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Safety and efficacy of a feed additive consisting of an essential oil derived from the flowering aerial parts of *Mentha arvensis* L. (cornmint oil) for use in all animal species (FEFANA asbl)

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Safety and efficacy of a feed additive consisting of an essential oil derived from the flowering aerial parts of *Mentha arvensis* L. (cornmint oil) for use in all animal species (FEFANA asbl)

EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) |

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The declarations of interest of all scientific experts active in EFSA's work are available at <https://open.efsa.europa.eu/experts>.

Abstract

Following a request from the European Commission, EFSA was asked to deliver a scientific opinion on the safety and efficacy of an essential oil from the flowering aerial parts of *Mentha arvensis* L. (cornmint oil) when used as a sensory additive in feed and in water for drinking for all animal species. The EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) concluded that the additive under assessment is considered safe up to the maximum use level of 8.8 mg/kg complete feed for all animal species. The FEEDAP Panel considered that the use of the additive in water for drinking is safe provided that the total daily intake of the additive does not exceed the daily amount that is considered safe when consumed via feed. The use of the additive in animal feed under the proposed conditions of use is safe for the consumer and the environment. Regarding user safety, the essential oil under assessment should be considered as an irritant to skin and eyes and as a dermal and respiratory sensitiser. Exposure of users by any route is considered a risk. Since the flowering aerial parts of *M. arvensis* L. and its preparations were recognised to flavour food and its function in feed would be essentially the same as that in food, no further demonstration of efficacy was considered necessary.

KEYWORDS

cornmint oil, efficacy, flavouring compounds, *Mentha arvensis* L., menthol, menthone, safety, sensory additives

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1 | INTRODUCTION

1.1 | Background and Terms of Reference

Regulation (EC) No 1831/2003¹ establishes the rules governing the Community authorisation of additives for use in animal nutrition. In particular, Article 4(1) of that Regulation lays down that any person seeking authorisation for a feed additive or for a new use of feed additive shall submit an application in accordance with Article 7. In particular, Article 10(2) of that Regulation specifies that for existing products within the meaning of Article 10(1), an application shall be submitted in accordance with Article 7, within a maximum of seven years after the entry into force of this Regulation.

The European Commission received a request from the Feed Flavourings Authorisation Consortium European Economic Interest Grouping (FFAC EEIG)² for authorisation/re-evaluation of 41 additives (king of bitter extract, thyme leaved gratiola tincture, devils claw extract, devils claw tincture, lavender oil, lavender tincture, spike lavender oil, melissa oil, balm leaves extract, mentha arvensis/corn mint oil, pennyroyal oil, spearmint oil, peppermint oil, peppermint tincture, basil oil, basil tincture, olive extract, marjoram oil, oregano oil, oregano tincture, patchouli oil, rosemary oil, rosemary oleoresin, rosemary extract, rosemary tincture, Spanish sage oil, sage oil, sage tincture, clary sage oil, savory summer oil, savory summer tincture, Pau darco tincture, thymus origanum oil, thyme oil, thyme oleoresin, thyme extract, thyme tincture, lilac chastetree extract, lilac chastetree tincture, Spanish marjoram oil and wild thyme tincture) belonging to botanically defined group (BDG) 01 – Lamiales, when used as a feed additive for all animal species (category: sensory additives; functional group: flavouring compounds). During the assessment, the applicant withdrew the applications for 12 additives.³ These additives were deleted from the register of feed additives.⁴ In addition, during the course of the assessment, the application was split and the present opinion covers only one out of the remaining 29 additives under application: peppermint oil from *Mentha arvensis* L. for use in all animal species.

The remaining 28 additives belonging to botanically defined group (BDG) 01 – Lamiales, under application are assessed in separate opinions.

According to Article 7(1) of Regulation (EC) No 1831/2003, the Commission forwarded the application to the European Food Safety Authority (EFSA) as an application under Article 4(1) (authorisation of a feed additive or new use of a feed additive) and under Article 10(2) (re-evaluation of an authorised feed additive). The particulars and documents in support of the application were considered valid by EFSA as of 1 June 2011.

According to Article 8 of Regulation (EC) No 1831/2003, EFSA, after verifying the particulars and documents submitted by the applicant, shall undertake an assessment in order to determine whether the feed additive complies with the conditions laid down in Article 5. EFSA shall deliver an opinion on the safety for the target animals, consumer, user and the environment and on the efficacy of the feed additive consisting of cornmint oil from *M. arvensis*, when used under the proposed conditions of use (see Section 3.3.3).

1.2 | Additional information

Cornmint oil from *M. arvensis* L. is currently authorised as a feed additive according to the entry in the European Union Register of Feed Additives pursuant to Regulation (EC) No 1831/2003 (2b natural products – botanically defined). It has not been assessed as a feed additive in the EU.

2 | DATA AND METHODOLOGIES

2.1 | Data

The present assessment is based on data submitted by the applicant in the form of a technical dossier⁵ in support of the authorisation request for the use of cornmint oil from *M. arvensis* as a feed additive. The dossier was received on 26 June 2025 and the general information and supporting documentation are available on Open.EFSA at <https://open.efsa.europa.eu/questions/EFSA-Q-2025-00406>.⁶

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 and experts' knowledge, to deliver the present output.

¹Regulation (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.

²On 13/03/2013, EFSA was informed by the applicant that the applicant company changed to FEFANA asbl, Avenue Louise 130 A, Box 1, 1050 Brussels, Belgium.

³Thyme leaves gratiola tincture, spike lavender oil, melissa oil, pennyroyal oil, basil oil and savory summer oil (27 February 2019); Spanish majoram oil (28 September 2023); lilac chastetree extract and savory summer tincture (8 July 2024); devils claw extract (wb), balm leaves extract (sb), olive extract (sb) (16 December 2024).

⁴Register of feed additives, Annex II, withdrawn by OJ L162, 10.05.2021, p. 5.

⁵Dossier reference: FAD-2010-0137.

⁶The original application EFSA-Q-2010-0137 was split on 26/06/2025 and a new EFSA-Q-2025-00406 was generated.

Many of the components of the essential oil under assessment have been already evaluated by the FEEDAP Panel as chemically defined flavourings (CDGs). The applicant submitted a written agreement to reuse the data submitted for the assessment of chemically defined flavourings (dossiers, publications and unpublished reports) for the risk assessment of preparations belonging to BDG 01, including the current one under assessment.⁷

EFSA has verified the European Union Reference Laboratory (EURL) report as it relates to the methods used for the control of the phytochemical markers in the additive. During the assessment, upon request of EFSA, the EURL issued two partial reports.⁸ The additive under assessment is included in the second partial report. In particular, the EURL recommended a method based on gas chromatography with flame ionisation detection (GC–FID) for the quantification of the phytochemical markers *menthol* and *trans-menthone* in *cornmint oil*.⁹

2.2 | Methodologies

The approach followed by the FEEDAP Panel to assess the safety and the efficacy of cornmint oil from *M. arvensis* is in line with the principles laid down in Regulation (EC) No 429/2008¹⁰ and the relevant guidance documents: Guidance on safety assessment of botanicals and botanical preparations intended for use as ingredients in food supplements (EFSA Scientific Committee, 2009), Compendium of botanicals,¹¹ Guidance on the identity, characterisation and conditions of use of feed additives (EFSA FEEDAP Panel, 2017a), Guidance on the safety of feed additives for the target species (EFSA FEEDAP Panel, 2017b), Guidance on the assessment of the safety of feed additives for the consumer (EFSA FEEDAP Panel, 2017c), Guidance on the assessment of the safety of feed additives for the environment (EFSA FEEDAP Panel, 2019), Guidance on the assessment of the safety of feed additives for the users (EFSA FEEDAP Panel, 2023), Guidance on the assessment of the efficacy of feed additives (EFSA FEEDAP Panel, 2024), Guidance document on harmonised methodologies for human health, animal health and ecological risk assessment of combined exposure to multiple chemicals (EFSA Scientific Committee, 2019a), Statement on the genotoxicity assessment of chemical mixtures (EFSA Scientific Committee, 2019b), Guidance on the use of the Threshold of Toxicological Concern approach in food safety assessment (EFSA Scientific Committee, 2019c).

3 | ASSESSMENT

The additive under assessment, cornmint oil, is an essential oil obtained from the flowering aerial parts of *M. arvensis* L. and is intended for use as a sensory additive (functional group: flavouring compounds) in feed and in water for drinking for all animal species.

3.1 | Origin and extraction

M. arvensis L. is a perennial herbaceous plant belonging to the family Lamiaceae. It has a widespread distribution in temperate regions, being native to Europe, India and other Asian countries, subsequently introduced into North America and cultivated in different subspecies and varieties for commercial purposes in Brazil, India and China. Its common names corn mint and field mint reflect the plants preference for open ground. It is also referred to as the wild mint. *M. arvensis* spreads by means of creeping rhizomes from which develop upright reddish stems (up to 60 cm), carrying slightly hairy green leaves in opposite pairs. It produces pale purple flowers in season.

M. arvensis L. is a name that refers to a highly polymorphic plant group that has been repeatedly reworked in the systematic literature. As a result, there are over 400 descriptions of infraspecifics applied to the species. Currently none of these descriptions are considered sufficiently robust to have taxonomic value. The majority have been retained within the broad definition of *M. arvensis* and are considered synonyms. The remaining have been re-assigned and are now considered synonyms of the closely related species *Mentha canadensis* L. (also sometimes called cornmint, Japanese cornmint or American cornmint). The latter includes *M. arvensis* L. var. *glabrata* (Benth.) Fern. and *M. arvensis* var. *piperascens* Malinv. ex Holmes, from which cornmint oils frequently originate (Burdock, 2009).

