European Food Safety Authority

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SCIENTIFIC OPINION

Request from the European Commission related to the safeguard clause invoked by Austria on maize lines MON863 according to Article 23 of Directive 2001/18/EC[1]

Scientific Opinion of the Panel on Genetically Modified Organisms

(Question No EFSA-Q-2008-742)

Adopted on 15 June 2009

PANEL MEMBERS[*]

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SUMMARY

On 16 July 2008, Austria invoked Article 23 of Directive 2001/18/EC (safeguard clause) to provisionally prohibit the import of the MON863 maize lines on its territory. Austria provided detailed reasons listed in supporting documents.

On 3 September 2008, the European Food Safety Authority (EFSA) has been requested by the European Commission to provide a scientific opinion on the statement and documents submitted by Austria in the context of the safeguard clause invoked under Article 23 of Directive 2001/18/EC.

In the light of the information package provided by Austria in support of its safeguard clause and, having considered all relevant scientific publications, the Scientific Panel on Genetically Modified Organisms (GMO Panel) of EFSA concludes that, in terms of risk to human and animal health and the environment, no new scientific evidence was presented that would invalidate the previous risk assessment of maize MON863. The EFSA GMO Panel also concludes that no new scientific data or information was provided in support of adverse effects of maize MON863 on the environment and on human and animal health in Austria.

[1] For citation purposes: Scientific Opinion of the Panel on Genetically Modified Organisms on a request from the European Commission related to the safeguard clause invoked by Austria on maize lines MON863 according to Article 23 of Directive 2001/18/EC. *The EFSA Journal* (2009) 1152, 1-18.

[*] (minority opinion) This opinion is not shared by x members of the Panel. / (conflict of interest) x members of the Panel did not participate in (part of) the discussion on the subject referred to above because of possible conflicts of interest.

Therefore, no specific scientific evidence, in terms of risk to human and animal health and the environment, were provided that would justify the invocation of a safeguard clause under Article 23 of Directive 2001/18/EC.

Key words: **GMOs, maize (*Zea mays* L.), MON863, Austria, safeguard clause, human health and animal health, environment, Directive 2001/18/EC**

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BACKGROUND

On 16 July 2008, Austria notified to the European Commission a national safeguard clause on genetically modified (GM) maize MON863 under Article 23 of Directive 2001/18/EC. The notification was accompanied by the scientific document entitled "*Scientific arguments for an import ban of genetically modified maize MON863 (Zea mays L., MON863) of Monsanto notification C/DE/02/9*".

On 3 September 2008, the European Food Safety Authority (EFSA) has received a request from the European Commission to provide a scientific opinion from its Scientific Panel on Genetically Modified Organisms (EFSA GMO Panel) on the statement and documents submitted by Austria in the context of its invoked safeguard clause.

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

EFSA was requested, under Article 29(1) and in accordance with Articles 22(2) and 22(5)(c) of Regulation (EC) No 178/2002, to provide a scientific opinion as to "*whether, in accordance with Article 23 of Directive 2001/18/EC, the statement and documents submitted by the Austrian authorities comprise new information affecting the environmental risk assessment, such that detailed grounds exist to consider that the above authorised GMO, for the uses laid down in the corresponding consent, constitute a risk to human health, animal health or the environment*".

ACKNOWLEDGEMENTS

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ASSESSMENT

1. Introduction

Directive 2001/18/EC provides the possibility for Member States to invoke safeguards on specific Genetically Modified Organisms (OGM) in the case where new or additional information, made available since the date of the consent, would affect the risk assessment of an authorised GMO. Provisions foreseen by Austria seek to provisionally prohibit the import of maize lines MON863 into the Austrian territory.

The EFSA GMO Panel examined the set of supporting documents submitted by Austria. In this respect, the EFSA GMO Panel assessed whether the submitted documents comprise new scientific knowledge information that would change the outcome of previously performed risk assessment, and if detailed grounds exist to consider that the authorised maize MON863, for its intended uses, constitutes a risk to human and animal health or the environment.

