Biocidal Products Committee (BPC)

Opinion on the application for approval of the active substance:

2-methylisothiazol-3(2H)-one

Product type: 13

ECHA/BPC/025/2014

Adopted

2 October 2014

Annankatu 18, P.O. Box 400, FI-00121 Helsinki, Finland | Tel. +358 9 686180 | Fax +358 9 68618210 | echa.europa.eu

Opinion of the Biocidal Products Committee

on the application for approval of the active substance 2-methylisothiazol-3(2H)-one for product type 13

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 13 of the following active substance:

Common name:	**2-methylisothiazol-3(2H)-one**
Chemical name(s):	**MIT, MI, methylisothiazolinone, 2-methyl-4-isothiazoline-3-one, 2-methyl-2H-isothiazol-3-one**
EC No.:	**220-239-6**
CAS No.:	**2682-20-4**
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 BPC opinions

Following the submission of an application by Rohm and Haas Europe Trading ApS, a subsidiary of The Dow Chemical Company (hereafter referred to Rohm and Haas) on 9 July 2007 and Thor GmbH on 30 July 2007, the evaluating Competent Authority Slovenia submitted an assessment report and the conclusions of its evaluation to the Commission on 11 April 2012. In order to review the assessment report and the conclusions of the evaluating Competent Authority, the Agency organised consultations via the BPC and the Commission via the Biocides Technical Meetings. Revisions agreed upon were presented and the assessment report and the conclusions were amended accordingly.

Adoption of the BPC opinion

Rapporteur: BPC member for Slovenia

The BPC opinion on the approval of the active substance 2-methylisothiazol-3(2H)-one in product type 13 was adopted on 2 October 2014.

The BPC opinion was adopted by simple majority of the members present having the right to vote. The minority position including its grounds is published on the ECHA webpage at: http://echa.europa.eu/web/guest/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 2-methylisothiazol-3(2H)-one in product type 13 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 2-methylisothiazol-3(2H)-one in product type 13. 2-Methylisothiazol-3(2H)-one acts by two step mechanism which involves rapid inhibition of growth and metabolism followed by irreversible cell damage resulting in loss of viability. Critical physiological functions such as growth, respiration (oxygen consumption), and energy generation (ATP synthesis) are disrupted and cell death results from the destruction of protein thiols and production of free radicals.

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. Specifications for the reference sources are established.

Validated analytical methods are available for the determination of the active substance as manufactured, for the analysis of impurities and the relevant matrices soil, water, air and food/feeding stuffs.

A harmonised classification for 2-methylisothiazol-3(2H)-one is not available and the active substance is not listed in Annex VI of the Regulation (EC) No 1272/2008. A CLH dossier is under preparation and will be submited to ECHA by the end of 2014.

The proposed classification and labelling for 2-methylisothiazol-3(2H)-one according to Regulation (EC) No 1272/2008 (CLP Regulation) is:

Proposed classification according to the CLP Regulation	
Hazard Class and Category Codes	Acute Tox. 3 (oral); H301 Acute Tox. 3 (dermal); H311 Acute Tox. 2 (inhalation); H330 Skin corr. 1B; H314 STOT Single 3; H335 Skin sens. 1A; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410
Labelling	
Pictograms	GHS05 GHS06 GHS09
Signal Word	Danger
Hazard Statement Codes	H301; Toxic if swallowed. H311; Toxic in contact with skin. H330; Fatal if inhaled. H314; Causes severe skin burns and eye damage. H317; May cause an allergic skin reaction. H335; May cause respiratory irritation. H410; Very toxic to aquatic organisms with long lasting effects.

Specific Concentration limits, M-Factors	SCL ≥ 0.06 % M=10 (Aquatic Acute 1) M=1 (Aquatic Chronic 1)
Justification for the proposal	
H301: Based on an oral LD_{50} 120 mg MIT/kg bw, rat (females). H311: Based on a dermal LD_{50} 242 mg MIT/kg bw, rat. H314: Based on the corrosive effects observed in rabbits exposed to MIT for 3 minutes, 1 hour and 4 hours and corrosiveness in human skin epidermal construct. .H317: Based on the effects observed in local lymph node assay, Magnusson-Klingmann skin sensitization test and supportive studies (Buehler test, open epicutaneous test and human patch tests). H335: Based on results from an acute inhalation toxicity study in rats, supported by and an upper airway irritation test in rats. H400: Based the 24 hours E_rC_{50} of 0.0695 mg/l from the *Skeletonema costatum* study. H410: Based the 24 hours E_rC_{10} of 0.024 mg/l from the *Pseudokierchneriella subcapiata* study and the substance failing the thresholds to be considered ready biodegradable.	

