Biocidal Products Committee (BPC)

Opinion on the application for approval of the active substance:

Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride

Product type: 2

ECHA/BPC/387/2023

Adopted

7 June 2023

Opinion of the Biocidal Products Committee

on the application for approval of the active substance alkyl (C_{12-16}) dimethylbenzyl ammonium chloride for product type 2

In accordance with Article 89(1) of Regulation (EU) No 528/2012 of the European Parliament and of the Council 22 May 2012 concerning the making available on the market and use of biocidal products (BPR), the Biocidal Products Committee (BPC) has adopted this opinion on the approval in product type 2 of the following active substance:

Common name:	**Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride**
Chemical name:	**Not applicable**
EC No.:	**270-325-2**
CAS No.:	**68424-85-1**
Existing active substance	

This document presents the opinion adopted by the BPC, having regard to the conclusions of the evaluating Competent Authority. The assessment report, as a supporting document to the opinion, contains the detailed grounds for the opinion.

Process for the adoption of the BPC opinion

Following the submission of an application by Lonza AG & Stepan Europe & Mason Europe Ltd (US ADBAC Issues Steering Committee, US ISC) and by Nouryon, Thor and Innospec (European Quat Consortium, EQC) on 31 July 2007, the evaluating Competent Authority Italy submitted an assessment report and the conclusions of its evaluation to the Commission on 10 September 2012. In order to review the assessment report and the conclusions of the evaluating Competent Authority, the Agency organised consultations via the BPC (BPC-41) and its Working Groups (WG III 2021). Revisions agreed upon were presented and the assessment report and the conclusions were amended accordingly.

The BPC delivered its opinion on 2 December 2021. The BPC opinion recommended the approval of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride, and it was adopted by simple majority. Subsequently, three BPC members provided minority opinions expressing concern for a possible risk for the soil compartment.

During the 77th meeting of the Standing Committee of Biocidal Products (SCBP) of October 2022 it was decided that further discussion was needed at technical level. Subsequently, a mandate was given to ECHA according to Article 75(1)(g) to address the concerns raised in the minority opinions[1]. A new evaluation was prepared and discussed at the Environment Working Group I 2023. Revisions agreed upon were presented to the BPC (BPC-47) and the assessment report and the conclusions were amended accordingly.

[1] The mandate is available at: Opinions on Article 75(1)(g) - ECHA (europa.eu).

Adoption of the BPC opinion

Rapporteur: Italy

The BPC opinion on the application for approval of the active substance alkyl (C_{12-16}) dimethylbenzyl ammonium chloride in product type 2 was adopted on 7 June 2023.

The BPC opinion was adopted by consensus of the members being present and having the right to vote.

The opinion is published on the ECHA webpage at: http://echa.europa.eu/regulations/biocidal-products-regulation/approval-of-active-substances/bpc-opinions-on-active-substance-approval.

Detailed BPC opinion and background

1. Overall conclusion

The overall conclusion of the BPC is that the alkyl (C_{12-16}) dimethylbenzyl ammonium chloride in product type 2 may be approved. The detailed grounds for the overall conclusion are described in the assessment report.

2. BPC Opinion

2.1. BPC Conclusions of the evaluation

a) Presentation of the active substance including the classification and labelling of the active substance

This evaluation covers the use of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride in product type 2. The active substance is already approved for product types 8 (Directive 2013/7/EU), 3 and 4 (Regulation 2021/1063/EU) and 1 (Regulation 2023/680/EU). Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride was notified as an existing active substance, separately by Lonza AG & Stepan Europe & Mason Europe Ltd (ADBAC Issues Steering Committee, US ISC) and Nouryon, Thor and Innospec (European Quat Consortium, EQC).

Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride is a cationic surfactant-type active substance, which is not manufactured solvent-free, but in process solvents as technical concentrate (in water or water/alcohol). Specifications for the reference sources are established.

The physico-chemical properties of the active substance and biocidal products have been evaluated and are deemed acceptable for the appropriate use, storage and transportation of the active substance and biocidal products.

