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Request from the European Commission related to the safeguard clause invoked by Greece on maize MON810 according to Article 23 of Directive 2001/18/EC[1]

Scientific Opinion of the Panel on Genetically Modified Organisms

(Question No EFSA-Q-2008-313)

Adopted on 3 July 2008

PANEL MEMBERS*

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SUMMARY

On 13 September 2007, Greece notified to the European Commission a ministerial decision concerning the extension of validity and amendment of an existing safeguard measure invoked under Article 23 of Directive 2001/18/EC and Article 18 of Directive 2002/53/EC (safeguard clause) to provisionally prohibit the cultivation of the authorised genetically modified maize MON810 on its territory. The European Commission received from Greece a written submission, composed of two notes accompanied with supporting documents.

As a consequence, the European Commission requested in a letter, dated 18 April 2008, a scientific opinion as to whether there is any scientific reason to deem that the placing on the market of MON810 seeds is likely to cause any adverse effects on human health and the environment justifying the Greek safeguard measure.

In the light of the information package provided by the Greek authorities in support of its safeguard clause and, having considered all relevant publications, the EFSA's Scientific Panel on Genetically Modified Organisms (GMO Panel) concludes that, in terms of risk to human and animal health and the environment, no new scientific evidence was presented that would

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* This opinion is not shared by 0 members of the Panel. / (conflict of interest) 0 members of the Panel did not participate in (part of) the discussion on the subject referred to above.

invalidate the previous risk assessments of genetically modified maize MON810. The GMO Panel also concludes that no new scientific data or information was provided in support of adverse effects of maize MON810 on the beekeeping industry in Greece, nor on human and animal health.

Therefore, no specific scientific evidences, in terms of risk to human and animal health and the environment, were provided that would justify a prohibition of cultivation of maize MON810 authorised in Greece.

Key words: GMOs, maize (*Zea mays*), MON810, Greece, safeguard clause, human health, animal health, environment, Directive 2001/18/EC, Directive 2002/53/EC.

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BACKGROUND

Maize MON810 (notification reference C/F/95/12-02) was authorised in the European Union for all uses with the exception of food by the Commission Decision 98/294/EC on 22 April 1998 (EC, 1998). A final consent was granted by France on 3 August 1998. Food use of maize derivatives was notified according to Article 5 of Regulation (EC) No 258/97 on 6 February 1998 (EC, 2004).

On 13 September 2007, Greece notified to the European Commission a ministerial decision concerning the extension of validity and amendment of an existing safeguard measure invoked both under Article 23 of Directive 2001/18/EC (EC, 2001) and Article 18 of Directive 2002/53/EC (safeguard clause) (EC, 2002) to provisionally prohibit the cultivation of the authorised genetically modified (GM) maize MON810 on its territory.

On 18 April 2008, the European Commission requested EFSA and its GMO Panel to provide a scientific opinion on the written submission provided by Greece to justify the extension of its national safeguard measure. EFSA received through the European Commission this Greek written submission, composed of two notes and a set of supporting documents.

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

On 18 April 2008, EFSA was requested by the European Commission, under Article 29(1) and in accordance with Articles 22(5) and 22(5)(c) of Regulation (EC) No 178/2002:

- to assess whether there is any scientific reason to deem that the placing on the market of maize MON810 seeds is likely to cause any adverse effects on human health and the environment justifying the Greek safeguard measure;
- to take account of the statement and scientific information submitted by the Greek authorities to justify their national safeguard measures concerning this product.

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ASSESSMENT

1. Evaluation of documents delivered by Greece

The GMO Panel has examined the submission consisting of notes and supporting documents from Greece. The GMO Panel looked for evidence for GMO-specific risks taking into consideration the EFSA guidance document 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.

EFSA is requested by the European Commission to assess whether there is any scientific reason to deem that the placing on the market of MON810 seeds is likely to cause any adverse effects on human and animal health and the environment justifying the Greek safeguard measure. In particular, EFSA is requested to take account of the notes and the set of supporting documents provided by Greece to justify their national safeguard measures concerning the above authorized GMO, for the uses laid down in the corresponding consent.