The additive is extracted from the fresh flowering aerial parts of different subspecies and varieties of *M. arvensis* by steam distillation. The volatile constituents are condensed and then separated from the aqueous phase by decantation. The essential oil may be partially dementholised (by crystallisation of menthol, filtration or centrifugation). The oil may also be subject to rectification (fractional distillation) and fractions obtained mixed with the essential oil to reach a specified profile.

⁷Technical dossier/Supplementary information August 2024/Letter dated 27/8/2024.

⁸Additives included in the first partial report: Spanish sage oil, peppermint oil, thymus origanum oil, patchouli oil, clary sage oil, lavender oil and sage oil; additives included in the second partial report: cornmint oil, spearmint oil, thyme oil, rosemary oil, marjoram oil, rosemary tincture, basil tincture, lavender tincture, peppermint tincture, sage tincture and wild thyme tincture.

⁹Evaluation report received on 18/6/2025 and available on the EU Science Hub https://joint-research-centre.ec.europa.eu/reports-and-technical-documentation/fad-2010-0137_en.

¹⁰Commission 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.

¹¹Online version: <https://www.efsa.europa.eu/en/data-report/compendium-botanicals>.

3.2 | Uses other than feed flavouring

There is no specific EU authorisation for any *M. arvensis* preparation when used to provide flavour in food. However, according to Regulation (EC) No 1334/2008¹² flavouring preparations produced from food, may be used without an evaluation and approval as long as ‘they do not, on the basis of the scientific evidence available, pose a safety risk to the health of the consumer and their use does not mislead the consumer.’

‘Mint oil, partly dementholised (*Menthae arvensis* aetheroleum partim mentholum depletum)’ from *M. canadensis* L. (synonyms: *Mentha arvensis* L. var. *glabrata* (Benth.) Fern., *Mentha arvensis* var. *piperascens* Malinv. ex Holmes) is described in a monograph of the European Pharmacopoeia 12.1 (PhEur, 2026) for medicinal uses.

‘Mint oil’ (*Menthae arvensis* aetheroleum) from the flowering tops of *Mentha arvensis* var. *piperascens* is described in a monograph of the European Medicines Agency (EMA, 2001) for veterinary medicinal uses.

3.3 | Characterisation

3.3.1 | Characterisation of cornmint oil

The essential oil is obtained from the flowering aerial parts of *M. arvensis* sourced from Brazil, China and India. It is a clear, pale-yellow liquid with a characteristic minty odour. Cornmint oil is identified with the single Chemical Abstracts Service (CAS) number 68917-18-0, the European Community (EC) number 614-794-7,¹³ the Flavor Extract Manufacturers Association (FEMA) number 4219 and the Council of Europe (CoE) number 492.

In 10 batches of the additive, the refractive index (20°C) fell within the range of 1.457–1.461. In eight batches the density (20°C) ranged between 902 and 904 kg/m³, and the optical rotation (20°C) between –25.72° and –24.96°.¹⁴

For cornmint oil, the product specifications used by the applicant are based on the standard developed by the International Organisation for Standardization (ISO) 9776:1999 for oil of *M. arvensis*, partially dementholised (*M. arvensis* L. var. *piperascens* Malinv. and var. *glabrata* Holmes, both names considered synonyms of *M. canadensis* L., which is the currently accepted name according to World Flora Online)¹⁵ and by the European Pharmacopoeia (PhEur, 2026) 01/2008:1838 for mint oil, partly dementholised (*M. arvensis* aetheroleum partim mentholum depletum),¹⁶ adapted to reflect the concentrations of selected volatile components. Four components contribute to the specifications as shown in Table 1, with menthol and menthone selected as the phytochemical markers. Analysis of 13 batches of the additive showed compliance with the specifications when analysed by GC–FID and expressed as percentage of gas chromatographic peak area (% GC area).¹⁷

TABLE 1 Constituents of cornmint oil as defined by specifications, and batch to batch variation based on the analysis of 13 batches by gas chromatography with flame ionisation detector (GC–FID). The content of each constituent is expressed as the area per cent of the corresponding chromatographic peak (% GC area), assuming the sum of chromatographic areas of all detected peaks as 100%.

Constituent			% GC area		
EU register name	CAS no	FLAVIS no	Specification ⁽¹⁾	Mean	Range
Menthol ⁽²⁾	89-78-1	02.015	30–51	40.8	36.0–46.7
Menthone ⁽³⁾	89-80-5	07.176	15–35	20.7	19.0–24.9
<i>d,l</i> -Isomenthone ⁽⁴⁾	491-07-6	07.078	5–22	15.0	12.9–19.5
Menthyl acetate ⁽⁵⁾	16409-45-3	09.016	1.5–7	3.9	3.0–4.4

Abbreviations: CAS no, Chemical Abstracts Service number; EU, European Union; FLAVIS no, EU Flavour Information System numbers.

⁽¹⁾Specification defined based on GC–FID analysis.

⁽²⁾Menthol [02.105]: The stereochemistry is not specified but the analytical data provided refer to (–)-menthol (= *l*-menthol) which is the natural one (EFSA FEEDAP Panel, 2016b). The same FLAVIS number [02.015] can be used to identify the racemate *d,l*-menthol and its isomeric forms (EFSA FEEDAP Panel, 2020a, 2020b).

⁽³⁾*trans*-Menthone, [07.176]: two diastereoisomers (+)-menthone and (–)-menthone in *trans*-configuration [07.176]. Referred in the opinion to as menthone.

⁽⁴⁾*d,l*-Isomenthone [07.078]: mixture of two stereoisomers (+)-isomenthone and (–)-isomenthone in *cis*-configuration.

⁽⁵⁾Stereochemistry not specified.

¹²Regulation (EC) No 1334/2008 of the European Parliament and of the Council of 16 December 2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods and amending Regulation (EC) No 1601/91 of the Council, Regulations (EC) No 2232/96 and (EC) No 110/2008 and Directive 2000/13/EC. OJ L 354, 31.12.2008, p. 34.

¹³The following entries were found at <https://echa.europa.eu/home>: ‘Cornmint oil’ EC 953–577-4; ‘*Mentha arvensis*’ (IUPAC name: cornmint oil): EC 614-794-7; CAS 68917-18-0.

¹⁴Technical dossier/Supplementary information July 2024/Annex_II_SIn_reply_cornmint_oil_CoAs_chrom.

¹⁵Technical dossier/Supplementary information July 2024/Annex_IIIa_SIn_reply_cornmint_oil_ISO_9776_1999.

¹⁶Technical dossier/Supplementary information July 2024/Annex_IIIb_SIn_reply_cornmint_oil_Ph.Eur 01–2008-1838.

¹⁷Technical dossier/Supplementary information July 2024/Annex_V_SIn_reply_cornmint_oil_raw_data.

The applicant provided a full analysis of the same 13 batches using gas chromatography–mass spectrometry (GC–MS).¹⁸ In total, up to 100 peaks were detected and identified in the chromatograms, accounting for on average 99.2% (98.2%–100.0%) of the GC area. The four specified compounds accounted for 77.2% on average (range 68.9%–92.6%) of the GC area when measured by GC–MS (Table). Besides the four compounds indicated in the product specifications, 22 compounds were detected at individual levels of > 0.2% and are listed in Table 2. These 26 compounds together account on average for 97.0% (range 94.5%–99.0%) of the GC area. The remaining 74 compounds (ranging between 0.2% and 0.002%) and accounting for 2.3% of the GC area are listed in the footnote.¹⁹ Based on the available data, cornmint oil is considered a fully characterised mixture, as defined by the EFSA Scientific Committee (2019a).

TABLE 2 Constituents of cornmint oil accounting for > 0.2% of the composition: Batch to batch variation based on the analysis of 13 batches by gas chromatography–mass spectrometry (GC–MS). The content of each constituent is expressed as the area per cent of the corresponding chromatographic peak (% GC area), assuming the sum of chromatographic areas of all detected peaks as 100%.

Constituent	EU register name	CAS no	FLAVIS no	% GC area	
				Mean	Range
Menthol ⁽¹⁾		89-78-1	02.015	39.81	33.18–46.95
Menthone ⁽²⁾		89-80-5	07.176	21.34	18.66–24.34
<i>d,l</i> -Isomenthone ⁽³⁾		491-07-6	07.078	11.07	7.38–19.74
Menthyl acetate ⁽⁴⁾		16409-45-3	09.016	4.96	3.15–6.21
Neomenthol		491-01-0	–	4.56	0.28–6.16
Isopulegol		18674-65-2	–	3.60 ⁽⁵⁾	–
<i>d</i> -Limonene ⁽⁶⁾		5989-27-5	01.045	3.56	0.01–5.90
α-Pinene (pin-2(3)-ene)		80-56-8	01.004	1.95	1.23–4.17
β-Pinene (pin-2(10)-ene)		127-91-3	01.003	1.92	1.22–3.83
Isopulegol		89-79-2	02.067	1.73	0.25–3.49
Pulegone ⁽⁷⁾		89-82-7	–	1.13	0.47–1.60
<i>p</i> -Menth-1-en-3-one		89-81-6	07.175	1.12	0.65–1.65
β-Caryophyllene		87-44-5	01.007	0.83	0.02–1.65
<i>cis</i> -3-Hexenyl isovalerate		35154-45-1	–	0.63	0.17–0.96
Isomenthol		490-99-3	–	0.62	0.20–1.37
Octan-3-ol		589-98-0	02.098	0.58	0.05–0.98
Myrcene		123-35-3	01.008	0.55	0.04–0.93
Neoisomenthol		491-02-1	–	0.52	0.15–1.00
Sabinene (4(10)-thujene)		3387-41-5	01.059	0.51	0.25–0.72
Neoisocarquejanol		31104-61-7	–	0.48	0.48–0.49
α-Terpineol		98-55-5	02.014	0.43	0.32–0.57
Germacre-1(10),4(14),5-triene		23986-74-5	01.042	0.37	0.01–0.67
Isopulegone		29606-79-9	07.067	0.37	0.16–0.94
β-Bourbonene		5208-59-3	01.024	0.28	0.15–0.47
1,8-Cineole		470-82-6	03.001	0.24	0.002–0.34
Linalool		78-70-6	02.013	0.22	0.10–0.30
Total				97.0 ⁽⁸⁾	94.5–99.0 ⁽⁹⁾

¹⁸Technical dossier/Supplementary information July 2024/Annex_II_SIn_reply_cornmint_oil_CoAs_chrom.