b) Intended use, target species and effectiveness

2-Methylisothiazol-3(2H)-one is a metalworking fluid (MWF) preservative intended to be used only in professional applications in order to control the growth of a variety of microorganisms in MWFs in their action of cooling, lubricating and flushing away metal shavings (or swarf). The biocidal product is added directly to the sump of a metalworking operation using a metering pump (semi-automatically) or fully automatically in closed system. Use in industrial processes and by the general public is not envisaged.

The data on methylisothiazol-3(2H)-one and the representative biocidal products have demonstrated a sufficient level of efficacy against target microorganisms at a concentration of 250 ppm and can act as a bactericide and fungicide over a broad range of environmental conditions within emulsifiable and water soluble metalworking fluids, metal cleaners and water-based hydraulic fluids.

The resistance to MIT commercial product has not been a problem of any significance since its first use in mid 1990s. There is only one published report of low level microbial resistance attributed to the MIT active ingredient alone and this was from a laboratory adapted strain. There are, however, a few published reports of microbial resistance or adaptation to CMIT/MIT combination products, but the extent and frequency of occurrence is minor and insignificant relative to the widespread global use of CMIT/MIT products. Furtheremore, no published reports of "acquired resistance" due to the transfer of genetic elements (plasmids, etc) from CMIT/MIT or MIT resistant organisms is available.

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

Human health

Inhalation of 2-methylisothiazol-3(2H)-one irritates the respiratory tract. 2-Methylisothiazol-3(2H)-one is corrosive to the skin and may cause serious damage to the eye. Skin sensitization was observed in test animals and humans. After repeated exposure only minor systemic effects were observed, like reduction in body weight gain. 2-Methylisothiazol-3(2H)-one is not genotoxic, mutagenic, reproductive or developmental toxicant.

The table below summarises the exposure scenarios assessed.

Summary table: human health scenarios		
Scenario	**Primary or secondary exposure and description of scenario**	**Exposed group**
Mixing/loading of the biocidal product into MWF	Primary exposure Scenario description: mixing/loading the biocidal product into MWF system by using a metering pump semi-automatically or fully automatically Duration of application: 10 min Frequency of application: 1/month Applied amount: depend on the size of the system RMM: safe operational procedures, appropriate organisational and technical risk mitigation measures must be implemented, including the appropriate PPE (gloves, impermeable coverall, face shield)	professionals
Application of MWF	Primary exposure Scenario description: - machine working Duration of application: 1 h/day Frequency of application: 260 days/year Applied amount: max 250 ppm PPE: impermeable coverall, no gloves* - other tasks than machine working (including post application tasks: maintenance/cleaning) Duration of application: 7 hrs/day Frequency of application: 260 days/year Applied amount: max 250 ppm PPE: impermeable coverall and gloves	professionals

*The use of protective gloves during machine work can represent a health risk (HEEG opinion on Human exposure assessment to biocidal products used in metalworking fluids (PT13)).

Local effects

According to the criteria of the Regulation 1272/2008 2-methylisothiazol-3(2H)-one is proposed to be classified as a skin, eye and respiratory irritant and a skin sensitizer category 1A. The most critical local effect is skin sensitization, with a proposed specific concentration limit (SCL) of maximum 0.06 %.

Due to the skin sensitisating properties, any contact with the biocidal products containing 20 or 50 % MIT should be prevented by the following risk mitigation measures: semi-automated or automated mixing and loading of MIT into MWF; application of closed systems designed to enable easy maintenance; keeping the equipment under negative pressure, if possible; regular cleaning of the equipment and work area; control of staff entry to work area; and ensuring good maintenance of all equipment.

A permit should be required for maintenance work; management/supervision to check that theRMM in place are being used correctly and occupational conditions are followed, training for staff on good practice, procedures and training for emergency decontamination and disposal should be performed, good standard of personal hygene is required, any "near miss" situation should be recorded.