Validated analytical methods are available for the active substance as manufactured and for the significant impurities. Validated analytical methods are available for the relevant matrices soil and water.

A harmonised classification for the active substance according to Regulation (EC) No 1272/2008 (CLP Regulation) is currently not available.

The proposed classification and labelling for alkyl (C_{12-16}) dimethylbenzyl ammonium chloride according to Regulation (EC) No 1272/2008 (CLP Regulation) is:

Classification according to the CLP Regulation	
Hazard Class and Category Codes	Acute Tox. 4 Skin Corr. 1B Eye Dam. 1 STOT SE 3 Aquatic Acute 1 Aquatic Chronic 1
	H302 H314 H318 H335 H400 H410
Labelling	
Pictogram Codes	GHS05, GHS07, GHS09
Signal Word	Danger

Hazard Statement Codes	H302: Harmful if swallowed. H314: Causes severe skin burns and eye damage. H335: May cause respiratory irritation. H410: Very toxic to aquatic life with long lasting effects.
Specific Concentration limits, M-Factors	M factor=10 (Acute) M factor=1 (Chronic)
eCA's NOTE: The classification as Eye Dam. 1 H318 was not discussed for the PTs 3, 4 and 8. This additional classification has been assigned for PTs 1 and 2 according to the Guidance on application of CLP criteria (v.5.0, July 2017), Section 3.3.2.4.	

b) Intended use, target species and effectiveness

Biocidal products based on alkyl (C_{12-16}) dimethylbenzyl ammonium chloride in PT2 are intended to be used for disinfection of surfaces, inanimate objects and materials and equipment in several sectors. The in-use concentration can vary, depending on the area and circumstances, *e.g.* frequency of use, level of soiling etc. The tested efficacious concentrations ranged from 700 to 1400 ppm.

Like other quaternary ammonium substances, alkyl (C_{12-16}) dimethylbenzyl ammonium chloride is a membrane active agent targeting predominantly the cytoplasmic (inner) membrane in bacteria or the plasma membrane in yeasts and fungi, leading to membrane disorganization, followed by leakage of the intracellular substance with release of K^+ ions and other cytoplasmic constitutes, and precipitation of cell content leading to cell death.

Efficacy data, provided by both Applicants, have demonstrated innate efficacy of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride against the target organisms bacteria, yeasts and fungi. The studies performed are regarded as sufficient at the approval stage. Further data in accordance with the relevant guidance documents shall be provided in the scope of product authorisation.

Quaternary ammonium compounds have been in use for many years, with no indication that their efficacy is diminishing over time. Nevertheless, occasional increase in tolerance has been reported in the literature. Therefore, as the development of resistance is possible for such uses, at the stage of product authorization strategies of resistance management will be reviewed, if needed.

c) Overall conclusion of the evaluation including need for risk management measures

Human health

The main critical effects associated with alkyl (C_{12-16}) dimethylbenzyl ammonium chloride are due to its corrosive properties. The active substance induces severe erythema, desquamation and corrosive eschar in the rabbit skin, and therefore it is classified as corrosive to skin. According to the available studies on toxicokinetics and metabolism as well as to the toxicity study package, no systemic effects in the absence of local effects were observed in any of those studies. Therefore, only a local risk assessment was considered necessary for the use of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride. To this aim, the local risk assessment has been performed applying the read-across principles from data presented for didecyldimethylammonium chloride (DDAC), a structurally related quaternary ammonium compound.

The table below summarises the exposure scenarios assessed.