The EFSA GMO Panel looked for evidence for GMO-specific risks – including long-term effects (e.g., BEETLE report, 2009) – taking into consideration the EFSA GMO Panel guidance for the risk assessment of genetically modified plants and derived food and feed (EFSA, 2006a) as well as any related risk assessments carried out in the past. In addition, the EFSA GMO Panel considered the relevance of raised concerns in the light of the most recent scientific data and relevant peer-reviewed publications.

2. Assessment of documents provided by Austria

A set of supporting documents, accompanying the mandate of the European Commission (see *Terms of Reference as provided by the European Commission*), was forwarded to EFSA on 3 September 2008.

Austria provided the following set of documents in support of its safeguard clause:

- Verbot des Inverkehrbringens von gentechnisch verändertem Mais der Linie MON863;

- Scientific arguments for an import ban of maize MON863.

Based on the supporting documents, several issues were identified and therefore considered by the EFSA GMO Panel in the following areas: (1) the toxicological and nutritional risk assessment, (2) the safety assessment of the antibiotic resistance marker (ARM) gene *npt*II, and (3) the environmental risk assessment and post-market environmental monitoring plan related to the accidental spillage of maize MON863.

In addition, the EFSA GMO Panel notes that it only gives its opinion on the scientific quality of the post-market environmental monitoring plan proposed by the applicant, whilst the final endorsement thereof is done by risk managers.

During its assessment, the EFSA GMO Panel identified issues raised by Austria that would require further clarifications. To present and clarify the provided set of documents, an informal meeting between the Austrian delegation, several experts of the EFSA GMO Panel

and EFSA staff was held on 23 April 2009. A representative of the European Commission attended the meeting as observer.

2.1. Food and feed safety issues

The Austrian Competent Authority has provided EFSA with a document entitled "Scientific Arguments for an Import Ban of Genetically Modified Maize MON 863 (*Zea mays* L., line MON 863) of Monsanto (Notification C/DE/02/9)". This document focuses on a number of details of toxicological and nutritional studies with maize MON863, which are cited by an article by Hammond et al. (2006) describing the outcomes of the 90-day rat oral toxicity study with maize MON863. The study by Hammond et al. (2006) refers to the same study for which another technical report was previously provided to EFSA as part of the dossier that was considered by the EFSA GMO Panel when formulating its opinion. In addition, various other documents have been published by EFSA in response to issues previously raised on the same 90-days study being part of the dossier (EFSA, 2004a; EFSA, 2004b; EFSA, 2007a; EFSA, 2007b). None of the studies quoted by Austria provide new direct evidence of risks to human and animal health associated with food and feed use of MON863, or its transgenic components, which would have evolved after the publication of EFSA's opinion on maize MON863 in 2004. In addition, the EFSA GMO Panel notes that 90-day study is not strictly required in the internationally harmonized approach of comparative safety assessment of a GMO versus its control. If the outcomes of the comparison of extensively analyzed compositional and other parameters indicate equivalence of a GMO to conventional food and feed, this would not trigger the performance of a 90-days study.

2.1.1. Toxicological risk assessment

The Austrian Competent Authority highlighted a number of details of the toxicological and nutritional studies cited by Hammond et al. (2006) as what they consider as deficiencies in experimental design and interpretation, which, as they assert, would impact on the interpretability of the outcomes of these studies. With regard to toxicity, the Austrian comments focus on the 90-days feeding study with diets containing kernels of MON863. They highlight various perceived deficiencies in the original dossier report on the 90-days study.

As the Austrian Competent Authority correctly notes, a report on the same 90-days oral rat feeding study as described by Hammond et al. (2006) has been provided with the dossier on MON863, albeit with more extensive coverage of experimental details.

