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SCIENTIFIC OPINION

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Safety of a feed additive consisting of ethyl cellulose for all animal species (Association Management & Regulatory Services Ltd)

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Abstract

Following a request from the European Commission, the EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) was asked to deliver a scientific opinion on the safety of ethyl cellulose as a technological feed additive for all animal species. In its previous opinions on the safety and efficacy of the product, the FEEDAP Panel could not conclude on proper identification and characterisation as required for a feed additive. The occurrence of potential toxic impurities could also not be assessed. Based on the new data provided, the feed additive ethyl cellulose was properly identified and characterised and was shown to meet the specifications set for the food additive. Therefore, the conclusions of the safety assessment reached in the previous opinions for ethyl cellulose meeting the food additive specifications, apply to the ethyl cellulose under assessment as a feed additive. The feed additive is considered safe for all animal species, the consumer and the environment. In the absence of data, the FEEDAP Panel is not in the position to conclude on the safety for the user.

KEYWORDS

characterisation, ethyl cellulose, safety, technological additive

CONTENTS

1 | INTRODUCTION

1.1 | Background and terms of reference as provided by the European Commission

Regulation (EC) No 1831/2003[1] establishes the rules governing the Community authorisation of additives for use in animal nutrition and, in particular, Article 9 defines the terms of the authorisation by the Commission.

The applicant, Association Management & Regulatory Services Ltd, on behalf of Evonik Degussa and DSM, is seeking a Community authorisation of ethyl cellulose E 463 as a feed additive to be used as a stabiliser for all animal species (Table 1).

TABLE 1 Description of the substances.

Category of additive	Technological additives
Functional group of additive	Stabilisers
Description	Ethyl cellulose E 462
Target animal category	All animal species
Applicant	Association Management & Regulatory Services Ltd, on behalf of Evonik Degussa and DSM
Type of request	New opinion

On 2 July 2020, the Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) of the European Food Safety Authority (EFSA), in its opinion on the safety and efficacy of the product, could not conclude on proper identification and characterisation as required for a feed additive. The occurrence of potential toxic impurities could also not be assessed. After evaluating the data, it also reclassified the additive as a stabiliser and not a binder.

The Commission gave the possibility to the applicant to submit supplementary information and data in order to complete the assessment and to allow a revision of the EFSA's opinion. The new data have been received on 5 May 2021 and the applicant has been requested to transmit them to EFSA as well.

In view of the above, the Commission asks the Authority to deliver a new opinion on ethyl cellulose E 462 as a feed additive for all animal species based on the additional data submitted by the applicant, in accordance with Article 29(1)(a) of Regulation (EC) No 178/2002.[2]

1.2 | Additional information

Ethyl cellulose (E462) is currently authorised as a feed additive for all animal species, without a minimum and a maximum content.

EFSA issued one opinion on the safety and efficacy of ethyl cellulose (E 462) (EFSA FEEDAP Panel, 2020).

The EFSA Panel on Food Additives and Nutrient Sources added to Food (ANS) adopted in 2017 an opinion on the re-evaluation of celluloses E 460(i), E 460(ii), E 461, E 462, E 463, E 464, E 465, E 466, E 468 and E 469 as food additives (EFSA ANS Panel, 2018) and the EFSA Panel on Food Additives and Flavourings (FAF) adopted in 2022 an opinion on the re-evaluation of sodium carboxy methyl cellulose (E 466) as a food additive in foods for infants below 16 weeks of age and follow-up of its re-evaluation as a food additive for uses in foods for all population groups (EFSA FAF Panel, 2022).

2 | DATA AND METHODOLOGIES

2.1 | Data

The present assessment is based on data submitted by the applicant in the form of supplementary information[3] to previous applications of the same products.[4]

The FEEDAP Panel used the data provided by the applicant together with data from other sources, such as previous risk assessments by EFSA or other expert bodies, peer-reviewed scientific papers, other scientific reports, to deliver the present output.

[1]Regulation (EC) No 1831/2003 of the European Parliament and of the Council of 22 September 2003 on the additives for use in animal nutrition. OJ L 268, 18.10.2003, p. 29.
[2]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.
[3]FEED dossier reference: EFSA-Q-2021-00734.
[4]FEED dossier reference: FAD-2011-0023.

2.2 | Methodologies

The approach followed by the FEEDAP Panel to assess the safety and the efficacy of active substance (trade name of the product) is in line with the principles laid down in Regulation (EC) No 429/2008[5] and the relevant guidance documents: Guidance on the identity, characterisation and conditions of use of feed additives (EFSA FEEEDAP Panel, 2017), Guidance on technical requirements for regulated food and feed product applications to establish the presence of small particles including nanoparticles (EFSA Scientific Committee, 2021), Guidance on risk assessment of nanomaterials to be applied in the food and feed chain: human and animal health (EFSA Scientific Committee, 2021).