¹⁹Additional constituents:

constituents (*n* = 45) between < 0.2 and ≥ 0.05%: *cis*-pinane, decyl acetate, octan-1-ol, 3-methylcyclohexanone, bicyclogermacrene, β-ylangene, decan-1-ol, β-caryophyllene epoxide, octyl acetate, hex-3(*cis*)-enyl phenylacetate, *o*-menthan-3-one, β-elemene, 2-isopropylcyclohexanol, (*R*)-(-)-lavandulol, 1-isopropyl-4-methylbenzene (*p*-cymene), sabinol, neomenthyl acetate, isomenthyl acetate, *1R,2S,5R*-isopulegyl acetate, octyl isovalerate, *ε*-muurolene, spathulenol, hexyl isovalerate, nonyl acetate, bicycloelemene, 2,5-diethyltetrahydrofuran, hex-3-enyl valerate, δ-cadinene, nonan-3-ol, 3,7,10-humulatriene, α-ylangene, camphene, *trans*-1-methyl-4-(1-methylvinyl)cyclohex-2-en-1-ol, *cis*-linalool oxide (5-ring), terpinolene, α-amorphene, aromadendrene, *p*-menthan-8-yl acetate, myrtenol, nonanal, β-copaene, α-cadinol, dihydrocarveol, decanal, carveol;

constituents (*n* = 26) between < 0.05% and ≥ 0.02%: longifolene, carvone (stereochemistry not indicated), pseudolimonene, octan-3-one, *cis*-*p*-2,8-menthadien-1-ol, α-copaene, T-muurolol, menthyl formate, citronellol, 1-isopropenyl-4-methylbenzene, *trans*-linalool oxide (5-ring), β-gurjenene, β-cubebene, *trans*-3,7-dimethyl-1,3,6-octatriene (*trans*-β-ocimene), *trans*-β-dihydroterpineol, γ-terpinene, γ-cadinene, α-terpinene, α-thujene, dihydroedulan I, *cis*-isopiperitenol, 10,10-dimethyl-2,6-dimethylenebicyclo[7.2.0]undecane, 3,7-dimethylocta-1,5,7-trien-3-ol, 2-phenylethan-1-ol, γ-muurolene, *p*-menthane;

constituents (*n* = 3) between < 0.02% and ≥ 0.002%: carvotan acetone, cyperene, *p*-3-menthene.

TABLE 2 (Continued)

Abbreviations: CAS no, Chemical Abstracts Service number; EU, European Union; FLAVIS no, EU Flavour Information System number.

⁽¹⁾Menthol [02.105]: The stereochemistry is not specified but the analytical data provided refer to (–)-menthol (= *l*-menthol) which is the natural one (EFSA FEEDAP Panel, 2016b). The same FLAVIS number [02.015] can be used to identify the racemate *d,l*-menthol and its isomeric forms (EFSA FEEDAP Panel, 2020).

⁽²⁾*trans*-Menthone, [07.176]: two diastereoisomers (+)-menthone and (–)-menthone in *trans*-configuration [07.176]. Referred in the opinion to as menthone.

⁽³⁾*d,l*-Isomenthone [07.078]: two diastereoisomers (+)-isomenthone and (–)-isomenthone in *cis*-configuration.

⁽⁴⁾Stereochemistry not specified.

⁽⁵⁾Detected in one batch only.

⁽⁶⁾Stereochemistry not given, however considering that the naturally occurring limonene is typically *d*-limonene, it is assumed that this form also occurs in cornmint oil.

⁽⁷⁾Substance which shall not be added as such to food (Annex III), maximum level in food is set by Regulation (EC) No 1334/2008, including dairy products (20 mg/kg), meat products (15 mg/kg), fish products (10 mg/kg), soups and sauces (60 mg/kg), ready-to eat savouries (20 mg/kg) and non-alcoholic beverages (1 mg/kg).

⁽⁸⁾The value given for the Total (mean) is the mean of the sum of the constituents in the individual batches analysed.

⁽⁹⁾The values given for the Total (range) are the lowest and the highest values of the sum of the constituents in the individual batches analysed.

The EFSA Compendium of botanicals²⁰ reports as substances of potential concern for human and animal health the occurrence of 1,8-cineole ($\leq 0.4\%$), carvone ($\leq 1.0\%$) and myrcene (0.5%–0.6%) in the essential oil from the aerial parts of *M. arvensis*. Pulegone (1.39%), menthone (20.25%, including 7.48% (+)-isomenthone) and *trans*-isopulegone (1.81%) were reported to occur in the essential oil from the ‘live plant’. The EFSA Compendium also reports the occurrence of menthone (4.32%–6.3%) and myrcene (0.23%–0.45%) in the essential oil from the aerial parts of *M. canadensis*/*M. haplocalyx* Bnq.

The applicant carried out an extensive literature search to identify data related to the chemical composition of *M. arvensis* and its botanical preparations and the possible presence of substances of concern.²¹ Four cumulative databases (LIVIVO, NCBI, OVID and ToxInfo) were searched. The keywords used covered different aspects of safety, and the inclusion and exclusion criteria were provided by the applicant. The literature search (no time limits specified) retrieved 26 references investigating the composition of cornmint oil. The results of the literature search confirmed the information in the EFSA Compendium.

3.3.1.1 | Impurities

The applicant referred to the ‘periodic testing’ of some representative flavourings premixtures for mercury, cadmium, lead, arsenic, fluoride, dioxins and polychlorinated biphenyls (PCBs), organo-chlorine pesticides, organo-phosphorous pesticides, aflatoxins (B1, B2, G1, G2) and ochratoxin A. However, no data were provided on the presence of these impurities.

3.3.2 | Shelf-life

The typical shelf-life of cornmint oil is stated to be at least 12 months, when stored in tightly closed containers under standard conditions (in a cool, dry place protected from light).²² However, no data supporting this statement were provided.

3.3.3 | Conditions of use

Cornmint oil is intended to be added to feed and/or water for drinking for all animal species without a withdrawal period. The maximum use level in complete feed proposed for all animal species and categories is 100 mg/kg. No use level has been proposed by the applicant for the use of the additive in water for drinking.

3.4 | Safety

No studies to support the safety for target animals, consumers and users were performed with the additive under assessment.

Fifty-seven of the individual components of the essential oil, accounting on average for 95.4% of the GC area, have been already assessed as chemically defined flavourings for use in feed and food by the FEEDAP Panel, the EFSA Panel on Food Additives, Flavourings, Processing Aids and Materials in contact with Food (AFC) superseded in 2008 by the EFSA Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids (CEF) and/or by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). The flavouring compounds together with the EU Flavour Information System (FLAVIS) number, the chemical group as defined in Commission Regulation (EC) No 1565/2000,²³ and the corresponding EFSA opinion are listed in Table 3.

²⁰Online version: <https://www.efsa.europa.eu/en/data-report/compendium-botanicals>, accessed on 11 June 2025.

²¹Technical dossier/Supplementary information July 2024/Literature search_cornmint_oil.

²²Technical dossier/Section II.

²³Commission Regulation (EC) No 1565/2000 of 18 July 2000 laying down the measures necessary for the adoption of an evaluation programme in application of Regulation (EC) No 2232/96 of the European Parliament and of the Council. OJ L 1 80, 19.7.2000, p. 8.

TABLE 3 Flavouring components of cornmint oil already assessed by EFSA and/or by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) as chemically defined flavourings, grouped according to the chemical group (CG) as defined in Commission Regulation (EC) No 1565/2000, with indication of the EU Flavour Information System (FLAVIS) number and the corresponding EFSA/JECFA opinion.

