Biocidal Products Committee (BPC)

Opinion on the application for renewal of the approval of the active substance:

Sulfuryl fluoride

Product type: 18

ECHA/BPC/390/2023

Adopted

13 September 2023

Opinion of the Biocidal Products Committee

on the application for renewal of the approval of the active substance Sulfuryl fluoride for product type 18

In accordance with Article 14(3) 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 application for renewal of the approval in product type 18 of the following active substance:

Common name:	**Sulfuryl fluoride**
Chemical name:	**Sulfuryl difluoride**
EC No.:	**220-281-5**
CAS No.:	**2699-79-8**

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 Douglas BLG BVBA on 28 June 2017 the evaluating Competent Authority in Sweden submitted an assessment report and the conclusions of its evaluation to the Agency on 12 December 2022, after performing a full evaluation of the renewal application.

Following the application for renewal it was decided that according to Article 14(2) of the BPR a full evaluation was necessary. Due to this and the need for additional information, the expiry date of the approval was postponed twice and is now 31 December 2024. In order to review the renewal assessment report and the conclusions of the evaluating Competent Authority, the Agency organised consultations via the BPC (BPC-48) and its Working Groups (WG-V-2019, WG-II-2023). Revisions agreed upon were presented and the assessment report and the conclusions were amended accordingly.

Adoption of the BPC opinion

Rapporteur: Sweden

The BPC opinion on the application for renewal of the active substance sulfuryl fluoride in product type 18 was adopted on 13 September 2023.

The BPC opinion was adopted by consensus. 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 approval of the **sulfuryl fluoride** in product type **18** may not be renewed. The detailed grounds for the overall conclusion are described in the renewal assessment report.

2. BPC Opinion

2.1. BPC Conclusions of the evaluation

This evaluation covers the use of sulfuryl fluoride as gaseous fumigant in product type 18.

The following information was generated since the initial approval[1] and was submitted by the applicant:

i. New data on toxicokinetic and pharmacokinetic modelling

ii. Neurotoxicity study

iii. Immunotoxicity study (OPPTS 870.7800)

iv. Ecotoxicological tests with organisms exposed via air: terrestrial plants, bobwhite quail and honeybee.

v. A general literature search for sulfuryl fluoride.

vi. Two reports on monitoring data in atmosphere (2017 and 2022) due to a specific requirement in the initial approval decision.

vii. A proposal for measures reducing emissions of sulfuryl fluoride, related to request BPC opinion ECHA/BPC/073/2015 that at renewal stage the possibility of risk mitigation measures in order to reduce the emissions to air needs to be addressed.

Further information was provided by the applicant on request by the eCA related to information requirements of the BPR as well as new or updated guidance:

viii. A new 5-batch analysis

ix. Analytical methods for the analysis of the technical material

x. An assessment of relevant impurities

xi. A literature search for endocrine disruption in humans for sulfuryl fluoride and metabolites fluoride and fluorosulfate

xii. A test according to OECD TG No. 489 (Comet assay)

xiii. Statistical re-analysis based on geometric mean concentrations of old ecotoxicological tests.

xiv. An updated environmental exposure assessment

[1] Annex I to Directive 98/8 for PT 18 on 1 July 2011 (Directive 2009/84/EC)

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

The manufacturing plant has been rebuilt since the first approval, and the previously under the Biocides Directive established maximum limits of the impurity do no longer comply with the contents found in the newly submitted quality control data and 5-batch analysis.

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

Validated analytical methods are available for the active substance as manufactured and for the impurities. Validated analytical methods are available for air, and for animal and human body fluids and tissues. Analytical methods for residues in food and feedstuffs are not required since no residues are expected from the use of sulfuryl fluoride as all food and feed items must be removed prior to fumigation. An analytical method for soil is not required due to the expected negligible exposure of soil.

