

PAPER FOR INFORMATION

ACNFP/SACN SUBGROUP ON APPROACHES TO THE NUTRITIONAL ASSESSMENT OF NOVEL FOODS**UPDATE ON THE WORK OF THE SUB-GROUP AND RECENT DEVELOPMENTS****Issue**

This paper provides updated background on the work of the Sub-Group, and reports on developments since the last meeting in 2004.

Work of the Sub-Group

The Sub-Group was established in 2004 to look into the development of detailed guidelines for nutritional assessment of novel foods (including GM foods). At that time it was recognised that nutritional assessment was an essential part of the overall assessment of new foods, in parallel with the safety assessment. Although this was recognised in the guidelines for the assessment of novel and/or GM foods, these guidelines provided little detail on the types of data that would be needed, so that applicants were unsure what data should be provided in different circumstances, and the bodies responsible for the assessment would have to make the best of whatever data were available, leading in many cases to delays while the applicants were asked to provide additional data and potentially to inconsistencies in the evaluations.

The Sub-Group's objectives, as agreed at the first meeting are:

- **to identify any gaps in the current guidelines for nutritional assessment of novel and GM foods**

and

- **to develop specific guidance for applicants, defining which nutritional data should be provided under different circumstances**

The resulting advice will be used in three ways:

- a) by the ACNFP in its future evaluations of novel foods
- b) by applicants making novel food authorisation via the UK,
- c) by the Food Standards Agency, who will circulate it to other EU bodies (including EFSA) in order to develop a consistent approach to nutritional assessment of novel foods.

Plan of Action

At its first meeting the Sub-Group adopted the following plan of action:

- A series of Sub-Group meetings (& email exchanges) to discuss and finalise the guidance document
- consultation with SACN
- draft document issued for public comment
- guidance document finalised by the Sub-Group, consulting with SACN on any substantive changes
- advice presented to ACNFP for formal adoption and publication.

The timings of the remaining stages will be updated following this meeting, taking account of the work that remains to be done.

At its second meeting (August 2004), the Sub-Group considered a first draft of the report and were content with the proposed structure. Members' comments on the text have been reflected in the revised draft presented to this meeting.

Other Developments

The major development since the last meeting is that EFSA has developed and published its guidance for the assessment of foods from GM plants and from GM microorganisms. The plant guidance was published in 2004 and updated in 2005. The parallel document on microorganisms was published in 2006. The sections of these documents that deal with nutritional assessment are attached (**Annexes 1 and 2**).

EFSA's GMO Panel has continued to review its approach to the different elements of its evaluations of GM food and feed, and in December 2007 it published a detailed paper on the role of animal feeding studies (**Annex 3**). Other "self-tasking" activities have involved a review of statistical methods and ongoing reviews of allergenicity assessment and environmental risk assessment.

In July 2008 the GMO Panel published a partially updated version of the plant guidelines for public comment. The consultation document reflected the conclusions of the Panel's reviews of animal feeding trials and the design and analysis of crop trials, and included various other amendments and improvements. The section of this document dealing with nutritional assessment of food is attached (**Annex 4**). EFSA is working with the European Commission to finalise this document, which may eventually be incorporated into the body of EC legislation on GM food and feed.

The Secretariat is not aware of any other developments in relation to nutritional assessment of (non-GM) novel foods.

**Secretariat
November 2008**

Annexes attached

Annex 1 – Extract from EFSA guidance on assessment of GM plants

Annex 2 – Extract from EFSA guidance on assessment of GM microorganisms

Annex 3 – *"Safety and nutritional assessment of GM plants and derived food and feed : The role of animal feeding trials"* – paper published by EFSA GMO Panel

Annex 4 – Extract from draft updated EFSA guidance on assessment of GM plants

The full text of all four documents can be downloaded from www.efsa.europa.eu

Extract from EFSA GMO Plant Guidelines (1994, updated 1996)