CG	Chemical group	Product (EU register name)	FLAVIS No	EFSA/JECFA opinion,* year
01	Straight-chain primary aliphatic alcohols/aldehydes/acids, acetals and esters with esters containing saturated alcohols and acetals containing saturated aldehydes	Octan-1-ol	02.006	2013
		Decan-1-ol	02.024	
		Decanal	05.010	
		Nonanal	05.025	
		Octyl acetate	09.007	
		Nonyl acetate	09.008	
		Decyl acetate	09.009	
		Hexyl isovalerate	09.529	
		Octyl isovalerate ⁽¹⁾	09.451	WHO, 1999 (JECFA)
04	Non-conjugated and accumulated unsaturated straight-chain and branched-chain aliphatic primary alcohols, aldehydes, acids, acetals and esters	Citronellol	02.011	2016a
		(R)-(-)-Lavandulol	02.170	2013, CEF
		Hex-(3Z)-enyl valerate	09.571	2010a, CEF
05	Saturated and unsaturated aliphatic secondary alcohols, ketones and esters with esters containing secondary alcohols	Nonan-3-ol	02.190	2010b, CEF
		Octan-3-ol	02.098	2015a, 2023b
		Octan-3-one	07.062	
		Isopulegol	02.067	2020a
06	Aliphatic, alicyclic and aromatic saturated and unsaturated tertiary alcohols and esters with esters containing tertiary alcohols ethers	Linalool	02.013	2012a, 2020b
		α -Terpineol	02.014	2012a
		p-Menthan-8-yl acetate ⁽¹⁾	09.617	2009, AFC
07	Primary alicyclic saturated and unsaturated alcohols/aldehydes/acids/acetals/esters with esters containing alicyclic alcohols	Myrtenol ⁽¹⁾	02.091	2017a, CEF
08	Secondary alicyclic saturated and unsaturated alcohols, ketones, ketals and esters with ketals containing alicyclic alcohols or ketones and esters containing secondary alicyclic alcohols	Menthol ⁽²⁾	02.015	2016b, 2020a
		cis-p-Menthan-3-one (<i>d,l</i> -isomenthone) ^(3,4)	07.078	2016b, 2023c
		trans-p-Menthan-3-o ^(4,5) (<i>trans</i> -menthone)	07.176	
		Menthyl acetate	09.016	2016b
		Isopulegone	07.067	2020a
		Dihydrocarveol ⁽¹⁾	02.061	WHO, 2000 (JECFA)
		Carveol ⁽¹⁾	02.062	
		<i>d</i> -Neomenthol ⁽¹⁾	02.063	
		Neomenthol ⁽¹⁾	02.220	
		p-Menthan-3-one ^(1,4)	07.059	2012, CEF
		p-Menth-1-en-3-one ⁽¹⁾	07.175	2014a, CEF
		3-Methylcyclohexanone ⁽¹⁾	07.180	WHO 2002 (JECFA)
		Carvone ⁽¹⁾	07.012	2014, SC
		(1 <i>R</i> ,2 <i>S</i> ,5 <i>R</i>)-Isopulegyl acetate ⁽¹⁾	09.219	2017b, CEF
13	Furanones and tetrahydrofurfuryl derivatives	2,5-Diethyltetrahydrofuran ⁽¹⁾	13.095	2016, CEF
		Linalool oxide ⁽⁶⁾	13.140	2012b
15	Phenyl ethyl alcohols, phenylacetic acids, related esters, phenoxyacetic acids and related esters	2-Phenylethan-1-ol	02.019	2012c
		Hex-3-enyl phenylacetate	09.805	WHO 2002 (JECFA)
16	Aliphatic and alicyclic ethers	1,8-Cineole	03.001	2012d, 2021
31	Aliphatic and aromatic hydrocarbons and acetals containing saturated aldehydes	1-Isopropyl-4-methylbenzene (<i>p</i> -Cymene)	01.002	2015b
		1-Isopropenyl-4-methylbenzene	01.010	
		<i>d</i> -Limonene	01.045	

TABLE 3 (Continued)

CG	Chemical group	Product (EU register name)	FLAVIS No	EFSA/JECFA opinion,* year
		Terpinolene	01.005	2015b, 2023c
		α-Terpinene	01.019	
		γ-Terpinene	01.020	
		Pin-2(10)-ene (β-pinene)	01.003	2016c
		Pin-2(3)-ene (α-pinene)	01.004	
		β-Caryophyllene	01.007	
		Myrcene	01.008	
		Camphene	01.009	
		3,7-Dimethyl-1,3,6-octatriene (β-Ocimene) ⁽⁷⁾	01.018	
		δ-Cadinene ^(1,8)	01.021	2011, CEF
		β-Cubebene ^(1,8)	01.030	
		Germacrene-1(10),4(14),5-triene δ-Germacrene ^(1,8)	01.042	
		3,7,10-Humulatriene ^(1,8)	01.043	
		Longifolene ^(1,8)	01.047	
		4(10)-Thujene (sabinene) ⁽¹⁾	01.059	2015a, CEF
		β-Bourbonene ⁽¹⁾	01.024	2015b, CEF
32	Epoxides	β-Caryophyllene epoxide ⁽¹⁾	16.043	2014b, CEF

Abbreviations: AFC, EFSA Panel on Food Additives, Flavourings, Processing Aids and Materials in contact with Food; CEF, EFSA Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids; FLAVIS No, EU Flavour Information System number; JECFA, Joint FAO/WHO Expert Committee on Food Additives, WHO, World Health Organization.

*FEEDAP opinion unless otherwise indicated.

⁽¹⁾Evaluated for use in food. According to Regulation (EC) 1565/2000, flavourings evaluated by JECFA before 2000 are not required to be re-evaluated by EFSA.

⁽²⁾Menthol [02.105]: The stereochemistry is not specified but the analytical data provided refer to (–)-menthol (= *l*-menthol) (EFSA FEEDAP Panel, 2016b). The same FLAVIS number [02.015] can be adequately used to identify the racemate and its isomeric forms (EFSA FEEDAP Panel, 2020a).

⁽³⁾*d,l*-Isomenthone [07.078]: two diastereoisomers (+)-isomenthone and (–)-isomenthone in *cis*-configuration. *p*-Menthane-3-one (menthone): The stereochemistry of menthone [07.059] is not specified. It possesses two chiral centres.

⁽⁴⁾*p*-Menthane-3-one (menthone): The stereochemistry of menthone [07.059] is not specified. EFSA evaluated a mixture of four diastereoisomers, (+)-menthone and (–)-menthone (in *trans*-configuration [07.176]) in co-occurrence with their two diastereoisomers (+)-isomenthone and (–)-isomenthone (in *cis*-configuration [07.078]), the mixture containing approximately 25% of each (EFSA CEF Panel, 2012).

⁽⁵⁾*trans*-Menthone [07.176]: menthone exists only as *trans*-isomer. Referred in the opinion to as menthone (JECFA name).

⁽⁶⁾Linalool oxide [13.140]: A mixture of *cis*- and *trans*-linalool oxide (5-ring) was evaluated [13.140] (EFSA FEEDAP Panel, 2012b).

⁽⁷⁾β-Ocimene [01.018]: a mixture of (*E*)- and (*Z*)-isomers was evaluated (EFSA FEEDAP Panel, 2016c), containing 50%–70% (*E*)-isomer and 15%–17% (*Z*)-isomer (EFSA CEF Panel, 2015b).

⁽⁸⁾Evaluated applying the ‘Procedure’ described in the Guidance on the data required for the risk assessment of flavourings to be used in or on food (EFSA CEF Panel, 2010c). No longer authorised for use as flavours in food.

Five compounds listed in Table 3, δ-cadinene [01.021], β-cubebene [01.030], δ-germacrene [01.042], 3,7,10-humulatriene [01.043] and longifolene [01.047] have been evaluated in Flavouring Group Evaluation 25 Revision 2 by applying the procedure described in the Guidance on the data required for the risk assessment of flavourings to be used in or on foods (EFSA CEF Panel, 2010c). For these compounds, for which there is no concern for genotoxicity, EFSA requested additional subchronic toxicity data (EFSA CEF Panel, 2011). In the absence of these data, the CEF Panel was unable to complete its assessment (EFSA CEF Panel, 2015a). As a result, these compounds are no longer authorised for use as flavours in food. For these compounds, in the absence of toxicity data, the FEEDAP Panel applies the threshold of toxicological concern (TTC) approach or read-across from structurally related substances, as recommended in the Guidance document on harmonised methodologies for human health, animal health and ecological risk assessment of combined exposure to multiple chemicals (EFSA Scientific Committee, 2019a).

The remaining 52 components of cornmint oil listed in Table 3, accounting on average for 95% of the GC area, have been previously assessed and considered safe for use as flavourings. They are currently authorised for use in food²⁴ without limitations and for use in feed²⁵ at individual use levels higher than those resulting from the intended use in feed of the essential oil under assessment, with the exception of menthone [07.176] and *d,l*-isomenthone [07.078].²⁶

²⁴Commission Implementing Regulation (EU) No 872/2012 of 1 October 2012 adopting the list of flavouring substances provided for by Regulation (EC) No 2232/96 of the European Parliament and of the Council, introducing it in Annex I to Regulation (EC) No 1334/2008 of the European Parliament and of the Council and repealing Commission Regulation (EC) No 1565/2000 and Commission Decision 1999/217/EC. OJ L 267, 2.10.2012, p. 1.

²⁵European Union Register of Feed Additives pursuant to Regulation (EC) No 1831/2003. Available online: <https://ec.europa.eu/food/food-feed-portal/screen/feed-additives/search>.

²⁶*trans*-Menthone [07.176] and *d,l*-isomenthone [07.078] are authorised for use in all animal species without a maximum content, but with a recommended maximum content of 5 mg/kg complete feed. Commission Implementing Regulation (EU) 2024/1989 of 24 July 2024. OJ L, 2024/1989, 24.7.2024.

The major component *d,l*-isomenthone [07.078] was included in tolerance studies made with the mixture of flavourings referred to as 'Herbal' (EFSA FEEDAP Panel, 2023c). Linalool [02.013] and octan-3-one [07.062] were similarly tested in mixtures of flavourings named 'TuttiFrutti' and 'MilkyVanilla', respectively (EFSA FEEDAP Panel, 2020b, 2023b). Based on these studies, the FEEDAP Panel concluded that *d,l*-isomenthone [07.078] is safe at 5 mg/kg complete feed for all animal species, linalool [02.013] at 30 mg/kg and octan-3-one [07.062] at 10 mg/kg. By applying read-across, the FEEDAP Panel also concluded that menthone [07.176] is safe for all animal species at 5 mg/kg complete feed (EFSA FEEDAP Panel, 2023b), and that octan-3-ol [02.098] and 3-octyl acetate [09.254] are safe at 10 mg/kg complete feed (EFSA FEEDAP Panel, 2023c).

Forty-three volatile compounds have not been previously assessed for use as flavourings. The FEEDAP Panel notes that 39 of them²⁷ accounting for 3.8% of the GC area are aliphatic monoterpenes or sesquiterpenes structurally related to flavourings already assessed in CG 4, 5, 6, 8, and 31 and a similar metabolic and toxicological profile is expected. Because of their lipophilic nature, they are expected to be rapidly absorbed from the gastro-intestinal tract, oxidised to polar oxygenated metabolites, conjugated and excreted, and not to accumulate in animal tissues and products (EFSA FEEDAP Panel, 2012a, 2015b, 2016a, 2016b, 2016c).

