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**Statement complementing the EFSA opinion on application EFSA GMO UK
2007 41 (cotton MON 88913 for food and feed uses, import and processing)
taking into consideration updated bioinformatic analyses**

Arpaia, Salvatore ; et al

Abstract: In this statement, the EFSA GMO Panel responds to a request from the European Commission (EC) to complement its partially inconclusive scientific opinion on cotton MON 88913 taking into consideration updated bioinformatic analyses submitted by the applicant after the adoption. Similarity searches assessed the identity of the genomic sequences flanking the MON 88913 insert, the potential of creating open reading frames (ORFs) showing similarity to known allergens or toxins and the similarity of the newly expressed CP4 EPSPS protein to known allergens or toxins. Having assessed these searches, the EFSA GMO Panel did not identify interruptions of known cotton genes or any safety issue arising from the identified ORFs including the newly expressed CP4 EPSPS protein. In conclusion, the EFSA GMO Panel considers that cotton MON 88913, as assessed in the scientific opinion on application EFSA-GMO-UK-2007-41 and in the supplementary bioinformatic dataset, is as safe and nutritious as its conventional counterpart and commercial cotton varieties with respect to potential effects on human and animal health and the environment in the context of its intended uses.

DOI: <https://doi.org/10.2903/j.efsa.2014.3591>

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-106216>

Journal Article

Published Version

Originally published at:

Arpaia, Salvatore; et al (2014). Statement complementing the EFSA opinion on application EFSA GMO UK 2007 41 (cotton MON 88913 for food and feed uses, import and processing) taking into consideration updated bioinformatic analyses. *EFSA Journal*, 12(3):3591.

DOI: <https://doi.org/10.2903/j.efsa.2014.3591>

SCIENTIFIC OPINION

Statement complementing the EFSA opinion on application EFSA-GMO-UK-2007-41 (cotton MON 88913 for food and feed uses, import and processing) taking into consideration updated bioinformatic analyses¹

EFSA Panel on Genetically Modified Organisms (GMO)^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

In this statement, the EFSA GMO Panel responds to a request from the European Commission (EC) to complement its partially inconclusive scientific opinion on cotton MON 88913 taking into consideration updated bioinformatic analyses submitted by the applicant after the adoption. Similarity searches assessed the identity of the genomic sequences flanking the MON 88913 insert, the potential of creating open reading frames (ORFs) showing similarity to known allergens or toxins and the similarity of the newly expressed CP4 EPSPS protein to known allergens or toxins. Having assessed these searches, the EFSA GMO Panel did not identify interruptions of known cotton genes or any safety issue arising from the identified ORFs including the newly expressed CP4 EPSPS protein. In conclusion, the EFSA GMO Panel considers that cotton MON 88913, as assessed in the scientific opinion on application EFSA-GMO-UK-2007-41 and in the supplementary bioinformatic dataset, is as safe and nutritious as its conventional counterpart and commercial cotton varieties with respect to potential effects on human and animal health and the environment in the context of its intended uses.

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KEY WORDS

GMO, cotton, MON 88913, bioinformatic analyses, safety

¹ On request from the European Commission, Question No EFSA-Q-2013-00881, adopted on 26 February 2014.

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³ Acknowledgement: The Panel wishes to thank the members of the Working Group on Molecular Characterisation for the preparatory work on this scientific opinion and EFSA staff: Zoltán Divéki for the support provided to this scientific opinion.

Suggested citation: EFSA GMO Panel (EFSA Panel on Genetically Modified Organisms), 2014. Statement complementing the EFSA opinion on application EFSA-GMO-UK-2007-41 (cotton MON 88913 for food and feed uses, import and processing) taking into consideration updated bioinformatic analyses. EFSA Journal 2014;12(3):3591, 6 pp. doi:10.2903/j.efsa.2014.3591

Available online: www.efsa.europa.eu/efsajournal

SUMMARY

On 28 October 2013, the European Commission requested the EFSA GMO Panel to complement its opinion on application EFSA-GMO-UK-2007-41 (cotton MON 88913 for food and feed uses, import and processing) taking into consideration the updated bioinformatic analyses provided by the applicant on 21 October 2013, after the adoption of the EFSA opinion (EFSA GMO Panel, 2013).

Updated bioinformatic analyses submitted by the applicant used up-to-date bioinformatic databases and appropriate algorithms. Similarity searches assessed the identity of the genomic sequences flanking the MON 88913 insert, the potential of creating open reading frames (ORFs) showing similarity to known allergens or toxins and the similarity of the newly expressed CP4 EPSPS protein to known allergens or toxins. Having assessed these searches, the EFSA GMO Panel did not identify interruptions of known cotton genes or any safety issue arising from the identified ORFs including the newly expressed CP4 EPSPS protein.

In conclusion, the EFSA GMO Panel considers that cotton MON 88913, as assessed in the scientific opinion on application EFSA-GMO-UK-2007-41 (EFSA GMO Panel, 2013) and in the supplementary bioinformatic dataset, is as safe and nutritious as its conventional counterpart and commercial cotton varieties with respect to potential effects on human and animal health and the environment in the context of its intended uses.

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BACKGROUND

In July 2013, the EFSA GMO Panel published a Scientific Opinion on application EFSA-GMO-UK-2007-41 for the placing on the market of the cotton MON 88913 for food and feed uses, import and processing under Regulation (EC) No 1829/2003 (EFSA GMO Panel, 2013). In this scientific opinion, the EFSA GMO Panel considered that the information available for cotton MON 88913 was not sufficient to reach a final overall conclusion as “bioinformatics-supported identification of hazards linked to the formation of new open reading frames caused by the insertion could not be completed due to the use of an outdated toxin database.”

