Adviesraad voor Bioveiligheid
Conseil consultatif de Biosécurité

Advice of the Belgian Biosafety Advisory Council on application EFSA-GMO-DE-2016-133 (maize MZHG0JG) from Syngenta under Regulation (EC) No. 1829/2003

11 December 2018
Ref. SC/1510/BAC/2018_1088

Context

Application EFSA-GMO-DE-2016-133 was submitted by Syngenta for the authorisation for the marketing of genetically modified (GM) maize MZHG0JG for food and feed uses, import and processing (excluding cultivation) within the European Union, within the framework of Regulation (EC) No. 1829/2003[1].

Maize MZHG0JG contains two expression cassettes for expression of the mEPSPS and PAT proteins, for tolerance to glyphosate and glufosinate-ammonium respectively.

The application was validated by EFSA on 20 January 2017 and a formal three-month consultation period of the Member States was started, lasting until 20 April 2017, in accordance with Articles 6.4 and 18.4 of Regulation (EC) No. 1829/2003 (consultation of national Competent Authorities within the meaning of Directive 2001/18/EC designated by each Member State in the case of genetically modified organisms being part of the products).

Within the framework of this consultation, the Belgian Biosafety Advisory Council (BAC), under the supervision of a coordinator and with the assistance of its Secretariat, contacted experts to evaluate the dossier, chosen from the common list of experts drawn up by the BAC and the Biosafety and Biotechnology Unit (SBB). Seven experts answered positively to this request, and formulated a number of comments to the dossier. See Annex I for an overview of all the comments and the comments sent to EFSA on 20 April 2017.

The opinion of the EFSA Scientific Panel on GMOs was published on 14 November 2018 (EFSA Journal 2018;16(11):5469[2]) together with the responses from the EFSA GMO Panel to comments submitted by the Member States during the three-month consultation period.
On 23 November 2018 these two documents were forwarded to the Belgian experts. They were invited to give comments and to react if needed.

In delivering the present advice the BAC considered in particular the information below:
- The comments formulated by the experts on application EFSA-GMO-DE-2016-133; and
- The opinion of EFSA.

[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).
[2] See https://www.efsa.europa.eu/en/efsajournal/pub/5469

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Scientific evaluation

1. Environmental risk assessment

The Biosafety Advisory Council is of the opinion that it is unlikely that the accidental release of maize MZHG0JG (i.e. during transport and/or processing) into the European environment[3] will lead to environmental harm.

2. Molecular characterisation

With regard to the molecular characterisation, the Biosafety Advisory Council is of the opinion that the information provided is sufficient and does not raise safety concerns.

3. Assessment of food/feed safety and nutritional value

3.1. Assessment of compositional analysis

The Biosafety Advisory Council agrees with the GMO panel of EFSA that the compositional data of GM maize MZHG0JG, in comparison with its conventional counterpart, does not raise safety concerns.

3.2. Assessment of toxicity

The Biosafety Advisory Council agrees with the GMO panel of EFSA that the available data on the toxicity of GM maize MZHG0JG, in comparison with its conventional counterpart, does not raise safety concerns.

3.3. Assessment of allergenicity

The Biosafety Advisory Council has evaluated the safety of the newly expressed mEPSPS and PAT proteins in the context of previous applications, and no concerns were identified. Since no new information on allergenicity of these proteins has become available, the Council is of the opinion that its previous conclusions remain valid.

3.4. Nutritional value

The Biosafety Advisory Council is of the opinion that the information provided is sufficient to conclude that the nutritional characteristics of maize MZHG0JG-derived food and feed are not expected to differ from those of conventional maize varieties.

4. Monitoring

With regard to monitoring, the Biosafety Advisory Council is of the opinion that the information provided is sufficient.

[3] As the application doesn't imply cultivation of the GM crop in the EU, a full environmental assessment, as in the case of a cultivation dossier, is not warranted.

Conclusion

Based on the whole set of data on maize MZHG0JG provided by the applicant, the scientific assessment of the dossier done by the Belgian experts, the opinion of EFSA, and the answers of the EFSA GMO panel to the questions raised by the Belgian experts, the Biosafety Advisory Council:

1) Agrees with the GMO panel of EFSA that the potential environmental release of maize MZHG0JG is unlikely to pose any threat to the European environment;
2) Agrees with the GMO panel of EFSA that in the context of its proposed uses, maize MZHG0JG is unlikely to pose any risk to human and animal health;

In addition the Biosafety Advisory Council recommends following up any unanticipated allergenicity aspects of the GM maize in the existing allergenicity monitoring systems.

