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SCIENTIFIC OPINION

Assessment of genetically modified maize MON 89034 × 1507 × NK603 for renewal authorisation under Regulation (EC) No 1829/2003 (application GMFF-2022-3670)

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Abstract

Following the submission of dossier GMFF-2022-3670 under Regulation (EC) No 1829/2003 from Corteva Agriscience Belgium BV and Bayer Agriculture BV, the Panel on genetically modified organisms of the European Food Safety Authority was asked to deliver a scientific risk assessment on the data submitted in the context of the renewal of authorisation application for the herbicide-tolerant and insect-resistant genetically modified maize MON 89034 × 1507 × NK603, for food and feed uses, excluding cultivation within the European Union. The data received in the context of this renewal application contained post-market environmental monitoring reports, a systematic search and evaluation of literature, updated bioinformatic analyses and a search for additional documents or studies performed by or on behalf of the applicant. The GMO Panel assessed these data for possible new hazards, modified exposure or new scientific uncertainties identified during the authorisation period and not previously assessed in the context of the original application. Under the assumption that the DNA sequences of the events in maize MON 89034 × 1507 × NK603 considered for renewal are identical to the sequences of the originally assessed events, the GMO Panel concludes that there is no evidence in renewal dossier GMFF-2022-3670 for new hazards, modified exposure or scientific uncertainties that would change the conclusions of the original risk assessment on maize MON 89034 × 1507 × NK603.

KEYWORDS

Articles 11 and 23, maize, MON 89034 × 1507 × NK603, Regulation (EC) No 1829/2003, renewal

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SUMMARY

Following the submission of dossier GMFF-2022-3670 under Regulation (EC) No 1829/2003 from Corteva Agriscience Belgium BV and Bayer Agriculture BV, the Panel on genetically modified organisms of the European Food Safety Authority (GMO Panel) was asked to deliver a scientific risk assessment on the data submitted in the context of the renewal of authorisation application for the herbicide-tolerant and insect-resistant genetically modified maize MON 89034 × 1507 × NK603. The scope of the renewal dossier GMFF-2022-3670 is for the renewal of the placing on the market of products containing maize MON 89034 × 1507 × NK603, for food and feed uses, excluding cultivation within the European Union (EU).

In delivering its scientific opinion, the GMO Panel took into account dossier GMFF-2022-3670, additional information provided by the applicant, scientific comments submitted by the EU Member States and relevant scientific publications. The data received in the context of the renewal dossier GMFF-2022-3670 contained: post-market environmental monitoring reports, an evaluation of the literature retrieved by a scoping review, a search for additional studies performed by or on behalf of the applicant and updated bioinformatics analyses. The GMO Panel assessed these data for possible new hazards, modified exposure or new scientific uncertainties identified during the authorisation period and not previously assessed in the context of the original application.

Under the assumption that the DNA sequences of the events in maize MON 89034 × 1507 × NK603 considered for renewal are identical to the sequences of the originally assessed events, the GMO Panel concludes that there is no evidence in renewal dossier GMFF-2022-3670 for new hazards, modified exposure or scientific uncertainties that would change the conclusions of the original risk assessment on maize MON 89034 × 1507 × NK603 (EFSA GMO Panel, 2010).

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1 | INTRODUCTION

1.1 | Background

On 14 December 2022, the European Food Safety Authority (EFSA) received from the European Commission dossier GMFF-2022-3670 for the renewal of the authorisation of maize MON 89034 × 1507 × NK603 (Unique Identifier MON-89Ø34-3 × DAS-Ø15Ø7-1 × MON-ØØ6Ø3-6), jointly submitted by Corteva Agriscience Belgium BV and Bayer Agriculture BV (hereafter referred to as 'the applicant') according to Regulation (EC) No 1829/2003.[1]

Following receipt of dossier GMFF-2022-3670, EFSA informed the Member States (MS) and made the summary of the application available to the public on the Open EFSA portal.[2]

EFSA checked the application for compliance with the relevant requirements of Regulation (EC) No 1829/2003 and Regulation (EU) No 503/2013[3] and, when needed, asked the applicant to supplement the initial application. On 3 May 2023, EFSA declared the application valid and made the valid application available to the MS and the EC.