The genotoxic potential of the remaining four compounds, *trans*-1-methyl-4-(1-methylvinyl)cyclohex-2-en-1-ol, *cis-p*-2,8-menthadien-1-ol, spathulenol and dihydroedulan I, was predicted using the Organisation for Economic Co-operation and Development (OECD) quantitative structure activity relationship (QSAR) Toolbox.²⁸ No alerts were identified for in vitro mutagenicity, genotoxic and non-genotoxic carcinogenicity, or other toxicity endpoints for spathulenol. For *trans*-1-methyl-4-(1-methylvinyl)cyclohex-2-en-1-ol and its isoform *cis-p*-2,8-menthadien-1-ol structural alerts were due to the presence of the vinyl/allyl alcohol group, and for dihydroedulan I to the presence of the vinyl/allyl ether group. For all substances, predictions of mutagenicity by Ames test (with and without S9) were made by 'read-across' analyses of data available for similar substances to the target compounds (i.e. analogues obtained by categorisation). Read-across-based predictions were found consistently negative for all categories of analogues. On this basis, the alerts raised were discounted by the FEEDAP Panel.

The oil under assessment contains up to 1.6% pulegone. For the absorption, distribution, metabolism and excretion (ADME) and the toxicology of pulegone, reference is made to the safety evaluation made by the FEEDAP Panel in the opinions on buchu leaves oil and peppermint oil (EFSA FEEDAP Panel, 2022, 2025).

3.4.1 | Safety for the target species

Tolerance studies in the target species and/or toxicological studies in laboratory animals with the essential oil under assessment were not submitted. In the absence of these data, the approach to the safety assessment of a mixture whose individual components are known is based on the safety assessment of each individual component (component-based approach). This approach requires that the mixture is sufficiently characterised and that the individual components can be grouped into assessment groups, based on structural and metabolic similarity. The combined toxicity can be predicted using the dose addition assumption within an assessment group, taking into account the relative toxic potency of each component (EFSA Scientific Committee, 2019a).

As the additive under assessment is a fully defined mixture (the identified components represent on average 99.2% of the GC area, see Section 3.3.1), the FEEDAP Panel applied a component-based approach to assess the safety for target species of the essential oil.

The oil under assessment contains by specification up to 35% of menthone [07.176] and up to 22% of *d,l*-isomenthone [07.078], which are assessed separately from the other components of the oil, based on the results of tolerance trials with the mixture of flavourings 'Herbal' (EFSA FEEDAP Panel, 2023c). Similarly, linalool [02.013] and octan-3-one [07.062], which were included in tolerance studies with mixtures of flavourings 'TuttiFrutti' and 'MilkyVanilla' (EFSA FEEDAP Panel, 2020b, 2023b) are assessed separately. The structurally related compound octan-3-ol [02.098] is assessed together with octan-3-one [07.062].

3.4.1.1 | Components tested in tolerance trials with mixtures of flavourings *d,l*-Isomenthone and menthone

At the proposed conditions of use of 100 mg cornmint oil/kg complete feed (see Section 3.3.3), the concentration of the sum of menthone [07.176] and *d,l*-isomenthone [07.078] in feed would be 57 mg/kg complete feed, considering that menthone [07.176] and *d,l*-isomenthone [07.078] are present in the essential oil under assessment at the highest specification of 35% and 22%, respectively. This concentration is above the safe level of 5 mg/kg complete feed experimentally established for *d,l*-isomenthone [07.078] in tolerance trials with the mixture of flavourings 'Herbal' and extrapolated to menthone by applying read-across (EFSA FEEDAP Panel, 2023c). On this basis, the FEEDAP Panel concludes that the use of cornmint oil is

²⁷*cis*-3-Hexenyl isovalerate (CG 4); isoisopulegol (CG 5); T-murolol, α -cadinol, 3,7-dimethylocta-1,5,7-trien-3-ol, *trans*- β -dihydroterpineol (CG 6); sabinol, neomenthol, isomenthol, neoisomenthol, neomenthyl acetate, isomenthyl acetate, 2-isopropylcyclohexanol, neoisocarquejanol, *cis*-isopiperitenol, carvotan acetone, o-menthan-3-one, menthyl formate (CG 8); *trans*-3,7-dimethyl-1,3,6-octatriene, *p*-menthane, *p*-3-menthene, pseudolimonene, β -elemene, α -thujene, α -copaene, γ -muurolene, bicyclogermacrene, γ -cadinene, α -ylangene, cypere, 10,10-dimethyl-2,6-dimethylenebicyclo[7.2.0]undecane, β -copaene, β -gurjenene, aromadendrene, *cis*-pinane, bicycloelemene, β -yangelene, ϵ -muurolene, α -amorphene.

²⁸Technical dossier/Supplementary information July 2024/Annex_VII_SIn_reply cornmint_oil_QSAR.

safe at a maximum use level of 8.8 mg/kg complete feed for all animal species, with regards to the presence of menthone [07.176] and *d,l*-isomenthone [07.078].

Linalool, octan-3-one and octan-3-ol

The highest concentration in feed of linalool [02.013] resulting from the use of the additive at the maximum proposed use level of 100 mg cornmint oil/kg complete feed would be 0.3 mg/kg complete feed.²⁹ This is below the value of 30 mg linalool/kg complete feed established by the tolerance trials with the mixture of flavourings 'TuttiFrutti' as safe for all animal species (EFSA FEEDAP Panel, 2020b).

The highest concentration in feed of the sum of octan-3-one [07.062] and octan-3-ol [02.098] resulting from the use of the additive at the maximum proposed use level of 100 mg cornmint oil/kg complete feed would be 1.03 mg/kg complete feed.³⁰ This concentration is below the safe level of 10 mg/kg complete feed experimentally established for octan-3-one [07.062] in tolerance trials with the mixture of flavourings 'MilkyVanilla' and extrapolated to octan-3-ol [02.098] by applying read-across (EFSA FEEDAP Panel, 2023b).

3.4.1.2 | Components other than those tested in tolerance trials

Based on considerations related to structural and metabolic similarities, the remaining components were allocated to 11 assessment groups, corresponding to the chemical groups (CGs) 1, 4, 5, 6, 7, 8, 13, 15, 16, 31 and 32, as defined in Annex I of Regulation (EC) No 1565/2000. For CG 31 (aliphatic and aromatic hydrocarbons), sub-assessment groups as defined in Flavouring Group Evaluation 25 (FGE.25) and FGE.78 were established (EFSA CEF Panel, 2015a, 2015b). The allocation of the components to the (sub)assessment groups is shown in Table 4 and in the corresponding footnote.

For hazard characterisation, each component of an assessment group was first assigned to the structural class according to Cramer classification using Toxtree (version 3.1.0, May 2018³¹). For some components in the assessment group, toxicological data were available to identify no observed adverse effect levels (NOAELs). Structural and metabolic similarity among the components in the assessment groups were assessed to explore the application of read-across, allowing extrapolation from a known NOAEL of a component of an assessment group to the other components of the group with no available NOAEL or, if sufficient evidence were available for members of a (sub-)assessment group, to derive a (sub-)assessment group NOAEL.

Toxicological data of subchronic studies, from which NOAEL values could be identified, were available for the following components: 127 mg/kg bw per day for hex-3(*cis*)-en-1-ol [02.056] and 50 mg/kg bw per day for citronellol [02.011] in CG 4 (EFSA FEEDAP Panel, 2016a), 38 mg/kg bw per day for isopulegol [02.067] in CG 5 (EFSA FEEDAP Panel, 2020a), 250 mg/kg bw per day for terpineol [02.230]³² in CG 6 (EFSA FEEDAP Panel, 2012a), 375 mg/kg bw per day for menthol [02.015] in CG 8 (EFSA FEEDAP Panel, 2016b), 100 mg/kg bw per day for 1,8-cineole [03.001] in CG 16 (EFSA FEEDAP Panel, 2021), 44 mg/kg bw per day for myrcene [01.008], 154 mg/kg bw per day for *p*-cymene [01.002], 250 mg/kg bw per day for *d*-limonene [01.046] and 222 mg/kg bw per day for β -caryophyllene [01.007] in CG 31 (EFSA FEEDAP Panel, 2015b, 2016c) and 109 mg/kg bw per day for β -caryophyllene epoxide [16.043] in CG 32 (EFSA CEF Panel, 2014b). For α -terpinene [01.019], the FEEDAP Panel identified a NOAEL of 60 mg/kg bw per day based on maternal toxicity (reduced body weight gain) in a teratogenicity study in rats. The NOAEL of 60 mg/kg bw per day was divided by a factor of 2 to take account of the nature of the study (see Araujo et al., 1996; ECHA, 2018). For cyclohexanol, a compound structurally related to several components in CG 8, a NOAEL of 159 mg/kg bw was derived from a 90-day oral toxicity study in rats (Api et al., 2021). For pulegone, the FEEDAP Panel applied a NOAEL of 9.38 mg/kg bw per day identified from a 90-day study in rats (EFSA FEEDAP Panel, 2022).

For CG 1, a group NOAEL of 120 mg/kg bw per day was identified from the toxicological data available for several compounds (EFSA FEEDAP Panel, 2013), and applied to octan-1-ol [02.006], decan-1-ol [02.024], decyl acetate [09.009], octyl acetate [09.007], nonyl acetate [09.008], nonanal [05.025] and decanal [05.010] in the current assessment.

