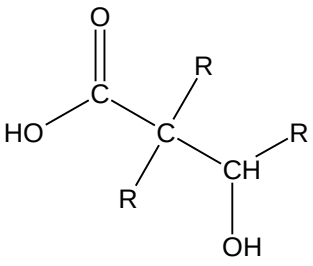
Assessment of regulatory needs

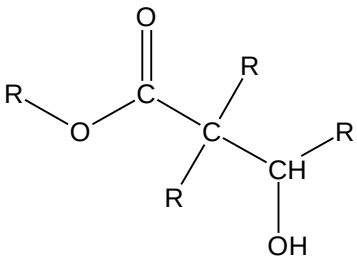
Authority: European Chemicals Agency (ECHA)

Group Name: beta-Hydroxyacids and their esters with aliphatic alcohols

General structure:



Acid

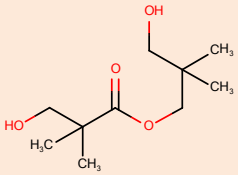
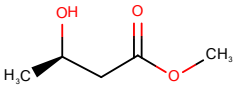
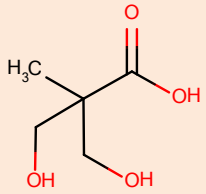
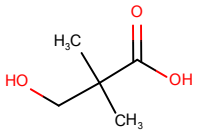
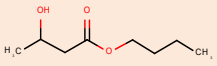
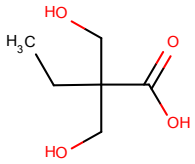


Ester

Revision history

Version	*Date*	*Description*
1.0	15 March 2023	

Substances within this group:

EC / List number	CAS number	Substance name	Chemical structure	Registration type (full, OSII or TII, NONS), highest tonnage band among all the registrations (t/y) [1]
214-222-2	1115-20-4	3-hydroxy-2,2-dimethylpropyl 3-hydroxy-2,2-dimethylpropionate		Full, not (publicly) available
223-610-0	3976-69-0	Methyl (R)-(-)-3-hydroxybutyrate		OSII or TII
225-306-3	4767-03-7	2,2-bis(hydroxymethyl) propionic acid		Full, > 1000
225-419-8	4835-90-9	3-hydroxypivalic acid		OSII or TII
258-658-1	53605-94-0	Butyl 3-hydroxybutyrate		Full, not (publicly) available
424-090-1	10097-02-6	2,2-bis(hydroxymethyl) butanoic acid		Full, 10-100

[1] Note that the total aggregated tonnage band may be available on ECHA's webpage at https://echa.europa.eu/information-on-chemicals/registered-substances

This table does not contain group members that are only notified under the CLP Regulation. Should further regulatory risk management action on one or more substances in the group be considered, ECHA may make an additional search for related C&L notified substances to be included in the group and develop an assessment of regulatory needs for them.

Contents

DISCLAIMER

The author does not accept any liability with regard to the use that may be made of the information contained in this document. Usage of the information remains under the sole responsibility of the user. Statements made or information contained in the document are without prejudice to any further regulatory work that ECHA, the Member States or other regulatory agencies may initiate at a later stage. Assessment of regulatory needs and their conclusions are compiled on the basis of available information and may change in light of newly available information or further assessment.

Foreword

The purpose of the assessment of regulatory needs of a group of substances is to help authorities conclude on the most appropriate way to address the identified concerns for a group of substances or a single substance, i.e. the combination of the regulatory risk management instruments to be used and any intermediate steps, such as data generation, needed to initiate and introduce these regulatory measures.

An assessment of regulatory needs can conclude that regulatory risk management at EU level is required for a (group of) substance(s) (e.g. harmonised classification and labelling, Candidate List inclusion, restriction, other EU legislation) or that no regulatory action is required at EU level. While the assessment is done for a group of substances, the (no) need for regulatory action can be identified for the whole group, a subgroup or for single substance(s).

The assessment of regulatory needs is an important step under ECHA's Integrated Regulatory Strategy. However, it is not part of the formal processes defined in the legislation but aims to support them.

The assessment of regulatory needs can be applied to any group of substances or single substance, i.e., any type of hazards or uses and regardless of the previous regulatory history or lack of such. It can be done based on a different level of information. A Member State or ECHA can carry out this case-by-case analysis. The starting point is available information in the REACH registrations and any other REACH and CLP information. However, a more extensive set of information can be available, e.g. assessment done under REACH/CLP or other EU legislation, or can be generated in some cases (e.g. further hazard information under dossier evaluation). Uncertainties associated to the level of information used should be reflected in the documentation. It will be revisited when necessary. For example, after further information is generated and the hazard has been clarified or when new insights on uses are available. It can be revisited by the same or another authority.