Following the submission of application EFSA-GMO-NL-2009-65 and the publication of the EFSA scientific opinion (EFSA GMO Panel, 2010), the placing on the market of maize MON 89034 × 1507 × NK603 for (a) foods and food ingredients containing, consisting of, or produced from this GM maize; (b) feed containing, consisting of, or produced from this GM maize; and (c) products containing this GM maize or consisting of it for any other use than (a) and (b), excluding cultivation in the EU, was authorised by Commission Implementing Decision 2013/648/EU.[4] A copy of the authorisation was provided by the applicant.[5]

From the validity date, EFSA and its scientific Panel on genetically modified organisms (hereafter referred to as 'the GMO Panel') endeavoured to respect a time limit of 6 months to issue a scientific opinion on dossier GMFF-2022-3670. This time limit was extended whenever EFSA and/or its GMO Panel requested supplementary information to the applicant. According to Regulation (EC) No 1829/2003, any supplementary information provided by the applicant during the risk assessment was made available to the MS and European Commission (for further details, see Section 5).

In accordance with Regulation (EC) No 1829/2003, EFSA consulted the nominated risk assessment bodies of the MS, including national Competent Authorities within the meaning of Directive 2001/18/EC.[6] The MS had 3 months to make their opinion known on dossier GMFF-2022-3670 as of date of validity.

1.2 | Terms of Reference as provided by the requestor

EFSA and its GMO Panel were requested to carry out a scientific risk assessment of maize MON 89034 × 1507 × NK603 for the renewal of authorisation, according to Articles 11 and 23 of Regulation (EC) No 1829/2003.

According to Regulation (EC) No 1829/2003, this scientific opinion is to be seen as the report requested under Articles 6(6) and 18(6) of that Regulation including the opinions of the nominated risk assessment bodies of the MS.[7]

In addition to the present scientific opinion on maize MON 89034 × 1507 × NK603, EFSA and its GMO Panel were also asked to report on the particulars listed under Articles 6(5) and 18(5) of Regulation (EC) No 1829/2003. The relevant information is made available in the OpenEFSA portal,[8] including the information required under Annex II to the Cartagena Protocol, a labelling proposal, a post-market environmental monitoring (PMEM) plan as provided by the applicant; the method(s), validated by the Community reference laboratory, for detection, including sampling, identification of the transformation event in the food–feed and/or foods–feeds produced from it and the appropriate reference materials.

[1] Regulation (EC) No 1829/2003 of the European Parliament and of the Council of 22 September 2003 on genetically modified food and feed. OJ L 268, 18.10.2003, p. 1–23.

[2] Available online: https://open.efsa.europa.eu/questions/EFSA-Q-2022-00868

[3] Commission Implementing Regulation (EU) No 503/2013 of 3 April 2013 on applications for authorisation of genetically modified food and feed in accordance with Regulation (EC) No 1829/2003 of the European Parliament and of the Council and amending Commission Regulations (EC) No 641/2004 and (EC) No 1981/2006. OJ L157, 8.6.2013, p. 1–48.

[4] Commission Implementing Decision of 6 November 2013 authorising the placing on the market of products containing, consisting of, or produced from genetically modified maize MON89034 × 1507 × NK603 (MON-89Ø34-3 × DAS-Ø15Ø7–1 × MON-ØØ6Ø3–6) pursuant to Regulation (EC) No 1829/2003 of the European Parliament and of the Council (2013/648/EU).

[5] Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – The authorisation for the placing of the GM food and/or feed onto the market in the EU.

[6] Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC. OJ L 106, 12.3.2001, p. 1–38.

[7] Opinions of the nominated risk assessment bodies of EU Member States can be found at the OpenEFSA Portal https://open.efsa.europa.eu/questions, querying the assigned Question Number.