Dr. Corinne Vander Wauven
President of the Belgian Biosafety Advisory Council

Annex I: Compilation of comments of experts in charge of evaluating the application EFSA-GMO-DE-2016-133 (ref. BAC_2017_0238)

Bioveiligheidsraad
Conseil de Biosécurité

20/04/2017

Secretariaat
Secrétariat

O./ref.: WIV-ISP/41/BAC_2017_0238
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Compilation of comments of experts in charge of evaluating the application EFSA/GMO/DE/2016/133
and
Comments submitted on the EFSAnet on mandate of the Biosafety Council

Mandate for the Group of Experts: Mandate of the Biosafety Advisory Council (BAC) of 31 January 2017.
Coordinator: Dr. Geert Angenon
Experts: Jan Van Doorsselaere (KATHO), Leo Fiems (ILVO), Eddy Decuypere (KUL), André Huyghebaert (UGent), Peter Smet (Consultant), Johan Grooten (UGent), Patrick du Jardin (ULg-Gembloux)

Domains of expertise of experts involved: Molecular characterisation, DNA/RNA/protein analysis, herbicide tolerance, animal and human nutrition, food/feed processing, toxicology, general biochemistry, statistics, immunology, alimentary allergology, plant allergens, agronomy, plant biology.

SBB: Didier Breyer, Fanny Coppens, Katia Pauwels.

♦ INTRODUCTION

Dossier **EFSA/GMO/DE/2016/133** concerns an application submitted by **Syngenta** for authorisation to place on the market genetically modified **maize MZHG0JG** in the European Union, according to Regulation (EC) No 1829/2003 on genetically modified food and feed.
The application has been officially acknowledged by EFSA on 20 January 2017.

The scope of the application is:
☒ GM plants for food use
☒ Food containing or consisting of GM plants
☒ Food produced from GM plants or containing ingredients produced from GM plants
☒ GM plants for feed use
☒ Feed produced from GM plants
☒ Import and processing (Part C of Directive 2001/18/EC)
☐ Seeds and plant propagating material for cultivation in European Union (Part C of Directive 2001/18/EC)

Depending on their expertise, the experts were asked to evaluate the genetically modified plant considered in the application on its 1) molecular, 2) environmental, 3) allergenicity, 4) toxicity and/or 5) food and feed aspects. It was expected that the expert should evaluate if the information provided in the application is sufficient in order to state that the marketing of the genetically modified plant for its intended uses, will not raise any problems for the environment or human or animal health. If information is lacking, the expert was asked to indicate which information should be provided and what the scientifically reasoning is behind this demand.

The comments are structured as in the "Guidance document of the scientific panel on genetically modified organisms for the risk assessment of genetically modified plants and derived food and feed" (EFSA Journal (2004), 99, 1-94). Items are left blank when no comments have been received either because the expert(s) focused on other related aspects, or because for this dossier the panel of experts who accepted to evaluate the dossier didn't have the needed expertise to review this part of the dossier.
It should be noted that all the comments received from the experts are considered in the evaluation of this dossier and in formulating the final advice of the Biosafety Advisory Council. Comments placed on the EFSAnet are indicated in grey.

List of comments/questions received from the experts

GENERAL COMMENTS

Comment 1

The structure of the document is quite similar to previous applications from the same applicant.

Comment 2

The use (import & processing) of maize MZHG0JG may be as safe for human and animal health and the environment as conventional maize, based on the results of the compositional analysis and the weight of evidence with regard to the toxicological and the allergenicity assessment.
Unfortunately, the effect of glyphosate and glufosinate cannot be ignored in the case of genetically modified herbicide-tolerant crops. An adverse side-effect of this event is that it may increase the use of the involved herbicides. Although the safety of glyphosate is not within the remits of the Biosafey Advisory Council, a holistic approach of herbicide-tolerant GM crops seems desirable. Therefore, the approval may be postponed until new epidemiological and toxicology studies clearly demonstrate the safety of glyphosate and its metabolites for human and animal health and the environment (see E.3.8.).