Suitable PPE (like chemical resistant gloves, boots, impermeable coverall and face shield) should be worn during mixing and loading. Coveralls and protective gloves during application and post-application tasks are required, except for machine working where gloves are not expected to be worn due to dexterity and safety reasons. The use of appropriate PPE, impermeable coverall, protective gloves, boots and face shield during handling these products as well good cleaning practise should be advised in the use instructions.

The concentration of 2-methylisothiazol-3(2H)-one in MWF is below the SCL for skin sensitization and that is why no adverse local effects are expected after handling 2-methylisothiazol-3(2H)-one preserved MWF. Additionally, the use of impermeable coverall and gloves is proposed also during application tasks based on good working practice and to reduce the systemic exposure of workers.

The risk for local respiratory effects was assessed quantitatively and indicated that inhalation exposure to 2-methylisothiazol-3(2H)-one during all tasks is very low and does not pose a risk for the health of professional users handling 2-methylisothiazol-3(2H)-one containing biocidal products or 2-methylisothiazol-3(2H)-one preserved MWF.

Systemic effects
Exposure of professionals to 2-methylisothiazol-3(2H)-one was evaluated for the scenarios summarised in the table above.

The mixing and loading, application and post-application tasks could potentially occur on the same day. Therefore combined exposure was considered for all tasks. Safe uses were identified for semi-automated or automated mixing and loading of the biocidal products into MWF and wearing of appropriate personal protective equipment (PPE), including impermeable coverall, gloves, boots and face shield during this task. To ensure workers safety coveralls and gloves should be worn during metalworking tasks.

The scenario of manual mixing and loading of biocidal products into MWF was also estimated and resulted in unacceptable exposure for professionals. Due to severe local effects any exposure to biocidal product should be prevented. Dermal exposure to MIT can be reduced by the use of PPE, yet complete prevention of exposure can not be assumed. However, at product authorization application further data can be submitted to demonstrate safe use for manual mixing and loading.

Regarding the use of MIT in MWF used for drilling machines no safe use was identified using the harmonized approach of HEEG opinion 5. For semi-automated or automated machines, like CNC machines, where the dermal contact is reduced a safe use of the product was identified based on expert judgment.

Environment

The table below summarises the exposure scenarios assessed.

Summary table: environment scenarios	
Scenario	**Description of scenario including environmental compartments**
Preservative for water-soluble metalworking fluids	Emission to wastewater for a waste treatment facility receiving spent metal-working fluids (subsequent release to sewage treatment plant (STP), surface water, sediment, soil, groundwater and secondary poisoning)
Preservative for emulsifiable metalworking fluids	Emission to wastewater for a waste treatment facility receiving spent metal-working fluids (subsequent release to sewage treatment plant (STP), surface water, sediment, soil, groundwater and secondary poisoning)

It was assumed that spent metalworking fluid is disposed of as hazardous waste. The main emission route of 2-methylisothiazol-3(2H)-one through its use in the representative biocidal product is via wastewater to sewage water treatment plants (STP) and subsequent release via effluents to surface water and sediment. There are no direct emissions to surface water or sediment, and aquatic or sediment organisms are not directly exposed to the active substance. Direct exposures of the environment via the pathways air, soil or groundwater are considered to be negligible. However, STP sludge might be applied to soil. Therefore, the risk was calculated also for soil and groundwater. In addition secondary poisoning was assessed.

In Tier 1 emissions during recovery of spent metalworking fluid are identified as a potential risk to the aquatic environment. The PEC/PNEC ratio is above 1 for both the use in emulsifiable MWF and the use in soluble MWF. The Tier 1 PEC/PNEC ratio is above 1 for the use in emulsifiable MWF and below 1 for the use in water-soluble MWF, indicating a potential risk to soil organisms from sewage sludge amendment of soil for the use in emulsifiable MWF. In Tier 1, the concentration in pore water (surrogate for groundwater) are < 0.1 µg/l set up for pesticides for the use of MIT as a preservative in water soluble metalworking fluids, indicating acceptable risk of leaching to groundwater. For the use of methylisothiazol-3(2H)-one as a preservative in emulsifiable metalworking fluids the trigger of 0.1 µg/l is in Tier 1 slightly exceeded.