7.10 Nutritional assessment of GM food/feed

Compositional analysis is the starting point and cornerstone for the nutritional assessment of food and feed material. Consensus documents prepared by OECD (OECD a) provide excellent guidance for the analyses needed and the analyses conducted should be determined on a case-by-case basis and may vary depending on the introduced trait. It should be noted that there are significant differences in composition of conventionally bred varieties and thus the compositional analysis of GM crops must be assessed against the background of natural variability in the conventional counterpart(s). Attention is drawn to the ILSI crop composition database (ILSI, 2003b) as a key source for such data and to an ILSI report (ILSI, 2004), which addresses the issue of nutritional assessment of GM foods and feeds.

7.10.1 Nutritional assessment of GM food

The development of GM foods may have the potential to improve the nutritional status of individuals and populations and provide products with enhanced functionality. GM foods also have the potential to introduce nutritional imbalances as a result of both expected and unexpected alterations in nutrients and other food components.

The nutritional assessment of GM foods should consider:

- (a) nutrient composition (see compositional studies as described in Sections III, D 7.1-7.4);
- (b) biological efficacy of nutrient components in the foods;
- (c) assessment of dietary intake and nutritional impact.

When substantial equivalence to an existing food is demonstrated, the only further nutritional assessment will deal with the impact of the introduction of the GM food on general human dietary intake patterns. Information on the anticipated intake/extent of use of the GM food will be required and the nutritional consequences should be assessed at average and at extreme levels of daily intake. The influences of non-nutrient components of the GM food should also be considered.

Specific additional requirements should be applied to those GM foods aimed at modifying nutritional quality. In this case additional detailed studies on specific biomolecules, tailored according to the genetic modification(s), would be required.

The introduction of a significant nutritional change in a food may require post-market assessment to determine if the overall diet has been altered and to what degree (see Section III, D 7.11).

*Extract from EFSA GM microorganism guidelines (1996)***6.9 Nutritional assessment****6.9.1 Nutritional assessment of the GM food**

The development of GM foods may have the potential to improve the nutritional status of individuals and populations and provide products with enhanced functionality. GM foods also have the potential to introduce nutritional imbalances because of both expected and unexpected alterations in nutrients and other food components (ILSI, 2004).

An intended modification introduced in a GMM may alter the overall profile of the product, which, in turn, could affect the nutritional status of individuals consuming the food. The impact of changes that could affect the overall nutrient profile should be determined.

Compositional analysis is the starting point and the cornerstone for the nutritional assessment of food and feed material. It is based on the assessment of possible compositional changes to key nutrients. If such nutritional modifications have been implemented, the product should be subjected to additional testing to assess the consequences of the changes and whether the nutrient intakes are likely to be altered by the introduction of such foods into the food supply.

The biological efficacy of nutrient components in the product should be considered. The analyses conducted should be determined on a case-by-case basis and may vary depending on the introduced trait and on the processing and storage.

An estimation of the expected intake should be provided for a correct evaluation of the nutritional changes.

The nutritional assessment of GM food should consider the assessment of dietary intake and nutritional impact. When substantial equivalence to an existing food is demonstrated, the only further nutritional assessment will deal with the impact of the introduction of the GM food on general human dietary intake patterns. Information on the anticipated intake and extent of use of the GM food will be required and the nutritional consequences should be assessed at average and at extreme levels of daily intake. The influences of non-nutrient components of the GM food should also be considered.

Specific additional requirements should be applied to those GM foods aimed at modifying nutritional quality. In this case, additional detailed studies on specific biomolecules, tailored according to the genetic modification(s), would be required.

The introduction of a significant nutritional change in a food may require post-market assessment to determine if the overall diet has been altered and to what degree (see Section III, C, 6.10).