Additional comment from the coordinator: The assessment of the safety of glyphosate is not within the remits of the Biosafety Advisory Council

Comment 3

No questions.

A. HAZARD IDENTIFICATION AND CHARACTERISATION

A.1. INFORMATION RELATED TO THE RECIPIENT OR (WHERE APPROPRIATE) THE PARENTAL PLANT

Comment 1

No comments.

Comment 2

Evaluated, no comment.

Comment 3

Page 14 first paragraph: Why no differentiation of use of maize for monogastric animals and ruminants is made?

A.2. MOLECULAR CHARACTERISATION

A.2.1. INFORMATION RELATING TO THE GENETIC MODIFICATION Including:

- Description of the methods used for the genetic modification
- Source and characterization of nucleic acid used for transformation
- Nature and source of vector(s) used

Comment 1

No comments.

Comment 2

Evaluated, no comment.

Comment 3

As there is a “low” affinity for glyphosate of maize MZHG0JG, why then no effects on aromatic amino acids is observed?

A.2.2. INFORMATION RELATING TO THE GM PLANT Including:

- Description of the trait(s) and characteristics which have been introduced or modified
- Information on the sequences actually inserted or deleted
- Information on the expression of the insert
- Genetic stability of the inserted/modified sequence and phenotypic stability of the GM plant

Comment 1

No comments.
The GMO contains herbicide resistance genes (mepsps and pat). Various examples of similar constructs (in maize or other species) have been described and approved.

Comment 2

Page 18 of the Report 1.2-1 describing the Southern analyses mentions that a real-time PCR test is performed to verify the ‘plant’s identity’ before the materials are sampled and proceeded to Southern analysis. However, part of the analysis aims at concluding on the stability of the insert based on the Southern blots of successive generations of selfing. No detail is given about the PCR test and on whether any plant material was discarded during this procedure. I wonder whether the design of the test ensures that no bias in stability assessment can be introduced at this stage. The applicant should give more details about the design and the results of the PCR test.

Expression of the insert: PAT protein concentration reported in the main dossier (Table 1.2-6 page 41) and in the report 1.2-13 (Table 12). Data are missing for ‘whole plant’ tissue samples at stage R6 in table 1.2-6 (no means calculated, the mention ‘not applicable’ is indicated in the footnote of the table) and it is unclear whether this corresponds to the lack of data for some of the sites where plants were grown and sampled for analysis (see the details of the sites in the table 12 of report 1.2-13) or to the low level of the protein in those samples (as suggested by the ‘<LOD’ mention in the column ‘ranges’ of table 1.2-6). The applicant gives no explanation on why such low levels are observed in whole plants whilst significant levels are observed in leaves at the same developmental stage (which I expect to correspond to a large proportion of the ‘whole plant’). Why data were obtained in some sites and not in others is also unclear. Could the applicant clarify this by giving some explanation on the missing data of Table 1.2-6?

Section 1.2.2.4 on Genetic stability of the insert: see my comment #1 above regarding the real-time PCR test before the Southern blot analysis of the selfed generations. However, the PCR-based study of the Mendelian inheritance of the insert (in report 1.2-6) may be considered as a further indication of its genetic stability.

Comment 3

Maize MZHG0JG expresses mEPSPS, like in maize GH21. EPSPS is involved in synthesis of aromatic amino acids and inhibited by glyphosate, but not mEPSPS that has a low affinity for glyphosate.
Maize MZHG0JG expresses PAT, like maize Bt11. PAT acetylates glufosinate-ammonium, an inhibitor of glutamine synthetase, and therefore inactivates glufosinate conferring tolerance to the herbicide glufosinate-ammonium.

On page 41 c) it is mentioned that “PAT proteins are expressed in whole plants…and kernels”, but in table 1.2-6 levels of PAT in kernels is always under the detection limit <LOD. How can this be explained?

Additional comment from the coordinator: In some kernel samples from stage R6 low levels of PAT have been detected.

A.3. COMPARATIVE ASSESSMENT

A.3.1. CRITERIA FOR THE SELECTION OF COMPARATOR(S)

Comment 1

Similar to previous applications maize MZHG0JG is compared with the conventional counterpart. Other maize hybrids with a history of production in the areas of the selected fields are included as well.
Nine test materials are included in the study: maize MZHG0JG, maize MZHG0JG herbicide treated, the conventional near isogenic comparator and six reference varieties.

