Position papers

ACNFP advice on the safety of genetically modified GHB614 cotton for renewal of authorisation

Reference Number RP608

Regulated Product Dossier Assessment

Assessment finalised: 5th of April 2024

Summary

Following the submission of application RP608 to the Food Standards Agency (FSA) under assimilated Regulation (EC) No. 1829/2003 from BASF Agricultural Solutions Seed US LLC, (New Jersey, USA), FSA/FSS (Food Standards Scotland) were required to undertake a safety assessment on genetically modified GHB614 cotton. To support the safety assessment by FSA/FSS, the Advisory Committee on Novel Foods and Processes (ACNFP) provided advice to FSA/FSS on the data submitted for the renewal of authorisation for genetically modified cotton GHB614, as outlined in this document.

Cotton is primarily used worldwide for its lint, however raw, unprocessed cottonseed may be fed to ruminants as meal, or the seed can be processed into oil. Cottonseed oil has been in use since the 19th century and is considered to be a premium quality oil. GHB614 cotton is modified to express the 2mEPSPS (5-enolpyruvylshikimate 3-phosphate synthase) protein. The *2mepsps* gene sequence has been modified by introducing two mutations to the *epsps* gene from maize which decreases the binding affinity of glyphosate, conferring tolerance to glyphosate herbicides.

GHB614 cotton has previously been authorised for food and feed uses and is most commonly used as animal feed. The scope of this application is for the renewal of the authorisation for placing on the market GHB614 cotton products for food and feed uses, import, and processing. The application does not include cultivation and therefore no GHB614 cotton will be grown in the UK.

In providing its advice on the safety of GHB614 cotton for food and feed, the ACNFP considered data provided as part of application RP608 (post-market environmental monitoring reports, evaluation of systematic literature searches, additional studies performed by or on behalf of the applicant, and updated bioinformatics analyses), additional information provided by the applicant, and analyses and reports from outside contractors. The ACNFP assessed these data for possible new hazards, modified exposures, or new scientific uncertainties identified during the authorisation period and not previously assessed in the context of the original application (EFSA GMO Panel 2009).

The ACNFP concludes that there is no evidence in the renewal application RP608 for new hazards, modified exposures, or new scientific uncertainties that would change the conclusions of the original risk assessment on genetically modified cotton GHB614 (EFSA GMO Panel 2009).

1. Introduction

1.1 Background

On 4th March 2021, the Food Standards Agency (FSA) received application RP608 for the renewal of the authorisation of genetically modified cotton GHB614 (unique identifier: BSC-GHØØ2-5), submitted on behalf of BASF Agricultural Solutions Seed US LLC (Florham Park, New Jersey) (hereafter referred to as “the applicant”) according to Regulation (EC) No. 1829/2003, as assimilated into UK law.

FSA checked the application for compliance with the relevant requirements of Regulation (EC) No. 1829/2003, and Regulation (EU) No. 503/2013, and on 25th March 2021, declared the application valid.

Following the submission of application EFSA-GMO-RX-018, and the publication of the EFSA (European Food Safety Authority) scientific opinion (EFSA GMO Panel 2009), the placing on the market of genetically modified GHB614 cotton products for food and feed uses, import, and processing, in the EU, was authorised by Commission Implementing Decision 2011/354/EU. A copy of Commission Implementing Decision 2011/354/EU was provided by the applicant.

FSA and FSS would like to thank the following members of the Advisory Committee on Novel Foods and Processes (ACNFP) who participated in the assessment: Dr Camilla Alexander White, Dr Andy Greenfield, Dr Anton Alldrick, Alison Austin, Dr Mark Berry, Prof Dimitris Charalampopoulos, Prof Susan

Fairweather-Tait, Prof Paul Fraser, Dr Hamid Ghouddusi, Prof Wendy Harwood, Prof Huw Jones, Dr Ray Kemp, Dr Elizabeth Lund, Emeritus Prof Harry McArdle, Rebecca McKenzie, Prof Clare Mills, Dr Lesley Stanley, Prof Hans Verhagen, Dr Maureen Wakefield, Prof Bruce Whitelaw, and Emeritus Professor Pete Lund (co-opted member of ACNFP-PGT Subcommittee).

1.2 Terms of Reference

According to Articles 6 and 18 of assimilated Regulation (EC) No. 1829/2003, FSA/FSS were requested to carry out a scientific risk assessment of genetically modified cotton GHB614 for the renewal of authorisation for placing on the market of genetically modified GHB614 cotton products for food and feed uses, import, and processing, in the context of its scope as defined in application RP608.