3 | ASSESSMENT

Dossier	***LINK TO DOSSIER SHAREPOINT***
Previous opinion on the same product	Previous opinion 2020
Previous dossier	Link to DMS
Authorisation	Feed additive Link to Regulation(s) Food additive
Opinions from other Panels/bodies	ANS Opinion sodium carboxy methyl cellulose (E 466) for NANO issues

Ethyl cellulose E 462 is intended to be used as a technological additive (functional group: stabilisers) in feed for all animal species with no minimum or maximum content.

In its previous opinions (EFSA FEEDAP Panel, 2020), the Panel was not in the position to properly identify and characterise the additive. No analytical data to support the identification of the active substance and the batch-to-batch consistency of the additive, as well as information on dusting potential of the additive and its particle size distribution, was made available. In addition, owing the lack of analytical data, the occurrence of potential toxic impurities in the additive could not be assessed. In the absence of a proper identification, the FEEDAP Panel limited its conclusion on safety to ethyl cellulose meeting food additive specifications. The Panel concluded that ethyl cellulose is safe for all animal species, consumers and the environment, but could not conclude on the safety for users due to the absence of data.

In order to address the limitations in the data submitted in the original application, the applicant provided new data on the characterisation of the additive and on its impurities.

3.1 | Characterisation

Ethyl cellulose is identified with the single Chemical Abstracts Service (CAS) number 9004-57-3 and the European Inventory of Existing Chemical Substances (EINECS) number 232-674-9. It is manufactured reacting partially depolymerised cellulose with ethyl chloride

Ethyl cellulose is in the form of white to off-white granules or powder and is insoluble in water.

The feed additive ethyl cellulose is claimed to be manufactured to meet the specifications set for its use as a food additive,[6] i.e. ethoxyl groups ≥ 44% and ≤ 50%, loss on drying < 3% and sulfated ash < 0.4%. In the original application, no evidence of the identity of the active substance in the additive was provided, as well as no analyses of sulfated ash, impurities, dusting potential of the additive; only partial information on particle size distribution was available.

In the present application, the identity of the active substance was confirmed by the analysis by infrared (IR) spectroscopy of seven recent batches of the additive.[7] The analysis of three batches of the additive[8] showed the following results: ethoxyl groups 48.4%–48.9%, loss on drying 0.5%–2.6% and sulfated ash 0.3% in the three batches, which demonstrated compliance with the proposed specifications for use as a food additive.

Three batches of the additive[9] were analysed for cadmium, lead, mercury and arsenic concentrations, showing the following results: cadmium < limit of detection (LOD, two samples) – 0.2 mg/kg, lead < LOD (two samples) – 1 mg/kg, mercury < LOD and arsenic < LOD (one sample) – 3 mg/kg.

Polychlorinated dibenzo-*p*-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), dioxin-like polychlorinated biphenyls (DL-PCBs) and non-DL-PCBs were analysed in three batches of the additive. The calculated upper bound (UB)

[5]Commission Regulation (EC) No 429/2008 of 25 April 2008 on detailed rules for the implementation of Regulation (EC) No 1831/2003 of the European Parliament and of the Council as regards the preparation and the presentation of applications and the assessment and the authorisation of feed additives. OJ L 133, 22.5.2008, p. 1.

[6]Commission Regulation (EU) No 231/2012 of 9 March 2012 laying down specifications for food additives listed in Annexes II and III to Regulation (EC) No 1333/2008 of the European Parliament and of the Council Text with EEA relevance. OJ L 83,22.3.2012, p. 1–295.

[7]Technical dossier/Annex 8.

[8]Supplementary Information September 2023/Annex II.

[9]Supplementary Information September 2023/Annex II. Limits of detection: cadmium 0.5 mg/kg; lead 0.5 mg/kg; mercury 0.5 mg/kg; arsenic 0.5 mg/kg.

concentration was < 0.345 ng WHO_{2005}-TEQ/kg for the sum of PCDD/Fs, and <.552 ng WHO_{2005}-TEQ/kg for the sum of PCCD/Fs and DL-PCBs. The UB for the sum of non-DL-PCBs ranged between 1.95 and 2.42 μg/kg.[10] In addition, in two batches of the raw pulp material from which ethyl cellulose is derived, the calculated UB concentration was < 0.07 ng WHO_{2005}-TEQ/kg for the sum of PCDD/Fs and < 0.113 ng WHO_{2005}-TEQ/kg for the sum of PCDD/Fs and DL-PCBs. The UB for the sum of non-DL-PCBs was < 0.41 μg/kg.[11]

The same three batches of the additive[12] and the two batches of raw pulp material[13] were analysed for aflatoxins (B1, B2, G1, G2) concentration, showing values below the limit of quantification (LOQ) of 0.1 μg/kg. The three batches of the additive were also analysed and for pesticides (organochlorine pesticides and pyrethroids, organophosphorus pesticides) which were not detected in any sample.

