



ADVISORY COMMITTEE ON RELEASES TO THE ENVIRONMENT

Advice on a notification for marketing of insect resistant GM cotton

Notifier: Agrigenetics Inc. d/b/a Mycogen Seeds c/o DowAgroSciences LLC

Notification Reference: C/NL/04/01

Product: A GM cotton line that contains two transformation events (281-24-236 and 3006-210-23) that have been combined through conventional breeding. This line (referred to as 281-24-236/3006-210-23) is modified with *cry 1Ac* and *cry 1F* genes, which confer resistance to certain lepidopteran pests and the *pat* gene, which confers tolerance to the herbicide glufosinate ammonium.

Scope: For import into the European community and use for processing. The scope also includes progeny produced by conventional breeding, which simultaneously express the Cry 1F and Cry 1Ac proteins. The scope of this notification does not include cultivation or use as feed.

Date: 16 November, 2004

Advice of the Advisory Committee on Releases to the Environment (ACRE) under S.124 of the Environmental Protection Act 1990 (Part VI) to the Secretary of State for Environment, Food and Rural Affairs, Scottish Ministers, Ministers of the Welsh Assembly Government and the Department of Environment (Northern Ireland).

Primary advice: ACRE agrees with the lead competent authority's (Netherlands) assessment¹ of notification C/NL/04/01 and concludes that the import and processing of GM cotton line 281-24-236/3006-210-23 does not pose an increased risk to human health or the environment compared with non-GM cotton varieties. In coming to this view, ACRE has taken advice from the GM sub-group of the Advisory Committee on Animal Feedingstuffs (ACAF). ACRE consider that the dossier has been well prepared and thorough and that the post-market monitoring plan is proportionate to the risk assessment.

Comment

¹ Please refer to the Joint Research Centre Website for the Dutch assessment report on C/NL/04/01: http://gmoinfo.jrc.it/csnifs/C-NL-04-01_AssessmentReport.pdf

As the scope of the notification is for import only and does not include cultivation or use as animal feed, ACRE concentrated on the molecular characterisation of 281-24-236/3006-210-23 cotton and on the plan for post-market monitoring. The ACAF GM sub-group was asked to assess the safety implications if livestock were accidentally exposed to 281-24-236/3006-210-23 cottonseed. In coming to its conclusions, the sub-group have considered the molecular characteristics of the transformation events, the safety of the transgenic proteins and the compositional studies presented in the notification.

Molecular characterisation

The cottonseed described in this notification contains two transformation events (281-24-236 and 3006-210-23) that have been combined (stacked) through conventional breeding. The line (referred to as 281-24-236/3006-210-23 cotton) is modified with *cry1F* and *cry1Ac* genes, which confer resistance to certain lepidopteran pests and the *pat* gene which confers tolerance to the herbicide glufosinate ammonium.

The results of Southern hybridisations support the notifier's conclusions that 281-24-236/3006-210-23 cotton contains two insertion events in its genome, one derived from each of the parental transgenic lines (281-24-236 and 3006-210-23). With respect to the 3006-210-23 transformation event (containing the *cry1Ac* and *pat* transgenes), the molecular analysis shows that there is one full-length copy of the intended insert; whereas for transformation event 281-24-236 (containing the *cry1F* and *pat* transgenes), Southern hybridisation and DNA sequence analysis identified an extra copy of the ubiquitin promoter linked to a fragment of the *pat* gene. The partial *pat* gene produced low levels of RNA/ transcript but no corresponding protein was detected.

Southern analysis supports the conclusion that the erythromycin resistance gene (present on the backbone of the vectors) is absent from 281-24-236/3006-210-23 cotton.

Environmental exposure

The notifier has thoroughly investigated whether the transgenic proteins synthesised in 281-24-236/3006-210-23 cotton have the potential to be allergenic or toxic. The notifier has also analysed the DNA flanking the inserts for DNA that could code for novel proteins with the potential to be biologically active, toxic or allergenic. ACRE and ACAF are content that this risk has been satisfactorily addressed.

Originally this notification included the use of 281-24-236/3006-210-23 cotton as animal feed, but since the coming into force of the Food and Feed Regulations (1829/2003), the notifier has reduced its scope so that feed use is no longer included. ACAF's GM sub-group have been asked for its advice on this notification because of the inclusion of data pertinent to animal feed safety (in case of accidental exposure).

The ACAF GM sub-group consider that although samples were taken over only one growing season, the stacked GM variety was shown to have essentially the same composition as its GM parents and a non-GM variety. The concentrations of individual components, including the measured toxicants/anti-nutritional factors, fell within the range recorded for non-GM cotton seed. The three newly introduced genes products have been previously examined and have been accepted as safe even when consumed at concentrations far exceeding those in the cotton seed.

Accidental exposure to GM cotton seed could arise through spillage or poor storage and opportunistic consumption by livestock. In this case, any toxic consequences for

non-ruminants would be the same as for any other cotton seed and depend predominately on the free gossypol² concentration and the amount consumed.

The subgroup noted the brief reference made to a poultry (broiler) study in the notification, in which the growth of birds fed a diet containing feed derived from the GM cotton was compared with birds fed a diet prepared with a non-GM counterpart. No data are provided and since cotton seeds and seed meal are considered toxic to poultry except at very low inclusion rates, the value of such an experiment must be open to question - as such, the subgroup is not requesting to see the details of this study.

Post-market monitoring

ACRE agrees with the Dutch competent authority that the post-market monitoring plan for 281-24-236/3006-210-23 cotton is proportionate to the environmental risk assessment. As the scope of this notification is for import and processing, the general surveillance plan addresses exposure to seeds that have been spilled and unexpected adverse effects on human health consequent with handling this product.

The time-period for general surveillance of 281-24-236/3006-210-23 cotton imports is proposed for 10 years, this in line with the approval period. The notifier/consent holder will prepare general surveillance reports on an annual basis, except for adverse findings that need immediate risk mitigation, which will be reported as soon as possible. ACRE agrees with this approach.

² Gossypol is a natural fat-soluble, cardiotoxin that is found in all cottonseed.