The responsibility for the content of this assessment rests with the authority that developed it. It is possible that other authorities do not have the same view and may develop further assessment of regulatory needs. The assessment of regulatory needs does not yet initiate any regulatory process but any authority can consequently do so and should indicate this by appropriate means, such as the Registry of Intentions.

For more information on Assessment of regulatory needs please consult ECHA website[2].

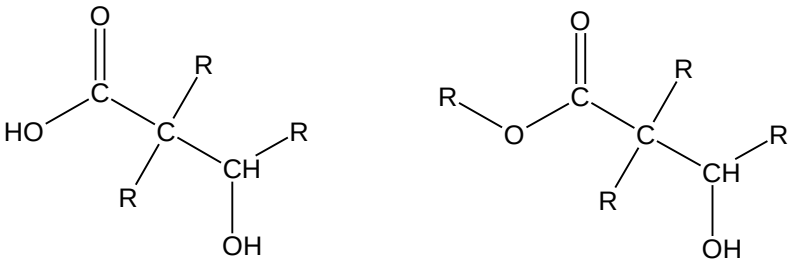
[2] https://echa.europa.eu/understanding-assessment-regulatory-needs

Glossary

ARN	Assessment of Regulatory Needs
CCH	Compliance Check
CLH	Harmonised classification and labelling
CMR	Carcinogenic, mutagenic and/or toxic to reproduction
DEv	Dossier evaluation
ED	Endocrine disruptor
NONS	Notified new substances
OEL	Occupational exposure limit
OSII or TII	On-site isolated intermediate or transported isolated intermediate
PBT/vPvB	Persistent, bioaccumulative and toxic/very persistent and very bioaccumulative
RMOA	Regulatory management options analysis
RRM	Regulatory risk management
SEv	Substance evaluation
STOT RE	Specific target organ toxicity, repeated exposure
SVHC	Substance of very high concern

1 Overview of the group

ECHA has grouped together structurally similar substances based on the presence of a carboxylic acid functional group and a hydroxy functional group that are separated by two carbon atoms. This is the main chemical feature of beta-hydroxyacids. The group consists of beta-hydroxyacids and certain esters of beta-hydroxyacids as represented in the figure below.



Acid Ester

The acids in the group are 2,2-bis(hydroxymethyl) propionic acid (EC 225-306-3), 3-hydroxypivalic acid (EC 225-419-8), and 2,2-bis(hydroxymethyl) butanoic acid (EC 424-090-1), whereas the esters are 3-hydroxy-2,2-dimethylpropyl 3-hydroxy-2,2-dimethylpropionate (EC 214-222-2), Methyl (R)-(-)-3-hydroxybutyrate (EC 223-610-0), and Butyl 3-hydroxybutyrate (EC 258-658-1). The esters are the results of the reaction between beta-hydroxyacids and certain alcohols. It is worth to note that the acids in the group are chemically/structurally very similar. Two out of the three are especially similar (EC 424-090-1 and 225-306-3) because they are only differing from each other in one -CH2- group.

All the substances of the group are registered within REACH. Four of the substances have full registrations and two (EC 225-419-8 and 223-610-0) have intermediate registrations.

Based on information reported in the REACH registration dossiers, all substances in the group have widespread uses excluding the two substances registered only as intermediates.

EC 225-306-3 and EC 424-090-1 are used e.g., as additives or intermediate/monomer by professional workers in polymer preparations and compounds as well as in coating and paint products. These uses can lead to exposure to professional workers or exposure to consumers via article service life, as well as to releases to the environment. For EC 225-306-3, the use is also related to plastic materials and articles intended to come into contact with food.

EC 258-658-1 is used as a solvent e.g., in washing and cleaning products, lubricants, greases, release products or in fillers, putties, plasters, modelling clay. These uses can lead to exposure to professional workers and consumers, as well as to releases to the environment.

EC 214-222-2 is used e.g., in adhesive and sealants, and in fillers, putties, plasters, modelling clay. These uses can lead to exposure to professional workers and consumers, as well as to releases to the environment. The use in fillers, putties, plasters, modelling clay also leads to inclusion of the substance in articles.

Although EC 225-419-8 is registered only as intermediate, it is relatively similar to EC 225-306-3 and EC 424-090-1 from the chemical structure perspective and could be therefore potentially a substitute for those substances.

Note on the scope of ECHA's assessment of regulatory needs

Regarding hazards, the focus of ECHA's assessment is on CMR (carcinogenic, mutagenic and/or toxic to reproduction), sensitiser, ED (endocrine disruptor), PBT/vPvB or equivalent (e.g. substances being persistent, mobile and toxic), aquatic toxicity hazard endpoints and therefore only those are reflected in the table in section 3. This does not mean that the substances do not have other known or potential hazards. In some specific cases, where ECHA identifies a need for regulatory risk management action at EU level for other hazards (e.g. neurotoxicity, STOT RE), such additional hazards may be addressed in the assessment. An overview of classification is presented in Annex 1.