Three batches of the additive[14] were analysed for microbiological contamination by determination of *Escherichia coli* and *Salmonella* spp. with no detection in 1 g and in 25 g, respectively. *Pseudomonas aeruginosa* and *Staphylococcus aureus* were also absent in 1 g of each batch of the additive. Total aerobic microbial counts and total yeast and moulds counts were <100 colony-forming unit (CFU).[15]

The detected amounts of the above undesirable substances and the microbial impurities do not raise safety concerns.

The dusting potential of three batches of the ethyl cellulose was determined using the Stauber-Heubach method and showed values on average of 3211 mg/m^3 (range 1138–4656 mg/m^3) (mg airborne dust per m^3 of air).

Three batches of the additive[16] were analysed for particle size distribution by laser diffraction. The results showed that 0.57%–2.80% of the particles had a size below 98 μm, 0.38%–1.22% of the particles was below 52 μm and 0.14%–0.18% of the particles was below 10 μm. In addition, the applicant analysed the same batches with scanning electron microscopy (SEM). However, in line with the opinion of the FAF Panel on the re-evaluation of sodium carboxy methyl cellulose (E 466) (EFSA FAF Panel, 2022), the FEEDAP Panel notes that 'currently no standardised methods are available for the polysaccharide thickening and gelling agents used as food additives, such as sodium carboxy methyl cellulose (E 466) to measure the particle size distribution by number'.

The FAF Panel further considered that: 'Based on the data on particle size distribution […] and the criteria set in the relevant EFSA Scientific Committee Guidance (EFSA Scientific Committee, 2021), the Panel concluded that the presence of small particles, including nanoparticles, cannot be confirmed or excluded in the pristine food additive'; in addition, 'The Panel noted, however, that polysaccharide thickening, and gelling agents used as feed additives, to exert their technical function in general swell in liquid environments. This also applies to carboxymethyl cellulose. The FAF Panel considers that carboxymethyl cellulose will not be present in the gastrointestinal tract in the pristine form taking into account the capacity to absorb and swell in water, and the volume of fluid in the stomach and gastrointestinal tract'. The FEEDAP Panel considers that the above would apply also to ethyl cellulose used as a feed additive.

3.2 | Safety

In its previous opinion (EFSA FEEDAP Panel, 2020), the FEEDAP Panel concluded that a proper identification and characterisation of ethyl cellulose as a feed additive was not possible. Therefore, the FEEDAP Panel could only assess the safety of ethyl cellulose meeting the specifications set for its use as a food additive. In particular, the Panel concluded that ethyl cellulose meeting the specifications set for its use as a food additive (i) is considered safe for all animal species, (ii) is of no concern for consumer safety, (iii) is safe for the environment, (iv) in the absence of data, the FEEDAP Panel was not in the position to conclude on the safety for the user.

The FEEDAP Panel considers that ethyl cellulose has been fully characterised in the current application and complies with the specifications set for its use as a food additive. Therefore, the conclusions on the safety of ethyl cellulose reached in the previous opinion apply to ethyl cellulose as a feed additive.

4 | CONCLUSIONS

Based on the data provided, the feed additive ethyl cellulose was properly identified and characterised and was shown to meet the specifications set for the food additive. Therefore, the conclusions of the safety assessment reached in the previous opinion for ethyl cellulose meeting the food additive specifications, apply to ethyl cellulose as a feed additive. The additive is considered safe for all animal species, the consumer safety and the environment. In the absence of data, the FEEDAP Panel is not in the position to conclude on the safety for the user.

[10]Supplementary Information September 2023/Annex III. Upper bound concentrations are calculated on the assumption that all values of the different congeners below the limit of quantification are equal to the limit of quantification. TEQ = toxic equivalency factors for dioxins, furans and dioxin-like PCBs established by WHO in 2005 (Van den Berg et al., 2006).

[11]Technical dossier/Annex 5 and Annex 6.

[12]Supplementary Information September 2023/Annex III.

[13]Technical dossier/Annex 4.

[14]Technical dossier/Annex 3 and Supplementary Information September 2023/Annex II.

[15]Supplementary Information September 2023/Annex II.

[16]Supplementary Information September 2023/Annex I.

ABBREVIATIONS

ANS	EFSA Scientific Panel on Additives and Nutrient Sources added to Food
CAS	Chemical Abstracts Service
CFU	colony-forming unit
DL	dioxin-like
DM	dry matter
EINECS	European Inventory of Existing Chemical Substances
FAF	EFSA Panel on Food Additives and Flavourings
FEEDAP	EFSA Scientific Panel on Additives and Products or Substances used in Animal Feed
IR	infrared
LOD	limit of detection
LOQ	limit of quantification
PCBs	polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-*p*-dioxins
PCDFs	polychlorinated dibenzofurans
SEM	Scanning electron microscopy
TEQ	toxic equivalent
UB	upper bound
WHO	World Health Organization

CONFLICT OF INTEREST

If you wish to access the declaration of interests of any expert contributing to an EFSA scientific assessment, please contact interestmanagement@efsa.europa.eu.

REQUESTOR

European Commission

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