With regard to the 90-days rat feeding study, the Austrian Competent Authority has made detailed and extensive comments regarding the experimental design (no updated protocol, inclusion of reference groups), diet formulation (Cry3Bb denaturation; contaminant analysis), endpoints measured (not all organs/tissues checked for histopathology; various single differences in performance and clinical chemistry). The same data of this study have already been assessed in detail by the EFSA GMO Panel, including the various differences observed (EFSA, 2004a; EFSA, 2004b; EFSA, 2007a; EFSA, 2007b)

Various general comments can be made, though, to the conclusions and assertions brought forward in the Austrian document. The Austrian Competent Authority, for example, appears to comment on the statistical analysis as performed by the applicant, including the asserted disappearance of differences through an increase of the total number of animals used for the

experiment, most of which comprise animals in reference groups fed diets containing commercial maize. The EFSA GMO Panel, though, has considered the direct comparison between the groups fed GM maize MON863 and the respective control groups. Any difference thus identified can then be further compared with the background ranges provided by the animals fed the reference diets. For example, the difference in reticulocytes that the Austrian authorities point at, was also noted by the EFSA GMO Panel, as summarized in section 4.2 of its opinion of 2004 (EFSA, 2004a). This approach of direct comparison of a GMO with its appropriate comparator is in line with the internationally harmonized comparative safety assessment principles for GM foods as laid down in Codex alimentarius guidelines (to which the Austrian authorities have also subscribed) and further elaborated in EFSA guidance document (EFSA, 2006a). Concerning the comment with regard to the percentage (60-80%) of the reference group in overall sample size, it should be noted that it is not the percentage of the reference groups within the sample size that is a problem in itself, but the replication of the GM and comparator. If this replication is too small because of the restrictions placed by having 60-80% reference varieties, then this could be a valid criticism. However, if the replication is sufficient, then there is no reason why reference groups should not contribute 60-80% of the sample size. In addition, the guidelines that were recently drafted by the Commission and discussed with EU Member States' representatives at the Standing Committee for the Food Chain and Animal Health recommend that compositional field trials be done with at least 60% of the plots being allocated to commercial varieties (reference groups).

Austria also refers to OECD guideline 408 (OECD, 1998) with regard to the number of doses and other details, which would not have been strictly followed by the applicant. In the EFSA GMO Panel's opinion, it has to be taken into account, though, that OECD guideline 408 has been developed for the testing of pure chemicals and that adjustments may be required for the testing of whole foods. This issue has also been extensively highlighted in the EFSA GMO Panel's report on animal feeding trials (EFSA, 2008).

In addition, Austria notes that the Cry3Bb protein should have remained intact in the test diet used in the 90-days rat feeding study, and therefore concludes that more details on the feed manufacturing conditions and the presence and nature of the transgenic elements in the rat diets should have been provided. Given the commonly low expression levels of transgenic proteins in GM crops, the EFSA GMO Panel notes, though, that for testing the safety of transgenic proteins, other models than whole-product feeding studies for testing purified components would be recommendable, such as repeated-dose oral rodent studies with the purified transgenic protein (see EFSA guidance document, EFSA, 2006a). Based on the data provided in the dossier, Cry3Bb has been assessed by the EFSA GMO Panel for its safety. The EFSA GMO Panel concludes that the data provided by the Austrian Competent Authority do not indicate that there would be an additional need for further testing the safety of Cry3Bb.

The EFSA GMO Panel concurs with the Austrian notion that nutritional feeding studies in food-producing animals cannot be considered toxicity studies. Again, the Austrian comments pertain to conclusions made by other authors than the EFSA GMO Panel in its opinion on MON863. The scientific opinions of the EFSA GMO Panel, including the one on MON863, make a distinction between toxicity, allergenicity, nutrition, and other issues that may be of relevance to food and feed safety.

In conclusion, no new data have been presented by the Austrian authorities that could be considered evidence of potential toxic effects on maize MON863 and its transgenic components on humans and animals. In the absence of such evidence, the EFSA GMO Panel

cannot follow the Austrian recommendation for requiring additional toxicity tests for sub-chronic, chronic, developmental, and reproductive toxicity of maize MON863.