In CG 4, the NOAEL of 127 mg/kg bw per day for hex-3(*cis*)-en-1-ol [02.056] was applied to the ester hex-3(*cis*)-enyl isovalerate but not to hex-3-enyl isovalerate [09.505] because the exact stereoisomeric form of this compound is not known (EFSA FEEDAP Panel, 2016a). Considering the structural and metabolic similarity of lavandulyl derivatives with citronellyl derivatives in CG 4, the NOAEL of citronellol [05.020] was applied to (*R*)-(-)-lavandulol³³ [02.170] in CG 4.

The NOAEL of 38 mg/kg bw per day for isopulegol [02.067] (EFSA FEEDAP Panel, 2020a) was applied to the structurally related compounds isoisopulegol, and to isopulegone [07.067] in CG 5 and to 1*R*,2*S*,5*R*-isopulegyl acetate [09.219] in CG 8.

In CG 6, a NOAEL of 250 mg/kg bw per day was identified for terpineol [02.230] and divided by a factor of 2 to consider the nature of the study (EFSA FEEDAP Panel, 2012a). The resulting value of 125 mg/kg bw per day was used as the reference point for terpinyl derivatives, α -terpineol [02.014], α -cadinol and T-muurolool.

²⁹Calculated considering the maximum proposed use level of 100 mg/kg complete feed and the highest analysed concentration of linalool (0.287%) in the 12 batches.

³⁰Calculated considering the maximum proposed use level of 100 mg/kg complete feed and the highest analysed concentrations of octan-3-one (0.047%) and octan-3-ol (0.985%) in the 12 batches.

³¹Toxtree includes both the original Cramer rule base with the 33 structural rules (Cramer et al., 1978) and an extended rule base with five additional rules which were introduced to overcome misclassification (in Class I or Class II) of several substances with low NOAELs. <https://toxtree.sourceforge.net/>.

³²Terpineol is a mixture of four structural isomers: α -terpineol [02.014], β -terpineol, γ -terpineol and 4-terpinenol [02.072]. α -Terpineol [02.014], is defined as a mixture of (*R*)-(+)- α -terpineol and (*S*)-(-)- α -terpineol.

³³Similarity index with citronellol (calculated using the Virtual Extensive Read-Across (VERA) software): 0.917.

In CG 8, the NOAEL of 375 mg/kg bw per day for menthol [02.015] has been already applied to menthyl acetate [09.016] (EFSA FEEDAP Panel, 2016b). In the current assessment, the NOAEL was also extrapolated to neomenthol, neoisomenthol, isomenthol, menthyl formate, neomenthyl acetate and isomenthyl acetate. The NOAEL of 159 mg/kg bw per day for cyclohexanol was applied to the structurally related compounds neoisocarquejanol, 2-isopropyl cyclohexanol, 3-methylcyclohexanone and *o*-menthan-3-one.

In CG 8, the benchmark dose lower confidence limit for a benchmark response of 10% (BMDL₁₀) of 60 mg/kg bw per day for *d*-carvone [07.146] (EFSA FEEDAP Panel, 2016b; EFSA Scientific Committee, 2014) was applied to carvone [07.012] (stereochemistry not indicated), carveol (mixture of isomers not specified), 1*R*,2*S*,5*R*-isopulegyl acetate [09.219], *p*-menth-1-en-3-one [07.175] and *cis*-isopiperitenol.

Considering the structural and metabolic similarities, the NOAELs for the representative compounds in CG 31, myrcene [01.008], *d*-limonene [01.045] and β -caryophyllene [01.007] were applied, respectively, using read-across to the compounds within sub-assessment groups II (*(E)*- β -ocimene), III (terpinolene [01.005] and γ -terpinene [01.020]) and V (α -pinene [01.004], β -pinene [01.003], sabinene [01.059], β -bourbonene [01.024], *cis*-pinane, β -ylangene, bicyclogermacrene, ϵ -murolene, α -ylangene, camphene [01.009], δ -cadinene [01.021], bicycloelemene, α -amorphene, longifolene, α -copaene, β -copaene, β -gurjerene, aromadendrene, β -cubebene [01.030], γ -cadinene, γ -murolene, α -thujene, 10,10-dimethyl-2,6-dimethylenebicyclo[7.2.0]undecane and cyperene),³⁴ respectively (EFSA CEF Panel, 2015a, 2015b).

The NOAEL of 44 mg/kg bw per day for myrcene [01.008] was also applied to 3,7-dimethylocta-1,5,7-trien-3-ol in CG 6.³⁵ The NOAEL of 222 mg/kg bw per day for β -caryophyllene [01.007] was also applied to spathulenol in CG 6, sabinol in CG 8 and 3,7,10-humulatriene [01.043] in CG 31, VI.³⁶ For spathulenol, the NOAEL of β -caryophyllene [01.007] was divided by a factor of 2 to take account of the differences in the structures (the presence of an additional cyclopropane ring). Similarly for 3,7,10-humulatriene, the NOAEL of β -caryophyllene was divided by a factor of 2 to take account of the uncertainty in read-across due to differences in the structure (extrapolation from a tricyclic to a macrocyclic non-aromatic compound) (EFSA FEEDAP Panel, 2023).

For the remaining compounds,³⁷ toxicity studies performed with the compounds under assessment were not available and read-across was not possible. Therefore, the TTC approach was applied (EFSA FEEDAP Panel, 2017; EFSA Scientific Committee, 2019c).

As the result of the hazard characterisation, a reference point was identified for each component in the assessment group based on the toxicity data available (NOAEL from in vivo toxicity study or read-across) or from the 5th percentile of the distribution of NOAELs of the corresponding Cramer Class (i.e. 3, 0.91 and 0.15 mg/kg bw per day, respectively, for Cramer Class I, II and III compounds, Munro et al., 1996). Reference points selected for each compound are shown in Table 4.

For each component in the assessment group, exposure of target animals (expressed as mg/kg bw per day) was estimated considering the maximum use level of 8.8 mg/kg complete feed (considered safe based on the presence of *d,l*-isomenthone and menthone), the percentage of the component in the oil and the default values for body weight and feed intake according to the guidance on the safety of feed additives for target species (EFSA FEEDAP Panel, 2017b). For those compounds covered by specifications (menthol and menthyl acetate, see Table 1), the indicated maximum specified concentration is used for the calculation of exposure. For the other components the highest analysed concentration is used.

For risk characterisation, the margin of exposure (MOE) was calculated for each component as the ratio between the reference point and the exposure. For an assessment group, (i) when a group reference point is available, a group MOE was calculated for the combined intake; (ii) when different reference points are available for the components, the combined (total) margin of exposure (MOET) was calculated as the reciprocal of the sum of the reciprocals of the MOE for the individual substances (EFSA Scientific Committee, 2019a). A MOE(T) > 100 allowed for interspecies- and intra-individual variability. The compounds resulting individually in an MOE > 50,000 were not further considered in the assessment group as their contribution to the MOE(T) is negligible. They are listed in the footnote.³⁸

The approach to the safety assessment of cornmint oil is shown in Table 4 for chickens for fattening, which is the species with the highest ratio of feed intake/body weight and represents the worst-case scenario among the target species. The calculations were done at the use level of 8.8 mg/kg complete feed, considered safe based on the presence of *d,l*-isomenthone and menthone.

³⁴Some of these compounds are not listed in Table 5 because their individual margin of exposure (MOE) was > 50,000.

³⁵Grouping of 3,7-dimethylocta-1,5,7-trien-3-ol (CG 6) with myrcene [01.008] and the other components assessed based on the same NOAEL of 44 mg/kg bw per day in CG 31,II had no impact on the outcome of the assessment (MOET 5497).

³⁶Grouping the components spathulenol (CG 6), sabinol (CG 8) and 3,7,10-humulatriene [01.043] (CG 31,VI) with β -caryophyllene [01.007] and the other components assessed based on the same NOAEL of 222 mg/kg bw per day in CG 31,V had no impact on the outcome of the assessment (MOET 2579).

³⁷CC I (3 mg/kg bw per day): hexyl isovalerate [09.529], octyl isovalerate [09.451] (CG 1); hex-3-enyl valerate [09.571] (CG 4); nonan-3-ol [02.190], (CG 5); *trans*-1-methyl-4-(1-methylvinyl)cyclohex-2-en-1-ol, *p*-menthan-8-yl-acetate, *cis*-*p*-2,8-menthadien-1-ol, *trans*- β -dihydroterpineol (CG 6); myrtenol [02.091] (CG 7); 2-phenylethan-1-ol [02.019], hex-3(*cis*)-enyl phenylacetate [09.805] (CG 15); β -elemene, pseudolimonene, *p*-menthane, *p*-3-menthene, 1-isopropenyl-4-methylbenzene, germacrene-1(10),4(14),5-triene [01.042] (CG 31); CC II (0.91 mg/kg bw per day): carvotan acetone (CG 8); 2,5-diethyltetrahydrofuran [13.095], *cis*-linalool oxide, *trans*-linalool oxide (CG 13); dihydroedulan I (CG 16).

³⁸Compounds included in the assessment groups but not reported in the table: octan-1-ol [02.006], decan-1-ol [02.024], decyl acetate [09.009], octyl acetate [09.007], nonyl acetate [09.008], nonanal [05.025], decanal [05.010] (CG 1); (*R*)-(-)-lavandulol [02.170], citronellol [02.011] (CG 4); spathulenol, α -cadinol, T-murolol, 3,7-dimethylocta-1,5,7-trien-3-ol (CG 6); 3-methylcyclohexanone [07.180], isomenthyl acetate, sabinol, neomenthyl acetate, 2-isopropylcyclohexanol, *o*-menthan-3-one, carveol [02.062], carvone [07.012], dihydrocarveol [02.061], menthyl formate, *cis*-isopiperitenol (CG 8); (*E*)- β -ocimene (CG 31,II); terpinolene [01.005], γ -terpinene [01.020], α -terpinene [01.019], *p*-3-menthene (CG 31,III); *p*-cymene (CG 31,IVe); β -bourbonene [01.024], *cis*-pinane, β -ylangene, bicyclogermacrene, ϵ -murolene, α -ylangene, camphene [01.009], δ -cadinene [01.021], bicycloelemene, α -amorphene, longifolene [01.047], α -copaene, β -copaene, β -gurjerene, aromadendrene, β -cubebene [01.030], γ -cadinene, γ -murolene, α -thujene, 10,10-dimethyl-2,6-dimethylenebicyclo[7.2.0]undecane, cyperene (CG 31, V); 3,7,10-humulatriene [01.043] (CG 31, VI).