Summary table: human health scenarios			
Scenario	**Primary or secondary exposure and description of scenario**	**Exposed group**	**Conclusion**
Disinfection of hard surface by spraying (coarse spray)	Primary exposure: Disinfection of hard surface in clean conditions. Mixing and loading: dilution of concentrate b.p. (containing 15% or 50% of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride) to the in-use concentrations (0.15% or 0.5%). PPE for mixing and loading: gloves, goggles, protective coveralls. Spraying: Disinfection of hard surface in the general sanitary sector (industry, institutions, laboratories and the primary healthcare/hospital sector).	Professional users	Acceptable with PPEs (needed for mixing and loading, only)

When appropriate risk mitigation measures are in place, including appropriate exposure control measures like PPEs, the potential risks associated with local effects were acceptable for the assessed use. The in-use concentrations do not trigger any classification for local effects, therefore no qualitative local risk assessment has been performed for inhalation and dermal route. Nevertheless, for primary exposure a semi-quantitative local risk assessment has been conducted for exposure via dermal route. No exposure is expected via inhalation route due to the dimensions of the particle sizes generated during the coarse spray application. The assessed product is not volatile and care should be taken that the application process does not result in the forming and exposure of inhalable aerosols. In case of spraying, only coarse sprays with big droplets are recommended. Coarse sprays with droplets ≥ 40 µm are not inhaled (TGD, EN 481 and WHO classification droplet sizes). Consequently, systemic effects do not occur and exposure/local effect potential is controlled or eliminated based on application equipment (which produces non-respirable particles), and/or PPE.

In conclusion, no unacceptable risks were highlighted due to the direct applications of the diluted solutions.

Since the in-use dilutions are of low concentration as well as the active substance has a low volatility, the secondary exposure *via* dermal and inhalation route was considered negligible.

Environment

Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride is readily biodegradable, and the substance is not persistent. The substance is hydrolytically stable, and hydrolytic processes do not contribute to its degradation in the environment, it is neither volatile nor is it expected to be present in the air. Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride can be considered immobile in soil and its degradation in soil has been demonstrated by a soil degradation study (OECD 307) carried out on the active substance. Regarding metabolites, it has been evaluated that the toxicity of the parent covers the toxicity of the metabolite(s), i.e. the maximum concentration of metabolite(s) in soil will not exceed initial concentration of parent at any time. The potential for bioaccumulation is low.

The sensitivity ranking of aquatic pelagic organisms to alkyl (C_{12-16}) dimethylbenzyl ammonium chloride is *Daphnia magna* >≈ algae > fish, hence the risk assessment to the

aquatic compartment is driven by the chronic toxicity to invertebrates. For the organisms in sediment compartment, the PNEC derived with the equilibrium partitioning method (EPM) is used in the risk assessment, as being more conservative than that derived experimentally.

The soil characteristics influence the toxicity of the active to terrestrial organisms by modulating its bioavailability. The chronic toxicity to microorganisms (most sensitive organisms in acute tests) drives the risk assessment.

The evaluation of secondary poisoning via aquatic food chain is based on short-term dietary toxicity data on birds and from a 52 weeks sub-chronic study with dog retrieved from the human health section, and using the fish experimental bioconcentration factor (BCF).

Product PT 2 is used as disinfectant in the sanitary sector for general hygiene purposes. Typical use of the product involves disinfection of hard surfaces (e.g. objects, floors, walls and ceilings) in several sectors by dilution of the product with water. Disinfection occurs by spraying (low pressure, coarse spray) and such a procedure is intended to be conducted by professionals only. All disinfected surfaces are subsequently washed with water. For such use conditions, it is considered that the only relevant environmental exposure is via emission to drains and STP after use. This exposure scenario is taken to represent a worst-case in terms of exposure to the environment.

The table below summarises the exposure scenarios assessed.

Summary table: environment scenarios		
Scenario	**Description of scenario including environmental compartments**	**Conclusion**
Disinfection of hard surfaces by spraying (coarse spray) Professional users	Disinfection of hard surfaces in the general sanitary sector (industry, institutions, laboratories and the primary healthcare/ hospital sector). Afterwards the treated surfaces are rinsed with water. Environmental compartments: STP, surface water, sediment and soil	Acceptable for all compartments using the consumption and tonnage based (based on the individual and combined tonnages of both applicants) approach.