Comment 2

OK, the conventional counterpart is of the same genetic background as maize MZHG0JG.

A.3.2. FIELD TRIALS: EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS

Comment 1

No remarks.

Comment 2

The experimental design for the cultivation of maize involved 9 factors: (1) conventional maize, (2) maize MZHG0JG, (3) maize MZHG0JG treated with glyphosate and glufosinate, and (4)-(9) reference lines. The 3rd factor was in line with the genetic modification of maize and the development of maize MZHG0JG, which is intended for its tolerance to both herbicides glyphosate and glufosinate. Consequently, it is evident that this factor should be taken into account for the comparative analysis, including the concentrations of glyphosate and glufosinate in maize MZHG0JG.

Comment 3

Nine entries (maize MZHG0JG with or without TSH, nontransgenic near-isogenic control, 6 nontransgenic reference lines) over 8 locations, and in a randomized complete block design with 4 replicate plots.
No further questions.

A.3.3. COMPOSITIONAL ANALYSIS

Comment 1

For the mEPSPS and PAT protein concentrations, please provide data based on dry weight. In dossier 60 the amounts are expressed on a dry weight basis. With these data, no comparison is possible.

Additional comment from the coordinator: Data on dry weight basis are given in report 1.2-13.

Ferulic acid (treated and non-treated) lies outside the reference interval but there is no significant difference compared to its control. p-Coumaric acid (treated and non-treated), inositol (treated) and phytic acid (non-treated) differ significantly from their control, but lie completely within the reference limits. Conclusion: When non-equivalences did occur, levels did not differ from the nontransgenic, near-isogenic control maize and vice versa.

Comment 2

The OECD guidelines were followed for the comparative analysis.

Grain analysis included:

- proximates: no remarks but only applicable for comparative purposes and not for nutrition tables and other actual data collections; it is regrettable that potential important information for human nutrition cannot be valorised due to inadequate analysis methods. Total dietary fibre has been assessed in addition to neutral and detergent fibre methods but there is no differentiation in carbohydrates.
- minerals: selenium is included, no other remarks.
- vitamins: significant vitamins in maize have been analyzed such as niacin (B3 or PP vitamin); vitamin E however is limited to α-tocopherol: no data are available for the other tocopherols: β- , γ- and δ- tocopherols and the equivalent tocotrienols; maize is known to have good antioxidative properties; important constituents such as the not assessed tocopherols and tocotrienols are missing.
  A similar observation can be made for the carotenoids of maize. Results for β-carotene are included but it would be of interest to have information on the lutein and zeaxanthin content as it is of growing importance for eye health.
- amino acids: no remarks as all relevant amino acids have been studied.
- fatty acids: no remarks as the important polyunsaturates are differentiated according to the up to date insights in the role of fatty acids human nutrition.
- secondary metabolites: no remarks.
- anti-nutrients: no remarks.

In previous evaluations of maize, it has been proposed to include data about particular toxicants, in this case mycotoxins. It is generally recognized that maize is among the grains of concern with respect to mycotoxins.
As an answer to this observation, it was mentioned that it is not the intention to study the presence of these toxicants.
The presence of particular myxotoxins depends upon a range of conditions during growing, harvesting and storage. Mycotoxins are much more relevant, in terms of food safety, than the anti-nutrients mentioned. Potential mould infection during growing, or the absence of it, could give important information about the sensitivity of GM maize to mycotoxins in comparison to the reference maize.

Results of the statistical analysis are summarized in graphs and tables. This analysis was performed according to the EFSA methodology.
It was concluded that the levels of most constituents are equivalent to those in the reference lines. In case some differences were observed, the levels were in the range of conventional maize.

Additional comment from the SBB: Concerning the comment above on mycotoxins, it is important to remind that the objective of the compositional analysis is to compare the genetically modified plant and its conventional counterpart in order to identify possible unintended effects resulting from the genetic modification.