TABLE 4 Compositional data, intake values (calculated for chickens for fattening at 8.8 mg/kg complete feed), reference points, margin of exposure (MOE) for the individual components of cornmint oil classified according to assessment groups and combined margin of exposure (MOET) for each assessment group.

Essential oil composition			Exposure		Hazard characterisation		Risk characterisation	
Assessment group	FLAVIS no	Highest concentration in the oil	Highest concentration in feed	Daily intake ⁽¹⁾	Cramer class ⁽²⁾	NOAEL ⁽³⁾	MOE ⁽⁴⁾	MOET ⁽⁵⁾
Constituent	–	%	mg/kg	mg/kg bw/day	–	mg/kg bw/day	–	–
CG 1								
Hexyl isovalerate	09.529	0.10	0.009	0.0008	I	3	3797	
Octyl isovalerate	09.451	0.10	0.009	0.0008	I	3	3773	
Group MOE CG 1							1893	
CG 4								
Hex-3(<i>cis</i>)-enyl isovalerate	–	0.96	0.085	0.0076	I	127	16,659	
Hex-3-enyl valerate	09.571	0.08	0.007	0.0006	I	3	4646	
MOET CG 4								3633
CG 5								
Isoisopulegol	–	3.60	0.316	0.0284	(I)	38	1338	
Isopulegol	02.067	3.49	0.307	0.0276	(I)	38	1377	
Nonan-3-ol	02.190	0.08	0.007	0.0006	I	3	4869	
MOET CG 5								596
CG 6								
α-Terpineol	02.014	0.57	0.050	0.0045	(I)	125 ⁽⁶⁾	27,906	
<i>trans</i> -1-Methyl-4-(1-methyl vinyl)cyclohex-2-en-1-ol	–	0.08	0.007	0.0006	I	3	4997	
<i>p</i> -Menthan-8-yl acetate	09.617	0.07	0.006	0.0005	I	3	5842	
<i>cis</i> - <i>p</i> -2,8-Menthadien-1-ol	–	0.04	0.004	0.0003	I	3	9262	
<i>trans</i> -β-Dihydroterpineol	–	0.03	0.003	0.0003	I	3	11,507	
MOET CG 6								1661
CG 7								
Myrtenol	02.091	0.07	0.006	0.0005	I	3	5680	
CG 8								
Menthol	02.015	51.00	4.488	0.4029	(I)	375	931	
Menthyl acetate	09.016	7.00	0.616	0.0553	(I)	375	6781	
Neomenthol	02.220	6.16	0.542	0.0487	(I)	375	7706	
<i>p</i> -Menth-1-en-3-one	07.175	1.65	0.145	0.0130	(II)	60	4606	
Isomenthol	–	1.37	0.120	0.0108	(I)	375	34,775	
Neoisomenthol	–	1.00	0.088	0.0079	(I)	375	47,603	
Isopulegone	07.067	0.94	0.083	0.0074	(II)	38	5117	
Neoisocarquejanol	–	0.49	0.043	0.0038	(II)	159	41,413	
1 <i>R</i> ,2 <i>S</i> ,5 <i>R</i> -Isopulegyl acetate	09.219	0.11	0.009	0.0008	(I)	38	44,765	
Carvotan acetone	–	0.01	0.001	0.0001	II	0.91	9599	
MOET CG 8								509
CG 13								
2,5-Diethyltetrahydrofuran	13.095	0.10	0.009	0.0008	II	0.91	1112	
<i>cis</i> -Linalool oxide	–	0.08	0.007	0.0006	II	0.91	1449	
<i>trans</i> -Linalool oxide	–	0.04	0.003	0.0003	II	0.91	2954	
Group MOE CG 13							519	
CG 15								
Hex-3(<i>cis</i>)-enyl phenylacetate	09.805	0.14	0.012	0.0011	I	3	2793	

(Continues)

TABLE 4 (Continued)

Essential oil composition			Exposure		Hazard characterisation		Risk characterisation	
Assessment group	FLAVIS no	Highest concentration in the oil	Highest concentration in feed	Daily intake ⁽¹⁾	Cramer class ⁽²⁾	NOAEL ⁽³⁾	MOE ⁽⁴⁾	MOET ⁽⁵⁾
Constituent	–	%	mg/kg	mg/kg bw/day	–	mg/kg bw/day	–	–
2-Phenylethan-1-ol	02.019	0.02	0.002	0.0002	I	3	16,511	
Group MOE CG 15							2389	
CG 16								
1,8-Cineole	03.001	0.34	0.030	0.0027	(II)	100	37,041	
Dihydroedulan II	–	0.03	0.002	0.0002	III	<i>0.15</i>	4266	
MOET CG 16								3826
CG 31, II (Acyclic alkanes)								
Myrcene	01.008	0.93	0.082	0.0073	(I)	44	6010	
CG 31, III (Cyclohexene hydrocarbons)								
<i>d</i> -Limonene	01.046	5.90	0.519	0.0466	(I)	250	5368	
β -Elemene	–	0.27	0.024	0.0021	I	3	1412	
Pseudolimonene	–	0.05	0.004	0.0004	II	3	7595	
<i>p</i> -Menthane	–	0.02	0.002	0.0002	II	3	18,987	
MOET CG 31,III								927
CG 31, IVe (Benzene hydrocarbons, alkyl)								
1-Isopropenyl-4-methylbenzene	01.010	0.04	0.004	0.0003	I	3	9262	
CG 31, V (Bi-, tricyclic, non-aromatic hydrocarbons)								
α -Pinene	01.004	4.17	0.367	0.0329	(I)	222	6739	
β -Pinene	01.003	3.83	0.337	0.0303	(I)	222	7337	
β -Caryophyllene	01.007	1.65	0.146	0.0131	(I)	222	16,990	
Sabinene	01.059	0.72	0.064	0.0057	(I)	222	38,823	
Group MOET CG 31, V							2708	
CG 31, VI (Macrocyclic non-aromatic hydrocarbons)								
Germacra-1(10),4(14),5-triene	01.042	0.67	0.059	0.0053	I	3	565	
CG 32								
β -Caryophyllene epoxide	16.043	0.28	0.025	0.0022	(I)	109	49,277	
Pulegone								
Pulegone	–	1.60	0.206	0.0185	(II)	9.38	741	

Abbreviations: bw, body weight; MOE, margin of exposure; MOET, combined (total) MOE; NOAEL, no observed adverse effect level.

⁽¹⁾Daily feed intake: 79 g DM/kg bw; bw: 2.0 kg (chickens for fattening). Rounded intake values are shown in the Table.

⁽²⁾When a NOAEL value is available or read-across is applied, the allocation to the Cramer class is put into parentheses.

⁽³⁾Values **in bold** refer to those components for which the NOAEL value was available, values *in italics* are the 5th percentile of the distribution of NOAELs of the corresponding Cramer Class, other values (plain text) are NOAELs extrapolated by using read-across.

⁽⁴⁾The MOE for each component is calculated as the ratio of the reference point (no observed adverse effect level, NOAEL) to the intake (non-rounded values are used in the calculations). When a group reference point is available, a group MOE is calculated for the combined intake. Group MOE values are reported **in bold**.

⁽⁵⁾The combined margin of exposure (MOET) is calculated for each assessment group as the reciprocal of the sum of the reciprocals of the MOE for the individual substances. MOET values are reported **in bold**.

⁽⁶⁾A factor of 2 was applied to the NOAEL of 250 mg/kg bw per day for terpineol because of the nature of the study.

As shown in Table 4, for all assessment groups the MOE(T) calculated for chickens for fattening at the use level of the additive of 8.8 mg/kg complete feed (see Section 3.4.1.1) was > 100. The lowest MOET of 509 was calculated for CG 8, the assessment group which includes the major components. The MOET for CG 8 compounds calculated for the other target species at 8.8 mg/kg complete feed are summarised in Table 5.

TABLE 5 Combined margin of exposure (MOET) for the assessment group CG 8 calculated for the different target animal categories at the use level of 8.8 mg/kg complete feed (calculated considering the content of *d,l*-isomenthone and menthone).

Animal species/categories	Daily feed intake (g DM/kg bw)	Use level (mg/kg complete feed) ⁽¹⁾	Lowest MOET CG 8
Chickens for fattening	79	8.8	509
Laying hens	53	8.8	759
Turkeys for fattening	59	8.8	682
Pigs for fattening	44	8.8	914
Piglets	37	8.8	1087
Sows lactating	30	8.8	1340
Veal calves (milk replacer)	19	8.8	2273
Cattle for fattening	20	8.8	2011
Dairy cows	31	8.8	1297
Sheep/goats	20	8.8	2011
Horses	20	8.8	2011
Rabbits	50	8.8	804
Salmonids	18	8.8	2234
Dogs	17	8.8	2365
Cats ⁽²⁾	20	8.8	2011
Ornamental fish	5	8.8	8042

Abbreviations: DM, dry matter; MOET, combined (total) margin of exposure.

⁽¹⁾Complete feed containing 88% DM, milk replacer 94.5% DM.

⁽²⁾The MOET for cats is increased to 500 because of the reduced capacity of glucuronidation.