The Human Health Working Group in June 2023 decided that the $AEC_{medium\text{-}term}$ for sulfuryl fluoride must be lowered by a safety factor of 10. Consequently, the new AEC is 0.1 ppm and thus the condition is no longer met for the validity of the analytical method in air since it does not have a sufficiently low limit of quantification (LOQ).

Thionyl fluoride had been identified as impurity already in the assessment of the first approval. No guidance how to identify relevant impurities was available at that time. Based on the new 5-batch analysis and in the light of the guidance for identification of relevant impurities developed after the first approval, thionyl fluoride was identified as a relevant impurity both for environment and human health in the current assessment.

The substance is currently also under assessment for renewal of approval under the Plant Protection Products Regulation, EC No 1107/2009.

A harmonised classification according to Regulation (EC) No 1272/2008 (CLP Regulation) is available. However, the eCA proposes to amend the current proposal and has therefore submitted a CLH dossier to ECHA (22 December 2022).

The current classification and labelling for sulfuryl fluoride according to Regulation (EC) No 1272/2008 (CLP Regulation). The classification has been translated from Commission Directive 2004/73/EC (29 April 2004) and is:

Classification according to the CLP Regulation	
Hazard Class and Category Codes	Press. Gas Acute Tox. 3 STOT RE 2 Aquatic acute 1
Labelling	
Pictogram codes	GHS04 GHS08 GHS09 GHS06
Signal Word	Dgr
Hazard Statement Codes	H331 H373 H400
Specific Concentration limits, M-Factors	Not assigned

The proposed classification and labelling for sulfuryl fluoride according to Regulation (EC) No 1272/2008 (CLP Regulation) is:

(Proposed) Classification according to the CLP Regulation	
Hazard Class and Category Codes	Press. Gas (Low Press. Liq.) Acute Tox. 2 STOT RE 2 Aquatic acute 1 Aquatic chronic 1
Labelling	
Pictogram codes	GHS09 GHS08 GHS06 GHS04 Dgr
Signal Word	Danger
Hazard Statement Codes	H280 H330 H373 H410
Specific Concentration limits, M-Factors	M = 1 (both acute and chronic)

The information relevant to conclude if sulfuryl fluoride requires classification as an oxidising gas in accordance with Regulation (EU) No 1272/2008 was not provided.

b) Intended use, target species and effectiveness

Sulfuryl fluoride is used as a fumigant for the control of stored product insect pests in emptied food processing facilities and empty storage facilities. Fumigation is conducted by trained professional fumigators only.

Sulfuryl fluoride penetrates the target organism's body through inhalation in actively respiring life stages or through diffusion into the egg. Sulfuryl fluoride is considered a non-specific target poison. When sulfuryl fluoride enters a target organism it is broken down to the fluoride anion which disrupts the glycolysis and fatty acid cycles, depriving the organism of the necessary cellular energy.

Sufficient information has been provided to demonstrate that sulfuryl fluoride is effective against insects in in emptied food processing facilities and empty storage facilities. Efficacy is a matter of concentration and time in relation to temperature and volume of the treated space. Effective concentrations vary depending on the target species and life-stage. The maximum target concentration is 128 g/m^3.

There are no indications of resistance towards sulfuryl fluoride in target species.

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

Human health

A classification of sulfuryl fluoride as acutely toxic by the inhalation route in Category 2 (H330: Fatal if inhaled) is proposed based on data in mice supported by human death cases.

Sulfuryl fluoride is not genotoxic or carcinogenic. The available data indicate thyroid hypertrophy in mice which appears at doses not exceeding the maximum tolerated dose (MTD), possibly due to the metabolite fluoride. A concern regarding T-mediated adversity was identified, but no conclusion could be drawn based on available data. Furthermore, relevant

parameters with regard to the E, A, S modalities have not been sufficiently investigated. The eCA requested an Extended One-Generation Reproductive Toxicity (EOGRT) Study (OECD TG 443) which was however not submitted by the applicant. As a result, the available information is not sufficient to conclude whether sulfuryl fluoride fulfils the criteria for endocrine disruption in humans.