2.1.2. Nutritional risk assessment

The Austrian Competent Authority refers to various nutritional studies that have appeared in scientific journals, in which the performance of various food-producing animals fed MON863, including poultry, beef and dairy cattle, and swine, have been measured. The article on the poultry feeding study with MON863 (Taylor et al., 2003) is based on the same feeding trial of which a report has been provided with the dossier assessed by EFSA. In addition, the quoted article on the dairy cattle study (Grant et al., 2003) has also been considered in the EFSA opinion. The other articles describing studies on beef cattle and swine were published after the publication of the opinion.

The Austrian comments pertain to perceived shortcomings of the abovementioned nutritional studies, such as to the composition of the diets (e.g., origin of the maize; certain micronutrients not being measured; levels of transgenic components in final product), experimental design (e.g., inclusion of reference groups; choice of animals; background variability), and statistical analysis (e.g. limited information based on p-values alone). None of these comments indicate that the new data cited by Austria demonstrate a potentially relevant adverse effect of maize MON863 on animal nutrition.

The EFSA GMO Panel concurs with the Austrian general comment that the first comparison to be made is between the GMO and its appropriate comparator, after which further comparison with the background range of reference values may be made, if applicable. The Austrian Competent Authority assert that whilst the transgenic identity of test materials has been verified, the levels of transgenic proteins and DNA in the final feed product, rather than in raw products, should be established. In the EFSA GMO Panel's opinion, these transgenic components do not contribute to nutrition given their very low abundance.

Moreover, the Austrian comments and the cited studies do not provide evidence of potential impacts of maize MON863 on nutrition that would lead the EFSA GMO Panel to deviate from its previous opinion (EFSA, 2004a). It should be noted that this kind of studies is not strictly required in the absence of indications of altered nutritional properties of a GMO based on compositional analysis and other data (e.g. type of modification) according to EFSA guidance. In the case of maize MON863, these data can therefore be regarded as supplementary data.

2.2. Molecular characterisation issues

2.2.1. Safety assessment of the ARM gene *aph(3')*-IIa

Therapeutic relevance of kanamycin and neomycin in human and veterinary medicine

The *aph(3')*-IIa gene confers resistance to neomycin and kanamycin but not to other aminoglycosides of clinical use. The *aph(3')*-IIa gene confers slightly reduced susceptibility to amikacin for *E. coli*. However, amikacin is a poor substrate for the APH(3')-IIa enzyme due to its hydroxyaminobutyryl side chain.

Antimicrobials are grouped into classes on the basis of chemical structure and mode of action. Most antimicrobials used for the treatment of animals belong to classes that are also used in

human medicine. A list of antimicrobial classes was compiled by WHO in 2007 (the WHO Expert Group on Critically Important Antimicrobials for Human Health) (WHO, 2007), giving examples of substances used for the treatment of infections in humans. Antimicrobials listed as 'Critically Important' in the WHO list are characterised as both: 1. 'sole therapy or one of few alternatives to treat serious human disease', and 2. 'antimicrobials used to treat diseases caused by organisms that may be transmitted *via* non-human sources or diseases caused by organisms that may acquire resistance genes from non-human sources'. With respect to this classification, kanamycin and neomycin were downscaled from "critically important" to "highly important" compared to the WHO report of 2005 (WHO, 2005), because they no longer were considered to comply with criterion 1. Antimicrobials classified as 'Highly Important' meet either criterion 1 or criterion 2. The World Animal Health Organisation (OIE) has similarly developed and adopted a list ranking the importance of different antimicrobials for animal health (OIE, 2007). Aminoglycosides, as a group, is a class of antibiotics critically important for veterinary medicine and animal production (OIE, 2007).