[8] Available online: https://open.efsa.europa.eu/questions/EFSA-Q-2022-00868

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2 | DATA AND METHODOLOGIES

2.1 | Data

The applicant has submitted a confidential and a non-confidential version of the dossier GMFF-2022-3670 following the EFSA requirements as detailed in EFSA GMO Panel (2015) and EFSA (2021).

In accordance with Art. 38 of the Regulation (EC) No 178/2002 and taking into account the protection of confidential information and of personal data in accordance with Articles 39 to 39e of the same Regulation, the non-confidential version of the dossier has been published on OpenEFSA.[9] According to Art. 32c (2) of Regulation (EC) No 178/2002[10] and to the Decision of EFSA's Executive Director laying down the practical arrangements on pre-submission phase and public consultations,[11] EFSA carried out a public consultation on the non-confidential version of the dossier from 14 August to 4 September 2023 for which no comments were received.

The GMO Panel based its scientific assessment of maize MON 8934 × 1507 × NK603 on the valid dossier GMFF-2022-3670, additional information provided by the applicant during the risk assessment, scientific comments submitted by EU MS and peer-reviewed scientific publications.

In the frame of the contracts OC/EFSA/GMO/2021/06 and OC/EFSA/GMO/2018/04, the contractor performed preparatory work and delivered reports on the methods applied by the applicant in performing updated bioinformatic analyses and literature search, respectively.

2.1.1 | Post-market monitoring reports[12]

Based on the outcome of the initial food and feed risk assessment, a post-market monitoring plan for monitoring of GM food and feed was not required by the authorisation decision. The implementation of a PMEM plan, consisting of a general surveillance plan to check for any adverse effects on the environment arising from maize MON 89034 × 1507 × NK603, was a condition for the authorisation. As no potential adverse environmental effects were identified in the environmental risk assessment of maize MON 89034 × 1507 × NK603 (EFSA GMO Panel, 2010), case-specific monitoring was not considered necessary by the GMO Panel.

The applicant provided eight annual PMEM reports covering a reporting period from November 2013 to June 2021. The annual PMEM plans submitted by the applicant included (1) commodity crop (GM and non-GM) imports into the EU by country of origin and destination; (2) the description of a centralised system established by EuropaBio[13] for the collection of information recorded by various operators (federations involved in maize import and processing) on any observed adverse effect(s) on human health and the environment arising from handling of maize possibly containing maize MON 89034 × 1507 × NK603; (3) the reports of the surveillance activities conducted by such operators; and (4) the review of relevant scientific peer-reviewed studies retrieved from literature searches.

2.1.2 | Systematic search and evaluation of literature[14]

In addition to the separate searches provided as part of the annual PMEM reports, the applicant performed scoping reviews covering the period from January 2012 to January 2024, in accordance with the recommendations on literature search outlined in EFSA (2010, 2019).

Searches in electronic bibliographic databases and in websites of relevant organisations were performed to identify relevant publications. Altogether 2983 publications (including the updated search) were identified (after removal of duplicates). After applying the eligibility/inclusion criteria defined a priori by the applicant, four peer-reviewed and one non-peer-reviewed publications were identified as relevant for food and feed safety assessment. The relevant publications are listed in Appendix A.

[9]Available online: https://open.efsa.europa.eu/questions/EFSA-Q-2022-00868

[10]Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 1.2.2002, p. 1–48.

[11]Decision https://www.efsa.europa.eu/sites/default/files/corporate_publications/files/210111-PAs-pre-submission-phase-and-public-consultations.pdf

[12]Dossier number: GMFF-2022-3670. Technical dossier - Information to support the risk assessment – Post-market monitoring and post-market environmental monitoring reports; additional information: 3/10/2023.

[13]The responsibilities of EuropaBio in coordinating activities of technology providers on the post-market environmental monitoring of GM crops were taken over by CropLife Europe as of 1st January 2021.