FSA/FSS sought safety advice from the ACNFP on genetically modified GHB614 cotton, which will inform the FSA/FSS safety assessment. The FSA/FSS safety assessment is to be seen as the report requested under Articles 6(6) and 18(6) of that Regulation.

In addition to the present advice on the safety of genetically modified GHB614 cotton, the ACNFP were also asked to advise on the particulars listed under Articles 6(5) and 18(5) of Regulation (EC) No. 1829/2003. These articles concern details that must be included in positive opinions/outcomes of assessment of GMO foods and feeds, including labelling details, any relevant conditions or restrictions, and monitoring plans.

2. Applicant details

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(represented by)

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3. Data and Methodologies

3.1 Data

The data for application RP608 submitted according to assimilated Regulation (EC) No. 1829/2003 and provided by the applicant at the time of submission are specified below. To inform the FSA/FSS safety assessment for the renewal of the authorisation of genetically modified cotton GHB614 for food and feed uses in accordance with Articles 11 and 23 of Regulation (EC) No. 1829/2003, the ACNFP was asked to provide safety advice. It considered the requirements described in applicable guidance for the risk assessment of renewal applications of GM food and feed authorised under assimilated Regulation (EC) No. 1829/2003, and based its scientific safety assessment on the data within application RP608, additional information provided by the applicant, and any relevant peer-reviewed scientific publications.

3.2 Methodologies

The ACNFP conducted its assessment in accordance with the principles described in assimilated Regulation (EU) No. 503/2013, applicable guidance, explanatory notes, and statements (EFSA GMO Panel, 2015; EFSA, 2019). Independent contractors performed preparatory work and delivered reports on the methods applied by the applicant in performing sequencing and bioinformatics analyses.

4. Assessment

4.1 Post-market environmental monitoring reports

The implementation of a PMEM (post-market environmental monitoring) plan was a condition of the authorisation, however since the previous environmental risk assessment of genetically modified cotton GHB614 identified no potential adverse environmental effects, and the application did not cover cultivation, case-specific post-market environmental monitoring was not required.

The assessment of the PMEM reports provided in the renewal application are within the remit of the Advisory Committee on Releases to the Environment (ACRE), and their assessment of the PMEM reports forms part of the final scientific opinion published by FSA/FSS.

4.2 Systematic searches and evaluation of literature

A systematic literature search and review is required for renewal applications to identify new information relevant to the risk assessment of the GM food and feed that has become available since the previous authorisation. This includes information relating to molecular characterisation, food and feed safety, and the environment.

In addition to the separate searches provided as part of the annual PMEM reports, the applicant also performed updated literature searches covering June 2011 to November 2019, in accordance with the recommendations on literature searches outlined in EFSA’s explanatory note on literature searching (2010, 2019). Searches in electronic bibliographic databases and in websites of relevant organisations were also performed.

Altogether, 373 publications were assessed for relevance, of which 27 were progressed to detailed assessment. Only one of these publications was considered relevant, however it did not have a negative impact on the risk assessment of GHB614 cotton.

The ACNFP assessed the applicant’s literature searches on genetically modified cotton GHB614 and the newly expressed protein and found the overall quality of the performed literature searches to be acceptable.

The ACNFP acknowledged that no publications raising a safety concern for human and animal health and the environment, which would change the original risk assessment conclusions on GHB614 cotton, were identified by the applicant.

4.3 Updated bioinformatic data

The bioinformatics assessment of renewal applications for GM food and feed is focused on demonstrating that the conclusions of the original risk assessment remain applicable when considering the information from up-to-date methods of bioinformatics analysis. This includes analysis of the DNA sequence of the insertion site and flanking sequences to identify:

- disruption of endogenous genes

- open reading frames (ORFs) that potentially encode peptides with amino acid sequences similar to known toxins or allergenic proteins
- similarity to microbial DNA sequences that may facilitate horizontal gene transfer

The amino acid sequence of the newly expressed protein(s) is also assessed, including for sequence similarity to known toxins and allergenic proteins, and their capacity to trigger coeliac disease.

An updated sequence analysis was performed in the context of another application to compare the DNA sequence of the GHB614 event (both insert and flanking sequences) to previously determined sequences for the GHB614 event. The DNA sequences of the insert and flanking DNA regions were identical to those sequences previously reported.

The updated bioinformatics analyses for the GHB614 event found no DNA sequences that could provide sufficient length and identity to facilitate horizontal gene transfer.