Paper published by the EFSA GMO Panel concerning the use of animal feeding trials in the assessment of genetically modified food and feed

"Safety and nutritional assessment of GM plants and derived food and feed : The role of animal feeding trials". Food and Chemical Toxicology 46 (2008) S2–S70

Extract from draft EFSA guidelines for risk assessment of GM plants and derived food and feed (July 2008)

7.4. Nutritional assessment of GM food/feed

Nutritional evaluation should be provided:

- to demonstrate that introduction of the GM food/feed into the market is not nutritionally disadvantageous to humans and animals, respectively. This evaluation should include the relevance for the nutrition of new proteins, other new constituents, and changes in the levels of natural constituents in the GM plant, as well as potential alterations in the total diet of the consumer.
- to demonstrate that unintended effects of the genetic modification that were identified during hazard identification or that may be assumed to have occurred based on the preceding molecular, compositional or phenotypic analyses (see sections 7.1), have not adversely affected the nutritional value of the GM food/feed.
- to assess, where events have been stacked by conventional crossing, potential changes in nutritional value that might arise from additive, synergistic or antagonistic effects of the gene products including compositional changes. This may be particularly relevant where the combined expression of the newly introduced genes has unexpected effects on biochemical pathways. This assessment will clearly require a case-by-case approach.

Compositional analysis is the starting point and cornerstone for the nutritional assessment of food and feed material. Consensus documents prepared by OECD (OECD a) provide guidance for the minimum number of key components needed to be analysed for the respective food/feed plants. However, the analyses conducted should be determined on a case-by-case basis and may vary depending on the introduced trait.

7.4.1. Nutritional assessment of GM food

GM foods may have the potential to improve the nutritional status of individuals and populations and provide products with additional health benefits (enhanced functionality). GM foods also have the potential to introduce nutritional imbalances as a result of both expected and unexpected alterations in nutrients and other food components.

The nutritional assessment of GM foods should consider:

- composition of the GM foods with regard to the levels of nutrients and anti-nutrients (see compositional studies as described in Sections III, D 7.1.4)
- bioavailability and biological efficacy of nutrients in the foods taking into account the potential influences of transport, storage and expected treatment of the foods;
- anticipated dietary intake of the foods (see Section III, D 7.5) and resulting nutritional impact.

If the GM food has been assessed as compositionally equivalent to the non-GM comparators except for the introduced trait(s) (see Sections 7.1.2) no further studies to demonstrate nutritional equivalence are required, provided that the new trait(s) is not expected to influence the nutritional characteristics of the food.

Further nutritional testing should be carried out if the composition of the GM food has intentionally or unintentionally been modified substantially or if there are any indications for the occurrence of unintended effects based on the preceding molecular, compositional, agronomical and/or compositional analysis (see Sections 7.1). In these cases a subchronic (90-day) feeding study in rodents using the whole GM food is normally required to demonstrate whether any changes are of toxicological relevance (see Section 7.2.5). Since it starts with juvenile animals in rapid growth phase that are sensitive to effects on weight gain, this toxicity study also gives information on nutritional aspects. The necessity and design of further nutritional studies will depend on the outcome of this subchronic feeding study. Supplemental information regarding the nutritional value may be obtained from comparative growth performance studies conducted with other animal species, e.g. broiler

chickens (see Section 7.2.5 and 7.4.2), addressing the nutritional assessment of GM feed (ILSI 2003, ILSI 2007).

GM foods modified to provide additional health benefits to the consumer as compared to conventional foods, may benefit specific populations or sub-populations while others may be at risk from the same food. Whereas the assessment of the intended benefits is not within the scope of this document, the potential risks of these GM foods have to be assessed. When animal feeding studies are performed, the choice of an appropriate comparator is of particular importance for the safety assessment (see section 7.1.1).

In cases where an altered bioavailability may raise concern and needs to be established, the level of the nutrient in the food should be determined, taking into account all the different forms of the compound. The methods to test for bioavailability should be selected on a case-by-case basis and depend on the nutrient or other constituent, the food containing these constituents, as well as the health, nutritional status and dietary practices of the specific population(s) anticipated to consume the food.