Following the use of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride, for the aquatic compartment (STP, surface water and sediment), PEC/PNEC ratios are less than one, demonstrating that the risks to aquatic organisms and to the functioning of sewage treatment plants, following the use of the active substance, are acceptable.

The terrestrial compartment PEC/PNEC ratios for use of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride for general hygiene purposes (PT 2) are less than one using the consumption-based approach and the tonnage-based approach using the individual tonnages of either applicant. When the combined tonnage approach was used, initially the PEC/PNEC for soil slightly exceeded one.

However, the refinement of the risk assessment of the soil compartment resulted in a lower fraction released to soil via sewage sludge. [2] The PEC/PNEC for soil is subsequently determined to be below one, thus showing that the risk for soil organisms is acceptable.

[2] To refine the risk assessment of the soil compartment, as no data were available addressing the degradation of C_{12-16}-ADBAC/BKC in STP, a read-across to the OECD 314B studies on the structurally related quaternary ammonium compound DMPAP was undertaken, which resulted in a lower fraction released to soil via sewage sludge.

Overall conclusion

For human health, acceptable risks were identified for the disinfection of hard surfaces by spraying in the general sanitary sector by professional users, when appropriate RMMs are in place for the mixing and loading phase to prevent local effects.

For the environment, acceptable risks were identified for the professional scenario of disinfection of hard surfaces in the general sanitary sector.

In conclusion, safe uses covering both the human health and the environment have been identified.

2.2. Exclusion, substitution and POP criteria

2.2.1. Exclusion and substitution criteria

The table below summarises the relevant information with respect to the assessment of exclusion and substitution criteria:

Property		Conclusions	
CMR properties	Carcinogenicity (C)	No classification required	Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion (a), (b) and (c) of Article 5(1)
	Mutagenicity (M)	No classification required	
	Toxic for reproduction (R)	No classification required	
PBT and vPvB properties	Persistent (P) or very Persistent (vP)	Not P	Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion (e) of Article 5(1) and does not fulfil criterion (d) of Article 10(1)
	Bioaccumulative (B) or very Bioaccumulative (vB)	Not B	
	Toxic (T)	T	
Endocrine disrupting properties	Section A of Regulation (EU) 2017/2100: ED properties with respect to humans	No	Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion (d) of Article 5(1) No conclusion can be drawn whether alkyl (C_{12-16}) dimethylbenzyl ammonium chloride fulfils criterion (e) of Article 10(1)
	Section B of Regulation (EU) 2017/2100: ED properties with respect to non-target organisms	No conclusion can be drawn based on the available data	
	Article 57(f) and 59(1) of REACH	No	
	Intended mode of action that consists of controlling target organisms via their endocrine system(s)	No	
Respiratory	Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion		

Property	Conclusions
sensitisation properties	(b) of Article 10(1)
Concerns linked to critical effects other than those related to endocrine disrupting properties	Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion (e) of Article 10(1)
Proportion of non-active isomers or impurities	As the proportion of impurities is below 20%, alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not fulfil criterion (f) of Article 10(1)

Consequently, the following is concluded: alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not meet the exclusion criteria laid down in Article 5 of Regulation (EU) No 528/2012. Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not meet the conditions laid down in Article 10 of Regulation (EU) No 528/2012 and is therefore not considered as a candidate for substitution.

The exclusion and substitution criteria were assessed in line with the "Note on the principles for taking decisions on the approval of active substances under the BPR"[3] and in line with "Further guidance on the application of the substitution criteria set out under Article 10(1) of the BPR"[4] and with "Implementation of scientific criteria to determine the endocrine-disrupting properties of active substances currently under assessment"[5] agreed at the 54th, 58th and 77th meeting respectively, of the representatives of Member States Competent Authorities for the implementation of Regulation 528/2012 concerning the making available on the market and use of biocidal products. This implies that the assessment of the exclusion criteria is based on Article 5(1) and the assessment of substitution criteria is based on Article 10(1)(a, b, d, e and f).