[14]Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – New information-Systematic search and evaluation of the literature; additional information: 3/10/2023, 8/2/2024.

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2.1.3 | Updated bioinformatic data[15]

At the time of submission of the renewal dossier, the applicant provided a complete bioinformatic dataset for maize MON 89034 × 1507 × NK603 including an analysis of the insert and flanking sequences, an analysis of the potential similarity to allergens and toxins of the newly expressed proteins and of all possible open reading frames (ORFs) within the insert and spanning the junction sites, an analysis of possible horizontal gene transfer (EFSA, 2017), and a safety assessment of the newly expressed proteins Cry2Ab2, Cry1A.105, Cry1F, PAT, CP4 EPSPS and CP4 EPSPS L214P regarding their capacity to trigger coeliac disease (EFSA GMO Panel, 2017). The outcome of the updated bioinformatic analyses is presented in Section 3.3.

2.1.4 | Additional documents or studies provided by the applicant[16]

In line with the renewal guidance requirements (EFSA, 2021; EFSA GMO Panel, 2015), the applicant provided an overview on the worldwide approvals of maize MON 89034 × 1507 × NK603 and searched for any available full reports of studies performed by or on behalf of the applicant over the course of the authorisation period and not previously submitted to the EU.

The relevance of the listed studies for molecular characterisation, human and animal safety and the environment was assessed by the applicant.

2.1.5 | Overall assessment as provided by the applicant[17]

The applicant provided an overall assessment concluding that information provided in the application for renewal of authorisation of maize MON 89034 × 1507 × NK603 for food and feed uses in the EU does not change the outcome of the original risk assessment (EFSA GMO Panel, 2010).

2.1.6 | Monitoring plan and proposal for improving the conditions of the original authorisation[18]

The applicant indicated in the dossier that the environmental post-market monitoring plan is appropriate and does not need any changes.

2.2 | Methodologies

The GMO Panel assessed the application for renewal of the authorisation of maize MON 89034 × 1507 × NK603 for food and feed uses in accordance with Articles 11 and 23 of Regulation (EC) No 1829/2003. The GMO Panel took into account the requirements described in its guideline for the risk assessment of renewal applications of GM food and feed authorised under Regulation (EC) No 1829/2003 (EFSA GMO Panel, 2015). The comments raised by the nominated risk assessment bodies of EU Member States were taken into consideration during the scientific risk assessment.

3 | ASSESSMENT

3.1 | Evaluation of the post-market monitoring reports

During the general surveillance activities covering the authorisation period of maize MON 89034 × 1507 × NK603, no adverse effects were reported by the applicant. Therefore, no further evaluation is needed by the GMO Panel.

3.2 | Evaluation of the systematic search and evaluation of literature

The GMO Panel assessed the applicant's literature searches on maize MON 89034 × 1507 × NK603 and the newly expressed proteins Cry2Ab2, Cry1A.105, Cry1F, PAT, CP4 EPSPS and CP4 EPSPS L214P. The overall quality of the performed literature searches is acceptable.

[15]Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – New information-Updated bioinformatics; additional information: 3/10/2023, 13/2/2024.

[16]Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – New information-Additional documents or studies performed by or on behalf of the applicant.

[17]Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – New information-Overall assessment.

[18]Dossier number: GMFF-2022-3670. Technical dossier – Information to support the risk assessment – Post-market environmental monitoring plan.

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The GMO Panel acknowledges that no publications raising a safety concern for human and animal health and the environment which would change the original risk assessment conclusions on Cry2Ab2, Cry1A.105, Cry1F, PAT, CP4 EPSPS and CP4 EPSPS L214P proteins (EFSA GMO Panel, 2010) have been identified by the applicant.

3.3 | Evaluation of the updated bioinformatic data

The results of the updated bioinformatic analyses to assess the interruption of maize endogenous genes confirm previous results indicating that no endogenous genes were interrupted by any of the inserts (EFSA GMO Panel, 2010, 2022).

