. In particular, she is concerned about the potential environmental and agricultural impact of these new plants genetically modified using new techniques. In her view, "*we cannot claim equivalence between NTG1 (plants) and normal plant breeding*". In response to the European Commission's proposal to divide genetically modified organisms into two categories based on a theoretical number of modifications, she also points out that "*even molecular biologists would agree that the distinction between NTG1 and NTG2 has no scientific basis. It's just a random number and doesn't make sense*". In fact, this theoretical number of less than 20 modifications for "*NTG 1*" and more than 20 for "*NTG 2*" opens the door to an infinite number of modifications[vi] and makes no scientific sense, which was also the opinion of Anses[vii].

i Christophe Noisette, "Grande-Bretagne - Un blé OGM " *bon pour la santé*" bientôt expérimenté", *Inf'OGM*, 11 May 2021.

ii Department for Environment, Food and Rural Affairs, "ENVIRONMENTAL PROTECTION ACT 1990, SECTIONS 111 AND 112: CONSENT TO RELEASE GENETICALLY MODIFIED ORGANISMS REFERENCE 21/R08/01", 3 August 2021.

iii Department for Environment, Food and Rural Affairs, 'ENVIRONMENTAL PROTECTION ACT 1990, SECTIONS 111 AND 112: CONSENT TO RELEASE GENETICALLY MODIFIED ORGANISMS REFERENCE 21/R08/01", 1st October 2022.

iv Annick Bossu, "OGM: quand la biologie met Crispr au pas", *Inf'OGM*, 10 November 2022. Eric Meunier, "OGM - Crispr/Cas peut "*éclater*" les génomes", *Inf'OGM*, 28 October 2021.

v Alice Carnevali and Farhan Rafid, "NGTs: Inside the first European gene-edited wheat field trial | Euronews Tech Talks", *Euronews*, 18 April 2025.

vi Eric Meunier, "Scientific manipulations, a basis of the future GMO/NGT law?", *Inf'OGM*, 29 November 2023.

vii Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (Anses).
Eric Meunier, "French Anses experts : GMO deregulation has « no scientific basis »", *Inf'OGM*, 16 January 2024.

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