Risk assessment and approval of GMOs according to Directive 2001/18/EC are done on a case-by-case basis. The Directive provides the possibility for Member States to raise objections against marketing of specific GMOs. If necessary, the risk assessment may include features specific to certain geographical regions or sub-regions. Moreover, the Directive provides safeguards in the case where new or additional information would affect the risk assessment of an authorised GMO. The provisions foreseen by Greece seek to provisionally extend the validity of an existing ministerial decision prohibiting the cultivation of maize MON810 in Greece.

The Greek authorities notified their decision to the European Commission and justified it with a set made of the following documents:

1. Greek note about the Ministerial decision 303061/7505/28.06.2007,
2. Greek note on new supplementary scientific evaluation,
3. SANCO note to EFSA of 15.03.2007 on MON863 rat feeding studies,
4. Study on colony collapse disorder by Paschalis Harizanis,
5. Florida Workshop on colony collapse disorder,
6. US national bee colony loss survey,
7. Sierra Club – Bee colony collapse disorder,
8. Archives of environmental contamination and toxicology – New analysis of a rat feeding study.

Out of these eight documents the notes both from the Greek authorities (items 1 and 2) and from European Commission (item 3) were provided as background documents. These documents do not contain new scientific data that would need to be assessed by the GMO Panel.

Based on the remaining supporting documents, two main concerns were identified and therefore considered by the GMO Panel:

1. an environmental concern related to potential impact on bee colonies, and
2. a toxicological concern related to the animal feeding studies.

In addition, the GMO Panel considered the relevance of the concerns in the light of the most recent scientific data and relevant peer-reviewed papers.

Concerns related to the co-existence of maize cropping systems and thresholds for the adventitious presence of GM seeds in conventional seed lots fall outside the remit of the GMO Panel. In relation to post-market environmental monitoring and insect resistance management, the GMO Panel gives its opinion on the scientific quality of the post-market monitoring environmental plans proposed by applicants. The definitive and final endorsement of post-market environmental monitoring is done by risk managers.

2. Assessment by the GMO Panel

The GMO Panel evaluated the above described information package. To present and clarify the provided set of data, an informal meeting between Greek scientists, representatives from the Greek Competent Authorities, some experts of the GMO Panel and EFSA staff was held on 11 June 2008. Representatives of the European Commission attended this meeting as observers.

The GMO Panel considers that the information provided by Greece to justify its national safeguard measure was not sufficiently specific to maize MON810 and did not relate to particularities of Greek farming or the Greek environment. The toxicity data provided concerned maize MON863 and Greece referred primarily to bee colony studies in the USA and not to data collected in Greece or Europe. Against this background and in order to facilitate a thorough assessment of potential risks, the GMO Panel strongly recommends Member States who invoke safeguard clauses to supply relevant new scientific data of a quality which can be subjected to detailed scientific scrutiny.

In its risk assessment and in addition to the information package supporting the Greek national measure on maize MON810, the GMO Panel reviewed all relevant and most recent publications, as well as those considered specific for Greek receiving environments.

2.1. Environmental concern related to potential impact on bee colonies (see supporting documents 4, 5, 6 and 7)

The supporting documents provided by the Greek authorities are related to surveys (and subsequent workshop) on bee colonies carried out in the United States such as the 'US National Bee Colony Loss Survey' (see doc 6). Because the survey questionnaire was only distributed to North American beekeepers that were willing to share information, the gathered data do not represent a statistically designed sample. Moreover, the statistical analysis provided in the report – as supporting document 6 – only concerns one-half of the collected surveys. Nevertheless, in the above mentioned report, there is no indication that the Colony

Collapse Disorder (CCD) is likely to be related to the presence of genetically modified crops in the area.

Consequently, the surveys provided by Greece do not provide the GMO Panel with biologically and statistically relevant data or new information that would indicate that the cultivation of maize MON810 would be associated to bee colony decrease in Greece.

