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SPECIAL ISSUE

Food additives and nutrient sources added to food: developments since the creation of EFSA

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ABSTRACT

During the ten-year period since the creation of EFSA, two scientific panels of EFSA, the former Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food (AFC Panel) and the Scientific Panel on Food Additives and Nutrient Sources added to Food (ANS Panel) have been successively responsible for the safety assessment of food additives and nutrient sources added to food. They have successfully addressed a challenging number of applications and re-evaluations while developing specific risk assessment methodologies and guidance for applicants. The achievements of these scientific panels are presented, focusing on: (i) safety assessment of food additives covering new applications and re-evaluation of already authorised food additives; (ii) safety assessment of nutrient sources added to food; and (iii) safety assessment of other substances with a nutritional or physiological effect. The most important developments are highlighted; these include establishment of new guidance for food additive applications and development of more refined exposure assessment methodologies. The future challenges for the ANS Panel are anticipated to be mainly linked to its role in the re-evaluation of the safety of authorised food additives and the assessment of substances other than vitamins and minerals.

KEY WORDS

Risk, assessment, methodologies, transparency, quality, food additives, nutrient sources.

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INTRODUCTION

The Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food of EFSA (AFC) composed of 21 scientific experts was established in mid 2003 by Article 24 of the Regulation (EC) No 178/2002[3] as one of the expert panels of the European Food Safety Authority (EFSA). This Panel was responsible for the scientific evaluation of food additives and nutrient sources added to food, as well as of flavourings, enzymes, processing aids and food contact materials, until its replacement in July 2008 by two separate Panels: the Scientific Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids (CEF) and the Scientific Panel on Food Additives and Nutrient Sources added to Food (ANS).

During the ten-year period since the creation of EFSA, the former AFC Panel and the ANS Panel have made an important contribution to the safety assessment of food additives and nutrient sources added to food, assessing numerous substances proposed for these purposes and developing specific methodologies and guidance.

1. ASSESSMENT OF THE SAFETY OF FOOD ADDITIVES

Although it is not necessarily reflected by the number of scientific opinions on the safety of food additives that have been adopted by the AFC and ANS Panels (approximately 90 scientific opinions and statements in total), these two Panels have devoted a substantial part of their work to the assessment of food additives.

1.1 Guidance on food additive submissions

In order to ensure the consistent scientific quality of the content of food additive applications, the AFC and ANS Panels endorsed in 2003 and 2008 respectively the guidance on submission for food additive evaluations established in 2001 by the former Scientific Committee on Food (SCF) of the European Commission (SCF, 2001). More recently, the ANS Panel has developed revised and updated guidance for applicants.

In July 2009, a statement on data requirements for the evaluation of food additive applications was adopted by the ANS Panel, describing a comprehensive approach for compiling both the administrative and the scientific requirements of applications (EFSA, 2009a). This statement also introduced a new requirement: to provide documentation of the literature search strategy used to gather data in the application and its outcome.

In June 2012, the ANS Panel adopted new guidance for submission for food additive evaluations (EFSA Panel on Food Additives and Nutrient Sources added to Food (ANS), 2012) to replace the one established by the SCF (2001). This new guidance takes into account the evolution of science and makes explicit reference to several key opinions related to innovative risk assessment procedures approved by EFSA's Scientific Committee (EFSA, 2005, 2007a, 2009b,c, 2012; EFSA Scientific Committee (SC), 2009, 2011a,b, 2012a,b,c). In contrast to the 2001 SCF guidance document, which described core and supplementary toxicological studies, the new guidance of the ANS Panel describes a tiered approach which balances data requirements against the risk, taking account of other factors such as use and animal welfare. The tiered approach initially uses less complex tests to obtain hazard data. These are then evaluated to determine if they are sufficient for risk assessment or, if not, they are used to assist the design of studies at higher tiers. The intention is that applicants will be able to identify more easily relevant data needs for their dossier, which will allow assessment of risks to humans from the intended use and strengthen the scientific basis for the assessment. This approach takes animal welfare into consideration by adopting animal testing strategies in line with the "3 Rs" "replacement, refinement, reduction" (de Boom et al., 2005).

[3] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 1.2.2002, p. 1-24.