Following the publication of the scientific opinion on cotton MON 88913, on 21 October 2013 the applicant submitted a new set of bioinformatic analyses to EFSA, using updated databases. On 28 October 2013, EFSA received a mandate from the European Commission (EC) to complement its scientific opinion on cotton MON 88913 taking into consideration the additional information received from the applicant. The mandate has also clarified that EC will base its risk management decision on both assessments (i.e. on the Scientific Opinion on cotton MON 88913 and on the present Statement).

The EFSA GMO Panel evaluated the updated bioinformatic analyses provided by the applicant, and expresses its view in this Statement. According to the mandate received from EC on 28 October 2013, this statement complements the EFSA scientific opinion on cotton MON 88913 (EFSA GMO Panel, 2013), which is the report requested under Articles 6(6) and 18(6) of Regulation (EC) 1829/2003 and is part of the EFSA overall Opinion in accordance with Articles 6(5) and 18(5) of that Regulation.

TERMS OF REFERENCE

EFSA was requested to complement its partially inconclusive scientific opinion on cotton MON 88913 by taking into consideration updated bioinformatic analyses received from the applicant.

EVALUATION

1. Introduction

During the course of assessment of application EFSA-GMO-UK-2007-41, no updated analysis was provided evaluating the similarity of ORFs spanning the insert–genomic DNA junctions to known toxins. The EFSA GMO Panel considered this as a remaining uncertainty and pointed out in its opinion that “*Hazard identification based on the bioinformatic analyses could not be completed because the version of the database used by the applicant for similarity searches of the open reading frames (ORFs) spanning the inserted DNA–genomic DNA junctions to known toxins was outdated (from 2001). Therefore, the EFSA GMO Panel cannot exclude that one of these ORFs might resemble a known toxin not included in this version of the database.*”

After the adoption of the EFSA opinion on application EFSA-GMO-UK-2007-41 (EFSA GMO Panel, 2013), the applicant provided a complete, updated bioinformatic analysis package addressing possible interruption of known cotton genes as well as the potential for creating ORFs showing similarity to known allergens or toxins. In addition, the similarity of the CP4 EPSPS protein to known allergens or toxins was investigated. The EC tasked EFSA with complementing its scientific opinion taking into consideration the additional information received. The present Statement addresses this request.

2. Evaluation of scientific data

2.1. Description of the data received

The potential for disruption of known cotton genes by the MON 88913 insert was assessed by BLASTn and BLASTx searches of the flanking regions against GenBank non-redundant nucleotide database, GenBank EST database and GenBank non-redundant amino acid database. All databases were released in 2013.

The potential for creation of new ORFs present within the insert and spanning the junction sites showing similarity to known allergens or toxins was assessed by FASTA searches against the allergen AD_2013 (derived from FARRP⁴), toxin TOX_2013 (a subset of GenBank) and general protein PRT_2013 (taken from GenBank) databases. The assembly of AD_2013 and TOX_2013 databases is described in detail in the additional information provided. All databases were released in 2013. FASTA searches against the AD_2013 database tested for 35 % or greater identity to known allergens over an 80 amino acid window and any contiguous 8 amino acid exact matches against known allergens (EFSA, 2010, 2011).

The similarity of CP4 EPSPS to known allergens or toxins was assessed by FASTA searches against the Allergen AD_2013, Toxin TOX_2013 and General protein PRT_2013 databases. All databases were released in 2013. FASTA searches against the AD_2013 database tested for 35 % or greater identity to known allergens over an 80 amino acid window and any contiguous 8 amino acid exact matches against known allergens (EFSA GMO Panel, 2010, 2011).

2.2. Assessment

The EFSA GMO Panel is of the opinion that the updated bioinformatic analyses provided by the applicant were performed properly; appropriate methods and up-to-date databases were used.

Evaluation of the results of the analyses indicated that (1) no known cotton genes were disrupted by the MON 88913 insert; (2) putative translation products of the new ORFs present within the insert and spanning the junction sites show no significant similarity to known allergens or toxins; and (3) the newly expressed CP4 EPSPS protein shows no significant similarity to known allergens or toxins.

⁴ Food Allergy Research and Resource Program, <http://farrp.unl.edu/>

CONCLUSIONS

The EFSA GMO Panel concludes that the updated bioinformatic analyses provided by the applicant do not raise a safety issue.

Therefore, the EFSA GMO Panel considers that cotton MON 88913, as assessed in the scientific opinion on application EFSA-GMO-UK-2007-41 (EFSA GMO Panel, 2013) and in the supplementary bioinformatic dataset, is as safe and nutritious as its conventional counterpart and commercial cotton varieties with respect to potential effects on human and animal health and the environment in the context of its intended uses.

DOCUMENTATION PROVIDED TO EFSA

1. Letter from applicant to EFSA, received on 21 October 2013, providing additional information.
2. Request from EC to EFSA, received on 28 October 2013, to complement the scientific opinion on cotton MON 88913 taking into account the additional information received from the applicant.
3. Acknowledgement letter from EFSA to EC, dated 28 November 2013.

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- EFSA Panel on Genetically Modified Organisms (GMO), 2010. Draft Scientific Opinion on the assessment of allergenicity of GM plants and microorganisms and derived food and feed. EFSA Journal 2010;8(7):1700, 168 pp. doi:10.2903/j.efsa.2010.1700
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