Based on more recent and comprehensive data from companies Tier 2 calculations were performed, considering dilution factors of 100 for the dilution from the company to an external STP as well as the dilution from STP to the receiving river and a factor of relevance of 0.5. The resulting PEC/PNEC ratios are all <1 for both the use in water-soluble MWF and the use in emussifiable MWF, indicating an acceptable risk. In Tier 2, the concentration in porewater (surrogate for groundwater) are < 0.1 µg/l set up for pesticides for the use of 2-methylisothiazol-3(2H)-one as a preservative in water soluble metalworking fluids as well as the use of 2-methylisothiazol-3(2H)-one as a preservative in emulsifibale metalworking fluids, indicating acceptable risks to groundwater.

The potential of bioaccumulation of 2-methylisothiazol-3(2H)-one can be considered very low.

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.
	Mutagenicity (M)	No classification required.
	Toxic for reproduction (R)	No classification required.
PBT and vPvB properties	Persistent (P) or very Persistent (vP)	not P or vP
	Bioaccumulative (B) or very Bioaccumulative (vB)	not B or vB
	Toxic (T)	not T
Endocrine disrupting properties	2-Methylisothiazol-3(2H)-one is not considered to have endocrine disrupting properties.	

Consequently, the following is concluded:
2-Methylisothiazol-3(2H)-one does not meet the exclusion criteria laid down in Article 5 of Regulation (EU) No 528/2012 and is therefore not considered as a candidate for substitution.

2-Methylisothiazol-3(2H)-one 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" agreed at the 54th 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 and d).

The BPC discussed whether MIT can be considered as a candidate for substitution based on Article 10(1)(e). It was noted that the concern for sensitisation was not relevant for PT13, in particular for professional use but may be relevant for other uses and product types. The BPC recommends that the issue is considered when the discussion on the development of related guidance takes place and a decision is taken on the approval of the active substance for PT13 under Article 9(1).

2.2.2. POP criteria

2-Methylisothiazol-3(2H)-one is not considered to be P, B or T. This active substance shows a half-life of 3.47 hours in air and a vapour pressure of 5.6×10^{-7} Pa, well below the cut-off value of 1000 Pa. Thus 2-methylisothiazol-3(2H)-one does not show a potential for long-range transport. Given the above 2-methylisothiazol-3(2H)-one does not meet the criteria for being a persistent organic pollutant (POP).

2.3. BPC opinion on the application for approval of the active substance 2-methylisothiazol-3(2H)-one in product type 13

In view of the conclusions of the evaluation, it is proposed that 2-methylisothiazol-3(2H)-one 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: 95.0% w/w

2. 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.

3. For professional users, safe operational procedures, appropriate organisational and technical risk mitigation measures shall be established. Where exposure cannot be reduced to an acceptable level by other means, products shall be used with appropriate personal protective equipment.

4. Loading of the products into metalworking fluids shall be semi-automated or automated and the resulting metalworking fluid shall only be used in semi-automated or automated machines, unless it can be demonstrated at product authorization that risks to professional users can be reduced to an acceptable level by other means.

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. Whilst the efficacy data provided is sufficient to recommend approval of the substance, data demonstrating the efficacy of the product at the minimum application rate against the range of proposed target organisms using the recommended application equipment must be provided at the product authorisation stage.

2. The professional exposure for MIT was estimated based on a non-harmonized approach which is described in the assessment report. At product authorisation, the ongoing discussion in the Ad hoc Working Group on Human Exposure and the resulting revised recommendation for PT 13 or further data have to be considered.

3. Where exposure cannot be reduced to an acceptable level by other means, the end-use concentration of MIT in MWF should not exceed the specific concentration limit for sensitisation, as the use of gloves is not common practice during metalworking on turning machines.

4. For applications at product authorisation the RAC opinion on sensitisation has to be considered. Biocidal products that trigger classification as skin sensitisers Category 1A shall normally not be authorised for non-professional uses as presented in the Member States' Competent Authorities note for guidance (CA-Sept13-Doc.6.2.a – Final.Rev1).

5. Awaiting new guidance to estimate emissions of MWF preservatives for PT 13 monitoring data of MIT in spent metalworking fluids may be submitted at product authorisation, if required.

6. The environmental exposure assessment for PT 13 as described in the Emission Scenario Document (ESD) is being revised currently. The exposure for MIT was estimated based on an intermediate revision of the ESD agreed at the Environment Working Group, which is described in the assessment report. At product authorisation, if available, the revised ESD has to be considered. The revised ESD will also contain on-site treatment of waste which was not considered in the current evaluation.

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 2-methylisothiazol-3(2H)-one.

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