The GMO Panel reviewed scientific literature related to CCD. Cox-Foster *et al*. (2007) indicated a possible association between CCD and a new viral disease (IAPV). Although the authors of the paper state that they "*have not proven a causal relationship between any infectious agent and CCD*", "*the prevalence of IAPV sequences in CCD operations, as well as the temporal and geographic overlap of CCD and the importation of IAPV-infected bees, indicate that IAPV is a significant marker for CCD*". It must also be indicated that CCD symptoms (e.g. low number of adult bees in the hives which still held food supplies and immature bees) do not resemble those expected in Bt intoxicated organisms (where immature stages are much more sensitive than adults). The American working group on CCD is currently concentrating on the following three hypotheses considered to be the more likely causes of bee colony loss in the USA[2]:

- Reemerging pathogens responsible for CCD;
- Stresses working together to weaken bee colonies and allowing stress-pathogens to cause final collapse;
- Environmental chemicals (especially neonicotinoids) causing the immuno-suppression of bees and triggering CCD.

Zea mays is generally regarded as being anemophilous, but bees can collect maize pollen when foraging for better food sources. Although maize pollen is not uncommon in honey, it does not usually represent the major pollen type. Evidence that maize pollen is collected by bees is available from experimental results and monitoring (Percival, 1947; Percival, 1955, Nowakowski and Morse, 1982; Vaissiere and Vinson, 1994). Due to the possible exposure of bees to Bt-maize pollen, potential adverse effects on honey bees have been studied. Within this context, honey bees have been exposed to specific Bt-proteins or to Bt-maize pollen either under laboratory or under 'semi-field' conditions. Malone *et al*. (2004) reviewed previous publications and concluded that "*evidence available so far shows that none of the GM plants currently commercially available have significant impacts on honey bee health*".

In addition, the GMO Panel looked at other available literature, specifically using MON810 derived material. Babendreier *et al.* (2005) investigated the suitability of hypopharyngeal gland development of worker bees as an indicator of potential disturbances in honey bee colony development due to pollen expressed toxins. The hypopharyngeal gland is used to prepare food for the young bees. The authors fed young bees for 10 days with Bt maize pollen expressing Cry1Ab toxin (MON810) or with purified Cry1Ab toxin solubilised in sugar solutions. No significant differences were found either in diameter or in weight development of hypopharyngeal glands of control bees and bees fed with Bt-pollen or Bt-containing sugar solutions. By contrast, protease inhibitors caused significant differences confirming the sensitivity of the applied method.

Duan *et al*. (2008) conducted a meta-analysis of 25 studies that independently assessed potential effects of Bt Cry proteins on honey bee survival (or mortality). Results show that Bt

[2] http://www.ento.psu.edu/MAAREC/CCDPpt/CoxFosterTestimonyFinal.pdf

Cry proteins used in genetically modified crops commercialised for control of lepidopteran and coleopteran pests do not negatively affect the survival of either honey bee larvae or adults in laboratory settings. However, they also indicated that additional stresses that honey bees face in the field could, in principle, modify their susceptibility to Cry proteins or lead to indirect effects.

The GMO Panel also discussed possible exposure under normal apiculture conditions. Pollen shed in a given maize field usually takes place for approximately 10 days each season and in maize cultivated areas in Europe, more flowering plants are usually available so that maize represents a minor component of pollen collections in most landscapes. Hence, the proportion of maize pollen as a total of all pollen collected and fed to larvae during a summer will be very low in most cases. However, pollen may be stored in hives for longer periods, therefore nurse-aged bees may consume larger amounts of pollen until they become foragers but due to the low proportion of maize pollen stored and the low concentration of Cry1Ab in MON810 pollen, it is likely that these bees will be exposed to low concentrations of the toxin. It was therefore concluded that potential exposure of bees to Bt-expressing MON810 maize pollen will be limited.