Kanamycin is rarely used systemically today due to its severe side effects although this antibiotic remains a recognised second line choice in conditions of infections with multiple drug resistant (MDR) *Mycobacterium tuberculosis* (MTB). Aminoglycoside resistance in *M. tuberculosis* results from a mutation causing alterations in the antibiotic target molecule within the mycobacterial cell; thus chromosomal resistance, and not the transfer of antibiotic resistance genes [such as *aph(3')*-IIa], is the only identified mechanism resulting in resistance to kanamycin (Goldstein *et al*., 2005 and references therein). Neomycin is poorly absorbed from the gastrointestinal tract, and is nephrotoxic and ototoxic. The use of neomycin in human medicine is limited to topical applications and gut irrigation/encephalopathy. By killing bacteria in the intestinal tract, it keeps ammonia levels low and prevents hepatic encephalopathy, especially prior to gastrointestinal surgery. In veterinary medicine kanamycin and neomycin could be used for therapies of neonatal diarrhoea in piglets and treatment of multi-resistant enteric gram-negative infections.

Transfer of ARM genes from GM plants to bacteria

Transfer of antibiotic resistance marker genes from GM plants to bacteria has not been detected either under natural or laboratory conditions in the absence of pre-existing sequence identity in the recipient organism. A number of studies have been published in which the possible occurrence of bacterial transformants carrying GM plant-derived antibiotic resistance marker genes in fields planted with GM plants were screened (Paget et al., 1998; Gebhard and Smalla, 1999; Badosa et al., 2004; Demanèche et al., 2008, Kim et al., 2008). Nonetheless, in none of these studies has transfer of antibiotic resistance marker genes from GM plant material to bacteria been demonstrated. Nor could such transfer be detected from the existing background.

In the cascade of events leading to clinical importance, the ARM genes present in GM plants would need to be transferred to, stabilised and expressed in a bacterial cell. Absence of sequence identity is known to be the major factor limiting the stable integration, by homologous recombination, of DNA from a GM plant to a bacterial cell. Other factors limiting the potential impact of the *aph(3')*-IIa marker gene used in maize MON863 include the lack of stability of the plant DNA in different environments and the limited competence of many bacterial cells.

ARM genes transfer from plants to bacteria has never been observed. There are limitations related to sampling and detection methods, as well as challenges in estimating exposure levels and in the inability to assign transferable resistance genes to a defined source. Notwithstanding these uncertainties, and taking into account all the peer-reviewed data, the probability of the transfer of antibiotic resistance genes from GM plants to bacteria must be considered as zero or below the limit of detection. It has to be stressed that the dissemination of antibiotic resistance genes between bacteria is not comparable with the potential transfer of these genes from plants to bacteria. Transfer of ARM genes from plants to bacteria would occur, if at all, with a very low frequency compared to that between bacteria.

Resistance in natural environments

Concerning the prevalence of the *aph(3')*-IIa gene and phenotypic kanamycin/neomycin resistance, two basically different sets of data are available.

In different countries the resistance is monitored in indicator bacteria and pathogens. The available data indicate that a pool of *aph(3')*-IIa-carrying bacteria occur in and outside hospital-associated environments. There are environmental fluctuations in the prevalence of the *aph(3')*-IIa gene and of the kanamycin/neomycin phenotypic resistance. During the bilateral technical meeting between the GMO Panel and the Austrian delegation a mean frequency of 0.74 % kanamycin resistant *Salmonella* has been reported in the Austrian surveillance programme of human isolates from 1999-2008. A similar frequency has been reported for neomycin resistant *Campylobacter* isolates from poultry from 2004-2007. This should be considered as high frequency.