At the use level of 8.8 mg/kg complete feed, the MOET exceeds the value of 100 for all animal species. Because glucuronidation is an important metabolic pathway to facilitate the excretion of the components of the essential oil and considering that cats have an unusually low capacity for glucuronidation, particularly for aromatic compounds (Court & Greenblatt, 1997; Lautz et al., 2021), the use of cornmint oil as an additive in cat feed needs a wider margin of exposure. A MOET of 500 is considered adequate. For all the animal species and categories listed in Table 5, cornmint oil is considered safe when used as feed additive at 8.8 mg/kg complete feed. This level is extrapolated to physiologically related species and is applied to other species not considered.

3.4.1.3 | Overall evaluation

When considering the assessment of the individual components or groups of components of cornmint oil, the maximum safe concentration of the additive in feed for all animal species was 8.8 mg/kg complete feed based on the presence of *d,l*-isomenthone and menthone (see Section 3.4.1.1).

No specific use levels have been proposed by the applicant for the use of cornmint oil in water for drinking. The FEEDAP Panel considers that the use in water for drinking is safe provided that the total daily intake of the additive does not exceed the daily amount that is considered safe when consumed via feed.

3.4.1.4 | Conclusions on the safety for the target species

The FEEDAP Panel concludes that cornmint oil is safe for all animal species at 8.8 mg/kg complete feed.

The FEEDAP Panel considers that the use of the additive in water for drinking is safe provided that the total daily intake of the additive does not exceed the daily amount that is considered safe when consumed via feed.

3.4.2 | Safety for the consumer

Cornmint oil is added to a wide range of food categories for flavouring purposes. Fenaroli's handbook reports use levels for the cornmint oil ranging from 100 to 5000 mg/kg in food and beverages.

Most of the individual constituents of the essential oil under assessment are currently authorised as food flavourings without limitations and have been already assessed for consumer safety when used as feed additives in animal nutrition (see Table 3, Section 3.4).

No data on residues in products of animal origin were made available for any of the constituents of the essential oil. However, the Panel recognises that the constituents of cornmint oil are expected to be extensively metabolised and excreted in the target species. For the major components, menthol, menthone, *d,l*-isomenthone and menthyl acetate, the available data in laboratory animals and humans indicate that they are absorbed, metabolised by oxidation and subsequent

conjugation and excreted. They are not expected to accumulate in animal tissues and products (EFSA FEEDAP Panel, 2016b). Consequently, relevant residues in food products are unlikely.

Considering the above and the reported human exposure due to the direct use of cornmint oil in food (Burdock, 2009), the FEEDAP Panel considers that the consumption of products from animals given cornmint oil at the maximum use level proposed by the applicant would be unlikely to increase human background exposure.

The use of cornmint oil in animal nutrition under the proposed conditions of use is considered safe for the consumer.

3.4.3 | Safety for the user

No specific data were provided by the applicant regarding the safety of the additive for users.

The applicant provided a safety data sheet,³⁹ based on which the FEEDAP Panel considers cornmint oil to be as irritant to skin and eyes and to be both a dermal and respiratory sensitiser. Exposure of users by any route is considered a risk.

3.4.4 | Safety for the environment

Mentha arvensis L. is native to and widely distributed over Europe and cultivated in many European countries. The use of cornmint oil in animal feed under the proposed conditions of use is not expected to pose a risk to the environment.

3.5 | Efficacy

Cornmint oil from *Mentha arvensis* L. is listed in Fenaroli's Handbook of Flavour Ingredients (Burdock, 2009) and by FEMA with the reference number 4219.

Since cornmint oil is recognised to flavour food and its function in feed would be essentially the same as that in food, no further demonstration of efficacy is considered necessary.

4 | CONCLUSIONS

Cornmint oil from the flowering aerial parts of *Mentha arvensis* L. is safe for all animal species at 8.8 mg/kg complete feed. The FEEDAP Panel considers that the use in water for drinking alone or in combination with use in feed should not exceed the daily amount that is considered safe when consumed via feed alone.

The use of the additive under the proposed conditions of use is safe for the consumer and the environment.

Regarding user safety, the essential oil under assessment should be considered as irritant to skin and eyes, and as a dermal and respiratory sensitiser. Exposure of users by any route is considered a risk.

Since cornmint oil is recognised to flavour food and its function in feed would be essentially the same as that in food, no further demonstration of efficacy is considered necessary.

5 | DOCUMENTATION PROVIDED TO EFSA/CHRONOLOGY

Date	Event
23/11/2010	Dossier received by EFSA. Botanically defined flavourings from Botanical Group 01 – Lamiales for all animal species and categories. Submitted by Feed Flavourings Authorisation Consortium European Economic Interest Grouping (FFAC EEIG)
03/01/2011	Reception mandate from the European Commission
06/01/2011	Application validated by EFSA – Start of the scientific assessment
01/04/2011	Request of supplementary information to the applicant in line with Article 8(1)(2) of Regulation (EC) No 1831/2003 – Scientific assessment suspended. <i>Issues: analytical methods</i>
08/01/2013	Reception of supplementary information from the applicant - Scientific assessment remains suspended
26/02/2013	EFSA informed the applicant (EFSA ref. 7,150,727) that, in view of the workload, the evaluation of applications on feed flavourings would be re-organised by giving priority to the assessment of the chemically defined feed flavourings, as agreed with the European Commission
24/06/2015	Technical hearing during risk assessment with the applicant according to the “EFSA's Catalogue of support initiatives during the life-cycle of applications for regulated products”: data requirement for the risk assessment of botanicals

³⁹Technical dossier/Supplementary information July 2024/Annex_VIII_SIn_reply_cornmint_oil_MSDS. Acute toxicity (oral) (H302, category 4), skin irritation (H315, category 2), eye irritation (H319, category 2), skin sensitization (H317, category 1), in accordance with the criteria outlined in Annex I of 1272/2008/EC (CLP/EU-GHS).

Date	Event
27/02/2019	Partial withdrawal by applicant (EC was informed) for the following additives: Thyme leaves gratiola tincture, spike lavender oil, melissa oil, pennyroyal oil, basil oil and savory summer oil
30/06/2021	EFSA informed the applicant that the evaluation process restarted
08/07/2021	Request of supplementary information to the applicant in line with Article 8(1)(2) of Regulation (EC) No 1831/2003 – Scientific assessment suspended. <i>Issues: characterisation, safety for target species, safety for the consumer, safety for the user and environment</i>
28/09/2023	Partial withdrawal of the application for the following additive: Spanish majoram oil
08/07/2024	Partial withdrawal of the application for the following additives: lilac chastetree extract and savory summer tincture
26/08/2024	Reception of the Evaluation report of the European Union Reference Laboratory for Feed Additives. Partial report related to seven additives: Spanish sage oil, peppermint oil, thymus origanum oil, patchouli oil, clary sage oil, lavender oil and sage oil
10/07/2024	Reception of supplementary information from the applicant (partial dataset: cornmint oil) - Scientific assessment remains suspended
27/08/2024	Reception of supplementary information from the applicant (letter of agreement)
16/12/2024	Partial withdrawal of the application for the following additives: devils claw extract (wb), balm leaves extract (sb), olive extract (sb)
18/06/2025	Reception of the Evaluation report of the European Union Reference Laboratory for Feed Additives. Partial report related to 11 additives: cornmint oil, spearmint oil, thyme oil, rosemary oil, marjoram oil, rosemary tincture, basil tincture, lavender tincture, peppermint tincture, sage tincture and wild thyme tincture.
26/06/2025	The application was split and a new EFSA-Q-2025-00406 was assigned to the additive included in the present assessment. Scientific assessment re-started for the additive included in the present assessment
24/10/2025	Request of supplementary information to the applicant in line with Article 8(1)(2) of Regulation (EC) No 1831/2003 – Scientific assessment suspended. <i>Issues: characterisation</i>
06/02/2026	Reception of supplementary information from the applicant (partial dataset: cornmint oil) - Scientific assessment restarted
11/03/2026	Opinion adopted by the FEEDAP Panel on cornmint oil (EFSA-Q-2025-00406). End of the Scientific assessment for the additive included in the present assessment. The assessment of other additives in BGD 01 is still ongoing

ABBREVIATIONS

ADME	absorption, distribution, metabolism and excretion
AFC	EFSA Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food
BDG	botanically defined group
BMD	benchmark dose
BMDL ₁₀	benchmark dose lower confidence limit for a benchmark response of 10%
BW	body weight
CAS	Chemical Abstracts Service
CDG	chemically defined group
CEF	EFSA Scientific Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids
CG	chemical group
CLP	Classification, Labelling and Packaging
CoE	Council of Europe
DM	dry matter
ECHA	European Chemicals Agency
EMA	European Medicines Agency
EURL	European Union Reference Laboratory
FEEDAP	EFSA Panel on Additives and Products or Substances used in Animal Feed
FEMA	Flavour Extract Manufacturers Association
FFAC EEIG	Feed Flavourings authorisation Consortium of FEFANA (EU Association of Specialty Feed Ingredients and their Mixtures) - European Economic Interest Grouping
FGE	food group evaluation
FLAVIS no	FLAVIS number
FLAVIS	The EU Flavour Information System
GC-FID	gas chromatography–flame ionisation detection
GC–MS	gas chromatography–mass spectrometry
ISO	International Organisation for Standardization
JECFA	The Joint FAO/WHO Expert Committee on Food Additives
MOE	margin of exposure
MOET	combined (total) margin of exposure
NOAEL	no observed adverse effect level
OECD	Organisation for Economic Co-operation and Development
PCBs	polychlorinated biphenyls
PhEur	European Pharmacopoeia

QSAR	quantitative structure activity relationship
TTC	threshold of toxicological concern
WHO	World Health Organization

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