For the endocrine-disrupting properties as defined in Regulation (EU) No 2017/2100, properties of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride have been sufficiently investigated and based on the available evidence, the substance does not meet the ED criteria for human health according to the criteria laid down in Regulation (EU) No 2017/2100. With respect to non-target organisms, in relation to the criteria set out in section B of Regulation (EU) No 2017/2100 no conclusion can be drawn based on the available data. For reports submitted before 1 September 2013, it is mentioned in the CA meeting note mentioned above that the evaluating Competent Authority has to conclude based on the already available data and/or the data provided by the applicant and, in case the data is insufficient to reach a conclusion, the BPC may conclude in its opinion that no

[3] See document: Note on the principles for taking decisions on the approval of active substances under the BPR (available from https://circabc.europa.eu/d/a/workspace/SpacesStore/c41b4ad4-356c-4852-9512-62e72cc919df/CA-March14-Doc.4.1%20-%20Final%20-%20Principles%20for%20substance%20approval.doc)
[4] See document: Further guidance on the application of the substitution criteria set out under article 10(1) of the BPR (available from https://circabc.europa.eu/d/a/workspace/SpacesStore/dbac71e3-cd70-4ed7-bd40-fc1cb92cfe1c/CA-Nov14-Doc.4.4%20-%20Final%20-%20Further%20guidance%20on%20Art10(1).doc)
[5] See document: Implementation of scientific criteria to determine the endocrine –disrupting properties of active substances currently under assessment (https://circabc.europa.eu/sd/a/48320db7-fc33-4a91-beec3d93044190cc/CA-March18-Doc.7.3a-final-%20EDs-%20active%20substances%20under%20assessment.docx).

conclusion could be drawn. It is noted that the evaluation of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride for PT 2 was submitted before 1 September 2013.

2.2.2. POP criteria

Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride does not meet the PBT criteria. No potential for long-range environmental transport is expected, either. Subsequently, it is concluded that alkyl (C_{12-16}) dimethylbenzyl ammonium chloride is not expected to meet the POP criteria.

2.3. BPC opinion on the application for approval of the active substance alkyl (C_{12-16}) dimethylbenzyl ammonium chloride in product type 2

In view of the conclusions of the evaluation, it is proposed that alkyl (C_{12-16}) dimethylbenzyl ammonium chloride shall be approved and be included in the Union list of approved active substances, subject to the following specific conditions:

1. Specification: minimum purity of the active substance evaluated: 972 g/kg dry weight

2. The authorisations of biocidal products are subject to the following condition(s):

    a. The product assessment shall pay particular attention to the exposures, the risks and the efficacy linked to any uses covered by an application for authorisation, but not addressed in the Union level risk assessment of the active substance.

    b. In view of the risks identified for the uses assessed, the product assessment shall pay particular attention to:

        i. Professionals.

Alkyl (C_{12-16}) dimethylbenzyl ammonium chloride meets the criteria for classification according to Regulation (EC) 1272/2008 as skin corrosive of category 1B, specific target organ toxicity – single exposure, category 3 and toxic to aquatic acute category 1. The active substance does not fulfil the criteria according to Article 28(2)(a) to enable inclusion in Annex I of Regulation (EU) 528/2012.

2.4. Elements to be taken into account when authorising products

1. The following recommendations and risk mitigation measures have been identified for the uses assessed. Authorities should consider these risk mitigation measures when authorising products, together with possible other risk mitigation measures, and decide whether these measures are applicable for the concerned product: **Error! Bookmark not defined.**

    a. If an unacceptable risk is identified for professional users, safe operational procedures and appropriate organisational measures shall be established. Products shall be used with appropriate personal protective equipment where exposure cannot be reduced to an acceptable level by other means.

    b. An assessment of the risk during spraying may be required at product authorisation where use of the product may lead to inhalable aerosol formation (droplets < 40 µm).

2.5. Requirement for further information

Sufficient data have been provided to verify the conclusions on the active substance, permitting the proposal for the approval of alkyl (C_{12-16}) dimethylbenzyl ammonium chloride.

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