Sulfuryl fluoride is a neurotoxic substance and effects on the brain and nervous system were observed in several mammalian species. There are also case reports and medical data showing effects on the brain. However, no developmental neurotoxicity (DNT) study is available with sulfuryl fluoride that includes exposure from the time of implantation throughout lactation and investigations for learning and memory. Thus, sulfuryl fluoride is not fully investigated for neurotoxicity and further information would be needed to assess whether the classification criteria for reproductive toxicity cat 1A or 1B for adverse effects on development are met. The Human Health Working Group in June 2023 agreed that there is insufficient information to conclude on developmental neurotoxicity and decided to apply an extra assessment factor of 10 to cover for remaining uncertainties.

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**
Structural fumigation	Primary exposure. Introduction of fumigant Gas monitoring during fumigation Aeration of structure/Re-entry	Professionals	Not possible to conclude due to insufficient information related to endocrine disrupting properties
Secondary exposure from atmospheric emissions	Secondary exposure	Bystanders/residentials	Not possible to conclude due to insufficient information related to endocrine disrupting properties

Exposure data from ten fumigation trials in Europe and US demonstrated that potential inhalation exposure (not taking RPE into account) to sulfuryl fluoride can occur at levels above 0.1 ppm for operators during the fumigation process. As reported in the RAR, the overall mean 8-hour time weighted average (TWA) air concentration was 0.92 ppm for fumigation and aeration, i.e., 920% of the proposed AEC of 0.1 ppm. Thus, to ensure that the exposure is below the proposed 0.1 ppm, mandatory use of a self-contained breathing apparatus and monitoring of the air concentrations in fumigator’s working area are essential.

Environment

Environmental exposure occurs when the gas is released from the confinement into the surrounding air at the end of a treatment period. Using fugacity modelling it is suggested that majority of sulfuryl fluoride remains in air (> 99.9%) and the exposure of soil, surface water and sediment are negligible.

Partly insufficient information was provided on the hydrolysis breakdown products of sulfuryl fluoride. Furthermore, information is lacking to assess whether the substance fulfils the ED

criteria in non-target organisms. However, the eCA did not request this information since the requested information for the ED assessment for humans was not submitted. Therefore, it cannot be concluded whether risks from the use of sulfuryl fluoride are acceptable.

The table below summarises the exposure scenarios assessed.

Summary table: environment scenarios		
Scenario	**Description of scenario including environmental compartments**	**Conclusion**
Fumigation of large, confined building	Release to air after treatment Compartments expected to be exposed: air, soil, surface water (incl. sediment), groundwater.	Not possible to conclude due to insufficient information related to endocrine disrupting properties

Sulfuryl fluoride is a highly potent greenhouse gas. Its global warming potential is between 4630 and 4880 (over 100 years). The atmospheric concentrations of sulfuryl fluoride are measured as part of the Advanced Global Atmospheric Gases Experiment (AGAGE[2]) project. The results show that concentrations in remote atmosphere are steadily increasing and there is no plateau concentration observed. On the contrary, it is expected that the atmospheric concentration will further increase in the future. The global emissions are the result of the world-wide use in pesticides (biocidal products and plant protection products). This current contribution of sulfuryl fluoride to global warming corresponds to several million tons of anthropogenic CO_2 emissions. Based on the data available in the biocide dossier it was estimated that the global emissions of sulfuryl fluoride corresponds to approximately 0.05% (over 100 years) of the total CO_2 equivalents. The use of sulfuryl fluoride in biocidal products in the EU contributes to a minor part (<10%) to these global emissions.

Overall conclusion

It is not possible to conclude on the risks from the use of sulfuryl fluoride as fumigant due to insufficient information related to endocrine disrupting properties for humans and non-target organisms. Sulfuryl fluoride is a greenhouse gas and therefore contributes to global warming. In addition, sulfuryl fluoride was concluded to meet the criteria for long-range transport potential.