1.2 Assessment of exposure to food additives

The ANS Panel has recently developed a new approach for the assessment of exposure to food additives, departing from the methodology originally developed by the European Commission and the Member States for post-marketing surveillance. This methodology, presented in the report from the European Commission on dietary food additive intake in the European Union (EU) (EC, 2001), followed a three-tiered approach. Tier 1 started with crude estimates (Budget method), based on theoretical food consumption data and the maximum intended use levels of the food additive (SCOOP report) (EC, 1998). Tier 2 estimates were calculated by using data on actual food consumption and the maximum intended use level of the food additive, thus representing a refined estimate of potential exposure compared to Tier 1. Tier 3 estimates (further refinement of exposure estimates at Tier 2) were calculated by the panel by using data on actual food consumption and normal use levels of the food additive (highest normal use levels reported by the food industry or post-marketing surveillance by food enforcement authorities in the Member States). This approach was applied to the re-evaluation of already authorised food additives until February 2012.

Overall, the Panel considered that Tier 1 of this tiered approach was no longer appropriate and that the exposure assessment should be made according to two scenarios: maximum permitted or proposed levels of use and normal use levels (when applicable). Taking advantage of the availability in the EFSA Comprehensive Food Consumption Database (EFSA, 2011), of more refined consumption data, covering a growing number of Member States, the Working Group on Exposure Assessment of the ANS Panel, with EFSA support, has developed a specific exposure assessment tool: the Food Additive Intake Model (FAIM). This tool is foreseen to be made publicly available on the EFSA website in September 2012 following consultation of the European Commission, Member States and food industry stakeholders. The exposure assessment tool will provide exposure estimates by combining the data from the applicant on the proposed uses and use levels for a new authorisation (**Scenario 1**) with summary data calculated from the EFSA Comprehensive Food Consumption Database. For a modification of an existing authorisation (**Scenario 2**) the FAIM tool will provide exposure estimates by combining the data on the proposed new uses and use levels and the data on the use levels of the existing authorisation with summary data from the EFSA Comprehensive Food Consumption Database (EFSA, 2011).

1.3 Re-evaluation of authorised food additives

The re-evaluation of authorised food additives constitutes the most important area of work for the ANS Panel, over and above the development of guidance documents and the assessment of new applications for food additives. Two strategies have been developed for this task. In 2005 the AFC Panel designed a first strategy to identify the food additives that needed to be fully or partially re-evaluated. Due to the age of the original evaluations, food colours were identified as the first priority. According to this strategy, several reasons could trigger the need for a full re-evaluation: (i) potential exceedance of the Acceptable Daily Intake (ADI) by the exposure; (ii) quality of the data used in the original evaluation; and (iii) availability of new data with results differing from those previously considered. Following the European legislative developments related to food additives and especially the Commission Regulation (EU) No 257/2010[4], setting up a programme for the re-evaluation of approved food additives, the ANS Panel developed a new strategy to take account of the requirement for full re-evaluation of all authorised food additives. This second strategy, adopted on 13 April 2010[5] is based on three objectives: (i) re-evaluate in accordance with Commission Regulation (EU) No 257/2010; (ii) re-evaluate the food additives per group according to the main functional class to which they belong; and (iii) follow currently applicable risk assessment practice. The strategy defines a seven-step procedure as well as criteria for scheduling the different evaluations among a functional class.

[4] Commission Regulation (EU) No 257/2010 of 25 March 2010 setting up a programme for the re-evaluation of approved food additives in accordance with Regulation (EC) No 1333/2008 of the European Parliament and of the Council on food additives. OJ L 80, 26.3.2010.

[5] Minutes of the 14th plenary meeting of the ANS Panel: http://www.efsa.europa.eu/en/events/event/ans100413-m.pdf

The first food additive to be re-evaluated was the colour Red 2G (E 128) in July 2007 (EFSA, 2007b). The Panel concluded that there was a safety concern because of the potential carcinogenicity of aniline, its main metabolite. Since 2007, the safety of 28 other food additives has been re-evaluated, out of a total of approximately 300 authorised substances.

The re-evaluation of authorised food additives has proven to be difficult, mainly because of the limited data available and the age and quality of the available data. There has been a need to make several public calls to collect the data on which to base the risk assessment, without assurance that enough data will be provided by the interested parties. This constitutes the main source of challenges for the ANS Panel in the coming years.