An additional and important source of information on the frequency and distribution of genes conferring resistance to aminoglycoside antibiotics has been generated from metagenomic analyses. These are based on the molecular detection of resistance determinants, and allow the analysis of an extended bacterial population compared to conventional culturing methods. The expanding metagenomic studies have revealed a high density of antibiotic resistance genes in the environment (D'Costa et al., 2007). The resistance mechanisms identified include inactivation of aminoglycoside antibiotics by phosphorylation and acetylation (Riesenfeld et al., 2004). The results indicate that soil bacteria are a reservoir of antibiotic resistance genes towards aminoglycosides with greater genetic diversity than previously accounted for. Even a remote Alaskan soil, with no known exposure to antibiotics, harbours a great variety of resistance determinants (Allen et al., 2009) and even before the clinical use of antibiotics, antibiotic resistant bacteria were isolated (Wright, 2007). The ubiquitous distribution of the wide variety of antibiotic resistance genes can be explained by the fact that many of these genes are not just weapons against bacterial competitors but have other primary signalling functions (*e.g.* detoxification of metabolic intermediates, virulence and signal trafficking) (Martinez, 2008).

Selective antibiotic pressure in field environments

The EFSA GMO Panel agrees that selective antibiotic pressure can be present in several environments. This selective pressure is the key factor in the selection of resistance from the environmental reservoir and in the dissemination of antibiotic resistance between bacteria. However, this does not increase the likelihood of transfer of ARM genes from GM plants to bacteria. In the unlikely event that such a transfer to a bacterial cell occurs, it would not add

to the existing pool of naturally occurring resistance genotypes present in the microbial resistome.

2.2.2. Conclusion

Kanamycin and neomycin are categorised by the WHO Expert Group on Critically Important Antimicrobials for Human Health as 'Highly Important' antimicrobials. Kanamycin is used as a second-line drug for the treatment of infections with multiple drug-resistant tuberculosis (MTB). The increasing occurrence worldwide of "extensively drug-resistant" isolates of MTB with resistance to second-line antibiotics such as kanamycin is a cause for global concern. The *aph(3')*-IIa gene has not been implicated in such resistance.

The transfer of ARM genes from GM plants to bacteria has never been shown to occur under laboratory or natural conditions in the absence of sequence identity. If transfer of ARM genes from GM plants to bacteria occurs at all, its frequency is below the limit of detection. The process is therefore considered unlikely to impact on the occurrence of antibiotic resistance in humans, animals and the environment.

The genetic determinants conferring resistance to kanamycin and neomycin are detected in the environmental resistome and in all environments analysed by metagenomic analyses. They are also widespread among bacteria in different environments. Data provided from Austria indicate the spread of this resistance in human food-borne pathogens at a frequency of about 1%. Taking into account the theoretical transfer frequencies of ARM genes from GM plants to bacteria, in the unlikely event of the transfer of the *aph(3')*-IIa gene from maize MON863 to a bacterium, its contribution to the existing pool of kanamycin resistance in bacteria would be negligible.

For further details concerning the safety assessment of the ARM gene *aph(3')*-IIa, the EFSA GMO Panel refers to the EFSA statement (EFSA, 2009).

2.3. Environmental safety issues and post-market environmental monitoring

2.3.1. Environmental risk assessment

The intended uses of maize MON863 specifically exclude cultivation, so the environmental exposure is mainly limited to exposure through manure and faeces from the gastrointestinal tracts mainly of animals fed maize MON863, as well as to accidental release into the environment of MON863 grains during transportation and processing and subsequently to potential occurrence of sporadic feral plants.

Maize is highly domesticated and generally unable to survive in the environment without cultivation. Maize plants are not winter hardy in most regions of Europe: they have lost their ability to release seeds from the cob and do not occur outside cultivated land or disturbed habitats in agricultural landscapes of Europe, despite cultivation for many years. In addition, there are no cross-compatible wild relatives in Europe, and gene flow via pollen is largely restricted to neighbouring maize crops.