The information provided is not sufficient to conclude whether sulfuryl fluoride fulfils exclusion criteria with regard to reproductive toxicity and endocrine disruption (ED). Therefore, it cannot be concluded that sulfuryl fluorides meets the conditions laid down in Article 12(1) of Regulation (EU) No 528/2012.

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[3]:

[2] https://agage.mit.edu/

[3] If the active substance meets substitution due to the properties of metabolite(s) or impurity(ies), explain this below the table by describing for which criteria the evaluation is based on the metabolite(s) or impurity(ies).

Property		Conclusions	
CMR properties	Carcinogenicity (C)	The active substance is not classified and does not meet the criteria to be classified as Carc. Cat. 1A or 1B.	It is not possible to conclude whether sulfuryl fluoride fulfils criterion (c) of Article 5(1)
	Mutagenicity (M)	The active substance is not classified and does not meet the criteria to be classified as Mut. Cat 1A or 1B	
	Toxic for reproduction (R)	The information provided by the applicant is not sufficient to allow a conclusion whether sulfuryl fluoride fulfils criterion.	
PBT and vPvB properties	Persistent (P) or very Persistent (vP)	The active substance as inorganic compound is excluded from the PBT assessment taking into account the Annex XIII of REACH regulation 1272/2008.	Sulfuryl fluoride 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)		
	Toxic (T)		
Endocrine disrupting properties	Section A of Regulation (EU) 2017/2100: ED properties with respect to humans	Information not sufficient to conclude	It is not possible to conclude on fulfilling Article 5(1)(d) or on fulfilling Article 10(1)(e)
	Section B of Regulation (EU) 2017/2100: ED properties with respect to non-target organisms	Information not sufficient to conclude	
	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	

Property		Conclusions
Respiratory sensitisation properties	No	
Concerns linked to critical effects other than those related to endocrine disrupting properties	No	
Proportion of non-active isomers or impurities	No	

Consequently, the following is concluded:

The information provided by the applicant is not sufficient to conclude whether sulfuryl fluoride meets the exclusion criteria laid down in Article 5 of Regulation (EU) No 528/2012.

The information provided by the applicant is not sufficient to conclude whether sulfuryl fluoride meets the conditions laid down in Article 10 of Regulation (EU) No 528/2012.

The exclusion and substitution criteria were assessed in line with "Further guidance on the application of the substitution criteria set out under article 10(1) of the BPR"[4] agreed at the 58th meeting 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).

2.2.2. POP criteria

Sulfuryl fluoride meets the criteria for long-range transport potential according to UNECE Decision 1998/2 on air pollution but is not a persistent organic compound.

2.3. BPC opinion on the application for renewal of the active substance sulfuryl fluoride in product type PT18

Information is not sufficient to conclude whether sulfuryl fluoride meets the criteria conditions laid down in Article 12(1) of Regulation (EU) 528/2012.

In particular, the provided information is not sufficient to conclude whether sulfuryl fluoride fulfils exclusion criteria with regard to reproductive toxicity and endocrine disruption (ED).

Consequently, as provided for in article 9(1)(b), since requisite information and data have not been submitted within the prescribed period, it is proposed that the approval of **sulfuryl fluoride** shall not be renewed under Regulation (EU) 528/2012 as an active substance in insecticides (product-type 18).

[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).

The following information was requested referring to article 6(2) last paragraph of the BPR but has not been provided: EOGRTS (OECD TG 443) including cohorts 2A and 2B with additional tests for learning and memory in order to assess developmental neurotoxicity and endocrine disruption in humans.

Sulfuryl fluoride does not fulfil the criteria according to Article 28(2) to enable inclusion in Annex I of Regulation (EU) 528/2012 as the active substance is proposed to be classified as acutely toxic of category 2, specific target organ toxicant by single or repeated dose, toxic to aquatic life of acute category 1, and it has neurotoxic properties.

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