The updated bioinformatics analyses of the newly created ORFs within the insert, or spanning the junctions with the genomic DNA, did not indicate sequence similarities to toxins or allergenic proteins, nor did analysis of the amino acid sequence of the newly expressed protein. In addition, the amino acid sequence of the newly expressed protein did not have significant similarities with proteins known to cause coeliac disease.

The ACNFP reviewed the updated bioinformatics data and analyses provided by the applicant as part of the risk assessment process and concluded that the bioinformatics analyses performed using updated methodologies and tools identified no new information that would change the conclusions on the safety of GHB614 cotton, or change the parameters of the previous authorisation.

4.4 Additional documents or studies provided by the applicant

The applicant stated that no prohibitions or restrictions have been placed on GHB614 cotton authorisations in any country.

Unpublished studies produced, controlled, or sponsored by the applicant, or provided by the applicant, within the previous authorisation period were reviewed, and the relevance of the studies for molecular characterisation, human and animal safety, and the environment, was assessed by the applicant.

The ACNFP concluded that the new additional documents or studies provided by the applicant do not raise any concerns for human and animal health, and do not change the original risk assessment conclusions on genetically modified cotton GHB614.

4.5 Overall assessment as provided by the applicant

The applicant provided an overall assessment concluding that the results of the monitoring reports and of the new information provided in the application for renewal of authorisation of genetically modified cotton GHB614 for food and feed uses does not lead to the identification of new hazards, modified exposures, or uncertainties, and therefore does not change the outcome of the original risk assessment or the conditions set out in the original authorisation.

The ACNFP evaluated the overall assessment provided by the applicant and confirmed that there is no evidence in the renewal application that would indicate new hazards, relevant changes in exposure, or scientific uncertainties that would change the previous conclusions on genetically modified cotton GHB614.

4.6 Environmental monitoring plan and proposal for improving the conditions of the original authorisation

The post-market environmental monitoring plan does not need revision as no adverse effects were reported during the authorisation period, nor was any literature identified that changes the conclusions of the previous assessment.

ACRE’s advice is available on the GOV.UK website

5. Overall conclusions and recommendations

The ACNFP concludes that there is no evidence in renewal application RP608 for new hazards, modified exposure, or scientific uncertainties that would change the conclusion of the original risk assessment on genetically modified cotton GHB614.

6. References

Regulation (EC) No. 1829/2003 of the European Parliament and of the Council of 22nd September 2003 on genetically modified food and feed.

Commission Implementing Regulation (EU) No. 503/2013 of 3rd April 2013 on application 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 (EUC) No. 641/2004 and (EC) No. 1981/2006.

Commission Implementing Decision (2011/354/EU) of 17 June 2011 authorising the placing on the market of the products containing, consisting of, or produced from genetically modified cotton GHB614 (BCS-GHØØ2-5) pursuant to Regulation (EC) No. 1829/2003 of the European Parliament and of the Council. Official Journal of the European Union L 160/90 18/6/2011.

EFSA GMO Panel (EFSA Panel on Genetically Modified Organisms), 2009. Scientific Opinion on application (EFSA-GMO-NL-2008-51) for the placing on the market of glyphosate tolerant genetically modified cotton GHB614 for food and feed uses, import and processing under Regulation (EC) No 1829/2003 from Syngenta. EFSA Journal 2009;985: [1-24 pp.]. www.efsa.europa.eu/efsajournal.html

EFSA GMO Panel (EFSA Panel on Genetically Modified Organisms), 2015. Guidance for renewal applications of genetically modified food and feed authorised under Regulation (EC) No 1829/2003. EFSA Journal 2015;13(6):4129, 8 pp. https://doi.org/10.2903/j.efsa.2015.4129.

EFSA (European Food Safety Authority), 2010. Application of systematic review methodology to food and feed safety assessments to support decision making. EFSA Journal 2010;8(6):1637, 90 pp. https://doi.org/10.2903/j.efsa.2010.1637.

EFSA (European Food Safety Authority), Devos Y, Guajardo IM, Alvarez F and Glanville J, 2019. Explanatory note on literature searching conducted in the context of GMO applications for (renewed) market authorisation and annual post-market environmental monitoring reports on GMOs authorised in the EU market. EFSA supporting publications 2019:EN-1614. 62 pp. https://doi.org/10.2903/sp.efsa.2019.EN-1614.

Abbreviations

Acronym	Definition
ACNFP	Advisory Committee on Novel Foods and Processes
ACRE	Advisory Committee on Releases to the Environment

DNA	Deoxyribonucleic acid
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
FSA	Food Standards Agency
FSS	Food Standard Scotland
GM	Genetically modified
GMO	Genetically modified organism
ORFs	Open reading frames
PMEM	Post-market environmental monitoring