Comment 3

All proximates, calcium, and phosphorus in forage from maize MZHG0JG and maize MZHG0JG treated with glyphosate and glufosinate were equivalent to those in the set of reference lines.
Some compounds of maize MZHG0JG were significantly different from conventional maize, but differences were not relevant, because the values were within normal ranges. Differences in the

compositional analysis may be due to heterogeneities in soil and landscape position. A recent study reported that the heterogeneity is rising in maize since 2000, both between and within fields (Lobell and Azzari, 2017).
Although part of the maize MZHG0JG was cultivated with the use of the herbicides glyphosate and glufosinate, the comparison of the compositional analysis did not deal with the concentration of glyphosate and glufosinate and their metabolites in the maize grain and forage.

Comment 4

Why selenium and sodium are below the level of quantification (p. 62)? Normally these can be quantified in maize (see also other dossiers).
Why no analysis of Vit K (phylloquine) or salicylate, since both are mentioned to be possibly influenced by EPSPS?
Outcome for ferulic acid is not categorized in table 1.3-10 and 11, but is not different between the GMO and the control grain. However in figure 1.3-10 (p. 67) its levels are much higher than the 6 non-transgenic reference lines. Any explanation or reason why?

A.3.4. AGRONOMIC AND PHENOTYPIC CHARACTERISTICS

Comment 1

No remarks
In some applications but not is this one, attention is given to plant diseases and mould infections.
As mentioned above this would be an opportunity to make observations related to the potential presence of mycotoxins.

Comment 2

Evaluated, no comment.

Comment 3

No questions.

A.3.5. EFFECTS OF PROCESSING

Comment 1

Taking into account the compositional equivalence, no major effects on milling characteristics and the obtained fractions are to be expected.
The applicant presents a study where products obtained by a laboratory scale milling process, were investigated for the presence of mEPSPS and PAT proteins.
There are no indications of interactions of any safety concern between the proteins present in maize MZHG0JG.

Comment 2

No questions.

A.4. TOXICOLOGICAL ASSESSMENT

A.4.1. METHODOLOGY USED FOR TOXICITY TESTS

Comment 1

No problems whatsover taking into account the molecular and biochemical characterization, bioinformatics searches for known toxins, stability under processing, resistance to proteolytic enzymes, history of safe use, and toxicity studies.
No further animal feeding studies required.

A.4.2. ASSESSMENT OF NEWLY EXPRESSED PROTEINS including:

- Molecular and biochemical characterisation of the newly expressed proteins
- Up-to-date bioinformatic search for homology
- Information on the stability of the protein under the relevant processing and storage conditions for the food and feed derived from the GM plant
- Data concerning the resistance of the newly expressed protein to proteolytic enzymes
- Repeated dose toxicity studies using laboratory animals

Comment 1

Rapid degradation of mEPSPS and PAT in both SGF and SIF was demonstrated.
A repeated dose 28-day oral toxicity study was not performed. No signs of toxicity have been demonstrated in earlier studies. No further testing is needed.
A recent homology search seems to be missing in this dossier.

Additional comment from the coordinator: Recent homology searches have been performed, see App B-Table 3.

Comment 2

The chance that the new proteins (mEPSPS and PAT) in maize MZHG0JG will pose serious risks for toxicity is negligible, based on the biochemical characterization of the newly expressed protein, the bioinformatics analysis that uses sequence searches to identify any similarities to toxins and anti-nutrients, inactivation of new proteins during heat processing and the *in vitro* protein stability.
EFSA (2016) did not identify safety concerns in the case of the five-stack event maize Bt11 × 59122 × MIR604 × 1507 × GA21. Therefore, no safety problems are expected in the case of maize MZHG0JG, where the mEPSPS and PAT proteins are identical to the mEPSPS protein produced in GA21 maize and the PAT protein produced in Bt11 maize. We assume that there is no biological pathway in which the newly inserted genes would directly or indirectly interact with safety (Kok et al., 2014; Zdziarski et al., 2014). There is also no plausible or testable hypothesis for an interaction of the new proteins in maize MZHG0JG (Steiner et al., 2013).
Deformed new-born pigs were reported when glyphosate tolerant GM soy was used (Sørensen et al., 2014). However, the main text and Appendix 1.4-19 did not mention the effect on fertility and reproduction in the Han Wistar rats 90-day feeding study, so that some caution may be warranted.

Comment 3

Evaluated, no comment.