Maize MON863 has been developed to provide protection against certain coleopteran pests such as corn rootworms (*Diabrotica* spp.) by the introduction of a variant *Bacillus thuringiensis cry3Bb1* gene. The insect resistance trait can only be regarded as providing a selective advantage for the GM maize in cultivation under corn rootworm infestation

conditions. However, survival of maize outside of cultivation in Europe is mainly limited by a combination of low competitiveness, absence of a dormancy phase, susceptibility to diseases and to cold climate conditions. Since these general characteristics of maize MON863 are unchanged, the inserted insect resistance trait is not likely to provide a selective advantage outside of cultivation in Europe. Therefore, it is considered very unlikely that volunteers of this GM maize, or its progeny, will differ from conventional maize varieties in their ability to survive until subsequent seasons, or to establish feral populations under European environmental conditions. Since studies in Europe and elsewhere with maize MON863 have shown no altered survival, multiplication or dissemination characteristics except in the presence of the specific target organisms, the EFSA GMO Panel is of the opinion that the likelihood of unintended environmental effects as a consequence of spread of genes from this maize due to accidental spillage will not differ from that of conventional maize varieties.

Considering the intended uses of maize MON863, the environmental risk assessment is concerned with indirect exposure through manure and faeces from the gastrointestinal tracts mainly of animals fed maize MON863. In its previous environmental risk assessment of maize MON863 (EFSA, 2004a), the EFSA GMO Panel also considered the possibility that gene products, particularly Cry proteins might enter the environment either from the intestinal tracts of animals or through horizontal gene flow to bacteria. Data supplied by the applicant and other data published in the scientific literature suggested that most proteins would be degraded by enzymatic activity in the intestinal tract (Lutz et al., 2005; Wiedemann et al., 2006), so that a small amount of Cry protein would remain intact to pass out in faeces. Subsequently, there would be further degradation of proteins in the manure due to microbial processes. Even though it has been observed that Cry proteins can bind to certain soil particles (e.g., humic acids, clays) resulting in protection from degradation, a number of studies revealed that there is no accumulation of Cry proteins from GM crops in soil (Herman *et al.,* 2001, 2002; Head *et al*., 2002; Baumgarte and Tebbe, 2005; Hopkins and Gregorich, 2005; Ahmad *et al*., 2005; Dubelman *et al.*, 2005; Icoz and Stotzky, 2007; Krogh and Griffiths, 2007; Lawhorn *et al.*, 2009).

Having considered the different routes of exposure to the environment, the EFSA GMO Panel reiterates its previous opinion that the likelihood of unintended environmental effects as a consequence of spread of genes from this maize will not differ from that of conventional maize varieties (EFSA, 2004a). The EFSA GMO Panel concludes that the Austrian submission provided no new scientific data or information in support of an adverse effect of maize MON863 on the environment and that would justify a national safeguard measure concerning this product.

2.3.2. Post-market environmental monitoring plan

Austria questioned the adequacy, relevance and completeness of the post-market environmental monitoring (PMEM) plan provided by the applicant for maize MON863. The EFSA GMO Panel notes that it gives its opinion on the scientific quality of the PMEM plans proposed by applicants. The definitive and final endorsement of post-market environmental monitoring is done by risk managers. In this context, the EFSA GMO Panel refers to the section 5.2 of its scientific opinion on post-market environmental monitoring of GM plants (EFSA, 2006b) stating that '*Details of the specific plans and methods of monitoring in each country should not be included in the original application. The GMO Panel advises that the application should describe the general approaches and methods that the applicant would apply in different commercialisation sites, including the type of dialogue that would be*

established with risk managers in each Member State. The implementation of general surveillance data collection at a regional and national scale will be dependent on the local circumstances prevailing at the time the consent is given. Thus detailed local arrangements will be developed by the applicant after the application has been accepted and will depend on where the crop will be grown, the scale of commercialisation, the nature of the cultivation systems and a range of other factors. Applicants are encouraged to establish contacts with national competent authorities at an early stage in the commercialisation planning.'