Conclusions: The GMO Panel considers that low exposure level of bees to maize pollen combined with the low toxicity of the Cry1Ab protein in maize MON810 is unlikely to result in any adverse effects on bees. Therefore, the GMO Panel concludes that the Greek submission provided no new scientific data or information in support of an adverse effect of MON810 maize on the beekeeping industry in Greece and that would justify a national safeguard measure concerning this product.

2.2. Toxicological concern related to animal feeding studies (see supporting documents 3 and 8)

The study by Séralini and co-workers on maize MON863 (Séralini *et al*., 2007), to which the Greek authorities refer, has been extensively considered by the GMO Panel and commented on in a statement (EFSA, 2007). Maize MON863 considered in this study contains a different Cry toxin from maize MON810 and the GMO Panel advises that conclusions on MON863 are not relevant to MON810. The GMO Panel has concluded that the re-analysis conducted by Séralini on the toxicological study carried out previously does not raise new issues that are toxicologically relevant.

A 90-day feeding study with maize MON810 has been provided in the dossier on GM maize MON863 x MON810 and it has also been published in peer-reviewed literature (Hammond *et al*., 2006). The GMO Panel considered that the results of the 90-day sub-chronic rodent study did not indicate adverse effects from consumption of maize MON810 and the GMO Panel concluded that there were no concerns over its safety (EFSA, 2005a).

In more general terms, the issue of safety testing of GM products in animals has been addressed by a working group of the EFSA GMO Panel, which has recently published its report as a supplement to the scientific journal Food and Chemical Toxicology (EFSA, 2008). This report discusses when and how animal studies can be incorporated into the safety assessment strategy for GM products. It is noted that there is no *a priori* requirement for animal testing, and that it is to be decided for on a case-by-case basis.

Conclusions: The GMO Panel concludes that the Greek submission provided no new scientific data or information in support of an adverse effect of maize MON810 on human or animal health in Greece and that would justify a national safeguard measure concerning this product. In addition the GMO Panel is not aware of any new scientific data that indicates food or feed safety issues associated with MON810.

CONCLUSIONS AND RECOMMENDATIONS

The GMO Panel has investigated the claims and documents provided by Greece. In these documents, the GMO Panel did not identify any new data subject to scientific scrutiny or scientific information that would change the previous risk assessments conducted on maize MON810 which currently has marketing consent in the EU. In addition, the Greek submission did not supply scientific evidence that the environment or ecology of Greece was different from other regions of the EU sufficient to merit separate risk assessments from those conducted for other regions in the EU. The GMO Panel considered the available data on the potential toxicity of maize MON810 together with available data on possible environmental impact. The GMO Panel also reviewed new literature on Cry1Ab-expressing maize. The GMO Panel concluded that maize MON810 is unlikely to have adverse effects on human and animal health or on the environment in the context of its proposed uses. The GMO Panel therefore re-affirms its previous conclusions on the safety of maize MON810.

Having considered the scientific information submitted by Greece as well as a broad range of relevant scientific literature, the GMO Panel is of the opinion that

- there is no new data that would invalidate the previous risk assessments carried out on maize MON810 (EFSA, 2005a,b; EFSA, 2006b,c; SCP, 1998, 1999),

- there is no specific scientific evidence, in terms of risk to human health and the environment, that would justify a prohibition of the placing on the market of maize MON810 authorised under Directive 90/220/EEC (repealed by Directive 2001/18/EC) and the prohibition of cultivation of maize MON810 varieties according to Directive 2002/53/EC in Greece.

In conclusion, the GMO Panel finds that the scientific evidence currently available does not sustain the arguments provided by Greece and that cultivation of maize MON810 in Greece is unlikely to have an adverse effect on human and animal health and the environment.

DOCUMENTATION PROVIDED TO EFSA

Note, dated 18 April 2008, with the supporting documents from M.P. Carl, Director-General Environment EC, to Catherine Geslain-Lanéelle, Executive Director EFSA (ref ENV/B3/YK/gm D(2008) 3738) – Assessment of the scientific studies supporting the suspension of cultivation of MON810 in Greece - Request for EFSA opinion.

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