*Comment 4***)**

No questions.

A.4.3. ASSESSMENT OF NEW CONSTITUENTS OTHER THAN PROTEINS

Comment 1

Not relevant.

A.4.4. ASSESSMENT OF ALTERED LEVELS OF FOOD AND FEED CONSTITUENTS

Comment 1

No questions.

A.4.5. ASSESSMENT OF THE WHOLE FOOD AND/OR FEED DERIVED FROM GM PLANTS

Comment 1

During a 90-day rat feeding study, no toxicological effects were noted on body weight, food consumption, clinical condition, ophthalmology, haematology, coagulation, chemistry, organ weights, macroscopic or microscopic pathology at inclusion levels up to and including 41.5%. No further testing is needed at the moment.

Comment 2

No questions.

A.5. ALLERGENICITY ASSESSMENT

A.5.1. ASSESSMENT OF ALLERGENICITY OF THE NEWLY EXPRESSED PROTEIN including:

- Amino acid sequence homology comparison between the newly expressed protein and known allergens using a comprehensive database
- Specific serum screening
- Pepsin resistance and in vitro digestibility tests
- Additional tests

Comment 1

The newly expressed PAT and mEPSPS proteins, encoded by the pat-09 and mepsps-02 genes respectively, have been assessed individually before by EFSA for their potential allergenicity in the context of previous applications. No indications pointing towards an increased risk for allergenicity were then identified by EFSA.
Furthermore, genetically modified maize containing mEPSPS (in GA21 maize a.o.) and PAT (in Bt11 maize a.o.) has been commercialized for several years already. Post Market Environmental Monitoring (PMEM) has revealed to date no adverse effects on human and animal health.
Finally, an updated amino acid sequence homology comparison between the newly expressed proteins and known allergens using the FARRP allergen online database, version 2016, did not reveal biologically relevant sequence similarities with known allergens.
Accordingly, I comply with the applicant's conclusion that no concerns in relation to allergenicity of the newly expressed proteins were identified.

Comment 2

Evaluated, no comment.

Comment 3

No questions.

A.5.2. ASSESSMENT OF ALLERGENICITY OF THE WHOLE GM PLANT

Comment 1

I have no further remarks.

Comment 2

Based on the weight of evidence, it is assumed that maize MZHG0JG has no greater allergenic potential compared to conventional commercial maize varieties, and that it does not pose a serious allergenic risk.

Comment 3

No questions.

A.5.3. ADJUVANTICITY

Comment 1

I have no further remarks.

Comment 2

No questions.

A.6. NUTRITIONAL ASSESSMENT

A.6.1. NUTRITIONAL ASSESSMENT OF FOOD DERIVED FROM GM PLANTS

Comment 1

No unexpected alterations in nutrients; no further nutritional tests requested.

A.6.2. NUTRITIONAL ASSESSMENT OF FEED DERIVED FROM GM PLANTS

Comment 1

Based on the compositional analysis, there is no reason to assume that the genetic modification may affect the nutritional value of the feed derived from maize MZHG0JG based on the compositional equivalence.

Comment 2

No questions.

B. EXPOSURE ASSESSMENT - ANTICIPATED INTAKE/EXTENT OF USE

Comment 1

Pages 115-116: For the assumptions in exposure of GM Food, the 4th assumption is that the mEPSPS protein is not degraded or denatured upon digestion or processing; why? While it IS degraded in digestion processes (see p. 97)!!?
Why is this assumption not retained as assumption for feed? (p. 118-119).

Additional comment from the coordinator: For feed the same assumption is made as for food: see p. 119 point 10).

C. RISK CHARACTERISATION

Comment 1

Evaluated, no comment.

Comment 2

No questions.

D. POST MARKET MONITORING (PMM) OF FOOD AND FEED DERIVED FROM GM PLANTS

Comment 1

Evaluated, no comment.

Comment 2

No comments.

E. ENVIRONMENTAL RISK ASSESSMENT

E.1. INTRODUCTION

Comment 1

Evaluated, no comment.

Comment 2

No questions.

E.2. GENERAL APPROACH OF THE ERA

Comment 1

Evaluated, no comment.

Comment 2

No questions.