On the exposure side, ECHA is mainly using the information on uses reported in the registration dossiers (IUCLID) as a proxy for assessing the potential for exposure to humans and releases to the environment. The potential for release / exposure is generally considered high for "widespread" uses, i.e. professional and consumer uses and uses in articles. For these uses, normally happening at many places, the expected level of control is *à priori* considered limited. The chemical safety reports are not necessarily consulted and no quantitative exposure assessment is performed at this stage.

2 Justification for the need for regulatory risk management action at EU level

Based on currently available information, there is a need for (further) EU regulatory risk management – Restriction for reproductive toxicity hazard due to the potential for release/exposure of 2,2-bis(hydroxymethyl) propionic acid (EC 225-306-3) and 2,2-bis(hydroxymethyl) butanoic acid (EC 424-090-1).

Based on ECHA's assessment of hazard information currently available in the registration dossiers the two substances have (potentially) reproductive toxicity.

EC 225-306-3 shows signs of reproductive toxicity in a pre-natal developmental toxicity study conducted with the substance. Although these effects are considered as test material related, they are not sufficient to warrant classification for reproductive toxicity. In the absence of information from a reproductive toxicity study (screening study or EOGRTS) and without data from a PNDT study in a second species, these findings warrant further data generation in a compliance check (CCH). Owing to the extensive structural similarity between EC 225-306-3 and EC 424-090-1, the potential for reproductive toxicity is extended to EC 424-090-1. The proposed CCH will be the key in determining if the findings were coincidental or whether they merit classification. It is also expected to confirm the low aquatic toxicity of the substance. EC 225-306-3 is listed in the regulation (EU) 10/2011 on food contact materials (FCM) with a specific migration limit of 0.05 mg/kg food.

Should the hazard be clarified by CCH, the FCM assessment maybe also revised accordingly.

Both substances have widespread professional and industrial uses in polymer preparations and coatings and paints, and potentially article service life due to their use in polymer preparations, coatings and paints and inks and toners.

The first step of the regulatory risk management action proposed, should the hazard exist, is the confirmation of hazard via harmonised classification (CLH) as reproductive toxic 1B.

CLH

i) will require company level risk management measures (RMM) or workers, to be in place,
ii) is needed or highly recommended for further regulatory processes under REACH

The professional uses as additives or intermediate/monomer in polymer preparations and in coatings and paints are expected to be widespread (at many sites and by many users). Professional use is often widespread with relatively low levels of operational controls and risk management measures but with often frequent exposures with a long duration. In addition, professional users may be self-employed and therefore not covered by occupational safety and health (OSH) legislation.

Therefore, a **restriction of the substance as such or in mixtures (concentration limit in mixtures) used by professionals** is suggested after CLH.

Restriction of professional uses is preferred over authorisation as it is considered to be more efficient and effective to introduce controls at the level of placing on the market rather than at the level of uses.

In addition, the use of the most harmful substances by professional workers has been recognised as an area of concern under the European Commission's Chemicals Strategy for Sustainability[3] which aims to extend to professional users under REACH the level of protection granted to consumers.

Moreover, potential exposure from articles needs further investigation. The need for restricting substances in articles used by professionals or consumers should be considered in the context of the restriction of professional uses.

Based on currently available information, there is no need for (further) EU regulatory risk management for 3-hydroxy-2,2-dimethylpropyl 3-hydroxy-2,2-dimethylpropionate (EC 214-222-2), Methyl (R)-(-)-3-hydroxybutyrate (EC 223-610-0), 3-hydroxypivalic acid (EC 225-419-8), and Butyl 3-hydroxybutyrate (EC 258-658-1).

Based on ECHA's assessment of hazard information currently available in the registration dossiers, these substances are not expected to be hazardous and therefore do not need any EU regulatory risk management. However, data generation is required for EC 214-222-2 to confirm the low reproductive toxicity

[3] European Commission, *Chemical Strategy for Sustainability Towards a Toxic-Free Environment*, available at https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf

and the low aquatic toxicity of this substance, which is structurally different from the other substances in the group and placed on the market in high volumes. If the outcome of the CCH invalidates this assumption, the assessment will be revisited for this substance.

3 Conclusions and actions

The conclusions and actions proposed in the table below are based on the REACH and CLP information available at the time of the assessment by ECHA. The main source of information is the registration dossiers. Relevant public assessments may also be considered. When new information (e.g. on hazards through evaluation processes, or on uses) will become available, the document will be updated and conclusions and actions revisited.

Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
225-306-3 2,2-bis(hydroxymethyl) propionic acid **424-090-1** 2,2-bis(hydroxymethyl) butanoic acid	Known or potential hazard for reproductive toxicity	No hazard or unlikely hazard	Widespread professional uses and article service life in polymer preparations, coatings and paints and inks and toners	**Need for EU RRM: Restriction** Justification: The reported professional uses are widespread (at many sites and many users) with relatively low levels of operational controls and risk management measures but with often frequent exposures with a long duration. Restriction of professional uses is preferred over authorisation as it is considered to be more efficient and	**First step:** CCH (225-306-3) **Next steps (if hazard confirmed):** 1. CLH 2. Restriction

Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
				effective to introduce controls at the level of placing on the market rather than at the level of uses. Potential exposure from articles needs further investigation, restriction for use in articles to be considered together with the restriction of professional uses.	
214-222-2 3-hydroxy-2,2-dimethylpropyl 3-hydroxy-2,2-dimethylpropionate **223-610-0** Methyl (R)-(-)-3-hydroxybutyrate **225-419-8** 3-hydroxypivalic acid **258-658-1** Butyl 3-hydroxybutyrate	No hazard or unlikely hazard	No hazard or unlikely hazard	ECs 214-222-2 and 258-658-1: Consumer and/or professional uses in e.g., washing and cleaning products; fillers, putties, plasters, modelling clay and coatings and paints ECs 225-419-8 and 223-610-0: Intermediate uses	**Currently no need for EU RRM** <u>Justification:</u> Overall, no or unlikely hazard that would lead to concern for the reported uses.	CCH (214-222-2)

Annex 1: Overview of classifications

Data extracted on 21 November 2022

EC/ List No	CAS No	Substance name	Harmonised classification	Classification in registrations
214-222-2	1115-20-4	3-hydroxy-2,2-dimethylpropyl 3-hydroxy-2,2-dimethylpropionate		Eye Damage 1 H318
223-610-0	3976-69-0	Methyl (R)-(-)-3-hydroxybutyrate		Eye Irrit. 2 H319 Skin Irrit. 2 H315 STOT Single Exp. 3 H335, affected organs: Respiratory tract irritation
225-306-3	4767-03-7	2,2-bis(hydroxymethyl) propionic acid		Eye Irrit. 2 H319 STOT Single Exp. 3 H335, affected system: respiratory system: upper respiratory tract, affected organs: Mucous membranes
225-419-8	4835-90-9	3-hydroxypivalic acid		Eye Damage 1 H318 Skin Irrit. 2 H315 STOT Single Exp. 3 H335, affected organs: respiratory tract
258-658-1	53605-94-0	Butyl 3-hydroxybutyrate		Eye Irrit. 2A H319
424-090-1	10097-02-6	2,2-bis(hydroxymethyl) butanoic acid	Index number: 607-420-00-9 Hazard Category: Eye Dam. 1 Hazard Statement: H318 Aquatic Chronic 3 Statement: H412	Eye Damage 1 H318 Aquatic Chronic 3 H412

Annex 2: Overview of uses based on information available in registration dossiers

Data extracted on 9 July 2021

Main types of applications structured by product or article types	EC	225-306-3	424-090-1	214-222-2	223-610-0	225-419-8	258-658-1
PC 4: Anti-freeze and de-icing products							F, **C**
PC 35: Washing and cleaning products							F, I, **P**, **C**
PC 8: Biocidal products (e.g. disinfectants, pest control)							F, **C**
PC 3: Air care products							F, **C**
PC 24: Lubricants, greases, release products							F, **C**
PC 32: Polymer preparations and compounds		F, I, **P**, **A**	F, I, **P**, **A**	I			
PC 1: Adhesives, sealants				F, **P**, **C**			
PC 9c: Finger paint							F, **C**
PC 9b: Fillers, putties, plasters, modelling clay				F, **P**, **C**, **A**			F, **C**
PC 9a: Coatings and paints, thinners, paint removes		I, **P**	I, **A**	F, **P**, **C**			F, **C**
PC 18: Ink and toners			I, **A**				
PC 21: Laboratory chemicals		**P**		I, **P**			
PC 19: Intermediate		I	I	I	I	I	
PC41: Oil and gas exploration or production products							I, **P**

F: formulation, I: industrial use, P: professional use, C: consumer use, A: article service life; P, C and A are highlighted in red to indicate widespread use with potential for exposure/release

Annex 3: Overview of completed or ongoing regulatory risk management activities

Data extracted on 19 July 2021

There are no relevant completed or ongoing regulatory risk management activities for any of the substances.