In its initial scientific opinion for the placing on the market of insect protected GM maize MON863 and MON863xMON810 (EFSA, 2004a), the EFSA GMO Panel concluded that the scope of the monitoring plan provided by the applicant was in line with the intended uses for the GMO since the environmental risk assessment did not cover cultivation. In addition, the EFSA GMO Panel advised that appropriate management systems should be in place to prevent seeds of the GM maize entering cultivation, as the latter requires specific approval under Directive 2001/18/EC.

The association of European traders, importing cereals, oilseeds and feedstuffs (Coceral) as well as the association of European port silos (Unistock) have recently joined with the European Association of Bioindustries (EuropaBio) in developing monitoring systems for GM maize grains imported through the main ports of entry and processing facilities in Europe (e.g., Spain, Portugal, Italy, the Netherlands). These monitoring systems are based on Hazard Analysis and Critical Control Points (HACCP) principles. Therefore, it is anticipated that risk managers will opt for post-market environmental monitoring of imported maize MON863 in accordance with these arrangements.

Subject to post-market environmental monitoring activities under the coordinating system established by EuropaBio**,** the EFSA GMO Panel maintains its opinion that the scope of the post-market environmental monitoring plan provided by the applicant complies with (1) the intended uses of maize MON863, which exclude cultivation, (2) the requirements of the EFSA GMO Panel guidance on GM plants (EFSA, 2006a), and (3) the EFSA GMO Panel scientific opinion on post-market environmental monitoring (EFSA, 2006a,b).

2.3.3. Conclusion

The EFSA GMO Panel confirms its opinion that the likelihood of unintended environmental effects as a consequence of spread of (trans)genes from maize MON863 will not differ from that of conventional maize varieties in the context of its intended uses. The EFSA GMO Panel agrees with the monitoring plan submitted by the applicant, especially now that comprehensive arrangements have been made by applicants and operators for monitoring at major points of import and processing in European Union. However, the EFSA GMO Panel continues to recommend that appropriate management systems should be in place to minimise accidental loss and spillage of transgenic maize grains during transportation, storage and handling in the environment, and processing into derived products.

OVERALL CONCLUSIONS AND RECOMMENDATIONS

The EFSA GMO Panel has investigated the claims and documents both submitted in support of the Austrian safeguard clause and presented at the informal meeting between the Austrian delegation, several experts of the EFSA GMO Panel and EFSA staff on 23 April 2009. In

these documents, the EFSA GMO Panel did not identify any new data subject to scientific scrutiny or scientific information that would invalidate the previous risk assessment of maize MON863. In addition, the Austrian submission did not supply scientific evidence, that the environment or ecology of Austria was different from other regions of the EU, sufficient to merit separate risk assessments from those conducted for other regions in the EU.

Having considered the overall information package submitted by Austria as well as relevant scientific literature, the EFSA GMO Panel is of the opinion that there is no specific scientific evidence, in terms of risk to human and animal health and the environment, that would justify the invocation of a safeguard clause under Article 23 of Directive 2001/18/EC for the import of maize MON863 for its intended uses in Austria. In conclusion, the EFSA GMO Panel finds that the scientific evidence currently available does not sustain the arguments provided by Austria, and therefore the EFSA GMO Panel reiterates its previous scientific opinions on maize MON863.

DOCUMENTATION PROVIDED TO EFSA

1. Letter, dated 3 September 2008, with supporting documents from Jos Delbeke, Acting Director-General Environment EC, to Catherine Geslain-Lanéelle, Executive Director EFSA (ref ENV/B3/YK/lh ARES(2008) 24354) requesting for a scientific opinion on the safeguard notification submitted by Austria under Article 23 of Directive 2001/18/EC for maize lines MON863 and comprising the following supporting documents:
    a. Verbot des Inverkehrbringens von gentechnisch verändertem Mais der Linie MON863;
    b. Scientific arguments for an import ban of maize MON863.
2. Letter, dated 15 October 2008, from Catherine Geslain-Lanéelle, Executive Director EFSA, to Jos Delbeke, Acting Director-General Environment EC, acknowledging the receipt of the mandate accompanied with the supporting documents.

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