E.3. SPECIFIC AREAS OF RISK

As stated in the EFSA guidance on the environmental risk assessment of genetically modified plants (EFSA Journal 2010, 8(11):1879) the objective of the ERA is on a case-by-case basis to identify and evaluate potential adverse effects of the GM plant, direct and indirect, immediate or delayed (including cumulative long-term effects) on the receiving environment(s) where the GM plant will be released. For each specific risk the ERA consists of the six steps described in Directive 2001/18/EC:
1. Problem formulation including hazard identification,
2. Hazard characterisation,
3. Exposure characterisation,
4. Risk characterisation,
5. Risk management strategies,
6. Overall risk evaluation and conclusions.

E.3.1. PERSISTENCE AND INVASIVENESS INCLUDING PLANT-TO-PLANT GENE FLOW

Comment 1

Evaluated, no comment.

Comment 2

No questions.

E.3.2. PLANT TO MICRO-ORGANISMS GENE TRANSFER

Comment 1

Evaluated, no comment.

Comment 2

No questions.

E.3.3. INTERACTION BETWEEN THE GM PLANT AND TARGET ORGANISMS

Comment 1

Evaluated, no comment (not relevant).

Comment 2

Not relevant.

E.3.4. INTERACTION BETWEEN THE GM PLANT AND NON-TARGET ORGANISMS (NTOS)

Comment 1

Evaluated, no comment (not relevant).

Comment 2

No questions.

E.3.5. IMPACTS OF SPECIFIC CULTIVATION AND MANAGEMENT AND HARVESTING TECHNIQUES

Comment 1

Maize MZHG0JG is tolerant to glyphosate and glufosinate, which may result in an increased application of these herbicides and the possibility that residues were found in maize MZHG0JG grain and forage.

Comment 2

Evaluated, no comment (not relevant).

Comment 3

Not applicable.

E.3.6. EFFECTS ON BIOGEOCHEMICAL PROCESSES

Comment 1

Evaluated, no comment (not relevant).

Comment 2

Not relevant.

E.3.7. EFFECTS ON HUMAN AND ANIMAL HEALTH

Comment 1

In the case of genetically modified herbicide-tolerant crops, such as maize MZHG0JG, the effect of the genetic modification cannot be isolated from the effect of the herbicides. High residue concentrations of glyphosate in maize MZHG0JG grain and forage may inhibit rumen digestion in ruminants (Reuter et al., 2007). Furthermore, glyphosate has been detected in the urine of dairy cows (Krüger et al., 2013). Glyphosate has been detected in the urine of sows and in the tissue of deformed new-born pigs, showing that glyphosate is absorbed, circulates in the body and is finally deposited (Sørensen et al., 2014). The latter authors concluded that that glyphosate is rather a risk factor than the GM crop itself.
Furthermore, human health concerns with regard to the use of glyphosate have been reported (Mensah et al., 2015).

Additional comment from the coordinator: The assessment of the safety of glyphosate is not within the remit of the Biosafety Advisory Council.

Comment 2

No further questions.

E.3.8. OVERALL RISK EVALUATION AND CONCLUSIONS

Comment 1

Because of the controversy between the WHO and EFSA with regard to the safety of glyphosate (EFSA, 2015; Guyton et al., 2015; Portier et al., 2016) a new examination of glyphosate toxicity should

be undertaken to adjust downward the acceptable daily intake for glyphosate, as proposed by Myers et al. (2016). Furthermore, the European Chemicals Agency is conducting an investigation into the wider human health effects of glyphosate: see http://echa.europa.eu/registry-of-submitted-harmonised-classification-and-labelling-intentions/-/substance-rev/13201/term. In the meantime, the approval of maize MZHG0JG may be postponed.

Additional comment from the coordinator: The assessment of the safety of glyphosate is not within the remit of the Biosafety Advisory Council.

Comment 2

Evaluated, no comment.

E.4. Post Market Environmental Monitoring plan

E.4.1. Interplay between environmental risk assessment and monitoring

Comment 1

Evaluated, no comment.

E.4.2. Case-specific GM plant monitoring

Comment 1

Evaluated, no comment (not relevant).

E.4.3. General surveillance for unanticipated adverse effects

Comment 1

Evaluated, no comment.

E.4.4. Reporting the results of monitoring

Comment 1

Evaluated, no comment.

References

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