The analyses of the amino acid sequence of the newly expressed Cry1A.105, Cry2Ab2, PAT, Cry1F, CP4 EPSPS and CP4 EPSPS L214P proteins reveal no significant similarities to toxins, allergens or immunogenic gluten-related epitopes. Moreover, updated bioinformatic analyses of the newly created open reading frames (ORFs) within the insert or spanning the junctions between the insert and genomic DNA indicate that the expression of any ORF showing significant similarities to toxins or allergens is unlikely in maize MON 89034 × 1507 × NK603 confirming previous assessment (EFSA GMO Panel, 2010, 2022).

The updated bioinformatic analysis for events MON 89034, 1507 and NK603 confirm the assessments provided in the context of previous Scientific Opinions (EFSA GMO Panel, 2017, 2019, 2022). Given the results of this analysis and that the recombinant DNA in maize MON 89034 × 1507 × NK603 does not confer selective advantages to microorganisms, the GMO Panel identified no safety concern linked to an unlikely but theoretically possible HGT.

3.4 | Evaluation of the additional documents or studies provided by the applicant

Taking into account (i) the relevance for molecular characterisation, human and animal safety and the environment; and (ii) the scope of this renewal application, there are no unpublished studies available performed by or on behalf of the applicant and not previously submitted to the EU since maize MON 89034 × 1507 × NK603 was authorised.

3.5 | Evaluation of the overall assessment as provided by the applicant

The GMO Panel evaluated the overall assessment provided by the applicant and confirms that there is no evidence in renewal dossier GMFF-2022-3670 indicating new hazards, relevant changes in exposure or scientific uncertainties that would change previous conclusions on maize MON 89034 × 1507 × NK603.

3.6 | Evaluation of the monitoring plan and proposal for improving the conditions of the original authorisation

The PMEM plan covers general surveillance of imported GM plant material, including maize MON 89034 × 1507 × NK603. This general surveillance is coordinated by CropLife Europe and implemented by selected operators (federations involved in maize grains import and processing). In addition, the applicant reviews relevant scientific publications retrieved from literature searches on an annual basis. The GMO Panel is of the opinion that the scope of the plan provided by the applicant is consistent with the scope of dossier GMFF-2022-3670, but reminds that monitoring is related to risk management, and thus, the final adoption and implementation of the PMEM plan falls outside the mandate of EFSA.

4 | CONCLUSIONS

Under the assumption that the DNA sequences of the events in maize MON 89034 × 1507 × NK603 considered for renewal are identical to the sequences of the originally assessed events, the GMO Panel concludes that there is no evidence in renewal dossier GMFF-2022-3670 for new hazards, modified exposure or scientific uncertainties that would change the conclusions of the original risk assessment on maize MON 89034 × 1507 × NK603 (EFSA GMO Panel, 2010).

5 | DOCUMENTATION AS PROVIDED TO EFSA

- Letter from the European Commission to EFSA received on 14 December 2022 for the continued marketing of genetically modified maize MON 89034 × 1507 × NK603 submitted in accordance with articles 11 and 23 of Regulation (EC) No 1829/2003 by Corteva Agriscience Belgium BV and Bayer Agriculture BV (GMFF-2022-3670).
- The application was made valid on 03 May 2023.
- Additional Information (Clock 1) was requested on 26 May 2023.
- Additional Information (Clock 1) was received on 03 October 2023.
- Additional Information (Clock 2) was requested on 12 December 2023.
- Additional Information (Clock 2) was received on 13 February 2024.

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ABBREVIATIONS

GM	genetically modified
GMO	genetically modified organism
GMO Panel	EFSA Panel on Genetically Modified Organisms
HGT	horizontal gene transfer
ORFs	open reading frames
PMEM	post-market environmental monitoring

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CONFLICT OF INTEREST

If you wish to access the declaration of interests of any expert contributing to an EFSA scientific assessment, please contact interestmanagement@efsa.europa.eu.

REQUESTOR

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A

List of relevant publications identified by the applicant through literature searches (January 2012 to January 2024)

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