2. ASSESSMENT OF THE SAFETY OF NUTRIENT SOURCES ADDED TO FOOD

Regulation (EC) No 1925/2006[6] defines a framework for the authorisation of sources of vitamins and minerals and of certain other substances which can be used in food (these are usually referred to as nutrient sources). In an unprecedented effort, with almost 300 opinions and statements covering 533 applications for sources of vitamins and minerals corresponding to 344 different substances adopted between 2006 and 2009, the AFC and the ANS Panels have established a standard for the assessment of the safety of nutrient sources and the bioavailability of the nutrients from their respective sources. This work was linked to the legal requirement to assess the safety of all the nutrient sources to be used in food supplements defined in the Directive (EC) No 2002/46[7] on food supplements.

As with food additives, the approach of risk assessment of nutrient sources followed by the two Panels and especially by the ANS Panel emphasises the importance of an unequivocal chemical characterisation of the compounds assessed, a consistent approach of exposure assessment that covers all sources of dietary exposure and a thorough consideration of biological data. Illustrations of these aspects can be found in the opinions on selenium yeasts (EFSA, 2008), calcium ascorbate with a content of threonate (EFSA, 2007c) and orotates (EFSA, 2009d). However, in several cases, the data provided for a number of nutrient sources, which had been granted Member State derogations in 2005, were extremely sparse, and the Panel was unable to assess their safety.

In the last two years the work of the Panel in the field of nutrient sources has decreased substantially, since most of the sources of vitamins and minerals have already been evaluated and only a limited number of new applications have been received.

3. OTHER SUBSTANCES ASSESSED BY THE AFC AND ANS PANELS

Within the scope of the ANS Panel and previously in the scope of the AFC Panel, there is another field for risk assessment which is less well known. These are the "other substances" with nutritional or physiological effects defined in Regulation (EC) No 1925/2006 and especially those covered by Article 8 of that Regulation, on substances prohibited, restricted or under EU scrutiny. The low profile is due to the fact that very few of these assessments have been made so far and that the implementing measures for Article 8 of Regulation (EC) No 1925/2006 have only been established in April 2012[8]. However, the few risk assessments of such substances done by the AFC and ANS Panels have been important in the sense that they related to substances subject to scientific and/or political controversy[9].

[6] Regulation (EC) No 1925/2006 of the European Parliament and of the Council of 20 December 2006 on the addition of vitamins and minerals and of certain other substances to foods. OJ L 404, 30.12.2006.

[7] Directive 2002/46/EC of the European Parliament and of the Council of 10 June 2002 on the approximation of the laws of the Members States relating to food supplements. OJ L 183, 12.7.2002.

[8] Commission Implementing Regulation (EC) No 307/2012 establishing implementing rules for the application of Article 8 of Regulation (EC) No 1925/2006 of the European Parliament and of the Council on the addition of vitamins and minerals and of certain other substances to foods. OJ L 102/2, 12.04.2012.

[9] L-carnitine (EFSA, 2003), creatine (EFSA, 2004), taurine and D-glucurono-γ-lactone as constituents of so-called "energy drinks" (EFSA, 2009e).

It can also reasonably be anticipated that the workload in this field will grow in the future. Anticipating the publication of these implementing measures of Article 8 of Regulation (EC) No 1925/2006, the first two requests made by the European Commission for such safety evaluations were received by EFSA in January 2012 related to substances linked to the use of extracts from certain plants (*Ephedra* species and *Pausinystalia yohimbe)*.

The number of related assessments might constitute a source of challenge in the future but the main challenge will be to assess substances and especially extracts of plants which are not necessarily chemically well-characterised and for which the available biological data may be very limited.

CONCLUSIONS

In the last ten years, through more than 60 plenary Panel meetings and more than 100 dedicated working group meetings, the two Scientific Panels of EFSA which have been responsible for the safety assessment of food additives and nutrient sources added to food (AFC Panel and ANS Panel) have successfully addressed a challenging number of new applications and re-evaluations while developing specific risk assessment methodologies and guidance for applicants.

Their work has been characterised by a risk assessment approach which emphasises the unequivocal chemical characterisation of the compounds assessed, a consistent approach to exposure assessment that covers all sources of dietary exposure and a thorough consideration of biological data.

The future challenges for the ANS Panel are anticipated to be linked mainly to the re-evaluation programme of authorised food additives and to the assessment of the substances falling under the scope of Article 8 of Regulation (EC) No 1925/2006.

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