Calcium chloride

(Also known as: calcium dichloride)

Last updated: 24/05/2024

PPDB

SUMMARY

Commonly known as salt, this inorganic substance has a range of agricultural uses but is mainly used as a plant growth regulator for fruit thinning. It is highly soluble in water, has a low volatility and is not expected to persist in the environment. It has a low to moderate toxicity, should not bioaccumulate and whilst may cause eye irritation, it is not associated with serious health impacts unless large quantities are consumed. It generally has a low ecotoxicity.

Data alerts

The following alerts are based on the data in the tables below. An absence of an alert does not imply the substance has no implications for human health, biodiversity or the environment but just that we do not have the data to form a judgement.

Environmental fate	Ecotoxicity	Human health
		

GENERAL INFORMATION

Description	An inorganic multi-use compound for fruit thinning, other growth regulating applications, protecting fruit in storage and for reducing physiological disorders
Example pests controlled	Bitter pit; Blossom-end rot; Storage diseases
Example applications	Fruit; Tomatoes; Vegetables
Efficacy & activity	-
Availability status	Current
Introduction & key dates	-

GB regulatory status

GB COPR regulatory status	Not approved
Date COPR inclusion expires	Not applicable
GB LERAP status	No UK approval for use as a pesticide

EC Regulation 1107/2009 (repealing 91/414)

EC Regulation 1107/2009 status	Not approved
Dossier rapporteur/co-rapporteur	Not applicable
Date EC 1107/2009 inclusion expires	Not applicable
EU Candidate for substitution (CfS)	No
Listed in EU database	Yes
Approved for use (✓) under EC 1107/2009 in the following EU Member States	

AT	BE	BG	CY	CZ	DE	DK	EE	EL
ES	**FI**	**FR**	**HR**	**HU**	**IE**	**IT**	**LT**	**LU**
LV	**MT**	**NL**	**PL**	**PT**	**RO**	**SE**	**SI**	**SK**

Approved for use (✓) under EC 1107/2009 by Mutual Recognition of Authorisation and/or national regulations in the following EEA countries	

IS	NO							

Additional information

Also used in	-

Chemical structure

Isomerism	None
Chemical formula	$CaCl_2$
Canonical SMILES	[Cl-].[Cl-].[Ca+2]
Isomeric SMILES	-
International Chemical Identifier key (InChIKey)	UXVMQQNJUSDDNG-UHFFFAOYSA-L
International Chemical Identifier (InChI)	InChI=1S/Ca.2ClH/h;2*1H/q+2;;/p-2
2D structure diagram/image available?	Yes

General status

Pesticide type	Plant Growth Regulator, Insecticide, Fungicide, Other substance
Other bioactivity & uses	Microbiocide
Substance groups	Inorganic compound
Minimum active substance purity	-
Known relevant impurities	-
Substance origin	Synthetic
Mode of action	Non-selective
CAS RN	10043-52-4
EC number	233-140-8
CIPAC number	None allocated
US EPA chemical code	-
PubChem CID	5284359
CLP index number	017-013-00-2
Molecular mass	110.98
PIN (Preferred Identification Name)	calcium chloride
IUPAC name	calcium dichloride
CAS name	calcium chloride
Other status information	E509
Relevant Environmental Water Quality Standards	-
Herbicide Resistance Class (HRAC MoA class)	Not applicable
Herbicide Resistance Class (WSSA MoA class)	Not applicable
Insecticide Resistance Class (IRAC MoA class)	UNM
Fungicide Resistance Class (FRAC MOA class)	NC
Examples of recorded resistance	-
Physical state	White crystalline solid

Formulations

Property	Value
Example manufacturers & suppliers of products using this active now or historically	• Tetra Chemicals
Example products using this active	• Cor-Clear
Formulation and application details	-

ENVIRONMENTAL FATE

Property		Value	Source; quality score; and other information	Interpretation
Solubility - In water at 20 °C (mg l^{-1})		74500	AC4	High
Solubility - In organic solvents at 20 °C (mg l^{-1})		183000	Q3 Ethanol	-
		218000	Q3 Methanol	-
Melting point (°C)		772	AC4	-
Boiling point (°C)		1935	Q3	-
Degradation point (°C)		-	-	-
Flashpoint (°C)		-	-	-
Octanol-water partition coefficient at pH 7, 20 °C	P	-	-	-
	Log P	-	-	-
Fat solubility of residues	Solubility	-	-	-
	Data type	-	-	-
Density (g ml^{-1})		1.34	AC4	-
Dissociation constant pKa) at 25 °C		-	-	-
		-		
Vapour pressure at 20 °C (mPa)		-	-	-
Henry's law constant at 25 °C (Pa m^3 mol^{-1})		-	-	-
Volatilisation as max % of applied dose lost	From plant surface	-	-	-
	From soil surface	-	-	-
Maximum UV-vis absorption L mol^{-1} cm^{-1}		-	-	-
Surface tension (mN m^{-1})		-	-	-

Degradation

Property		Value	Source; quality score; and other information	Interpretation
General biodegradability		Readily biodegradable		
Soil degradation (days) (aerobic)	DT_{50} (typical)	0.1	Q3	Non-persistent
	DT_{50} (lab at 20 °C)	-	-	-
	DT_{50} (field)	-	-	-
	DT_{90} (lab at 20 °C)	-	-	-
	DT_{90} (field)	-	-	-
	DT_{50} modelling endpoint	-	-	-
	Note	Best available data. Natural substance that rapidly disperses in the environment		
Dissipation rate RL_{50} (days) on plant matrix	Value	-	-	-
	Note	-		
Dissipation rate RL_{50} (days) on and in plant matrix	Value	-	-	-
	Note	-		
Aqueous photolysis DT_{50} (days) at pH 7	Value	-	-	-
	Note	-		
Aqueous hydrolysis DT_{50} (days) at 20 °C and pH 7	Value	-	-	-
	Note	-		
Water-sediment DT_{50} (days)		-	-	-
Water phase only DT_{50} (days)		-	-	-
Sediment phase only DT_{50} (days)		-	-	-
Air degradation		As this parameter is not normally measured directly, a surrogate measure is used: 'Photochemical oxidative DT_{50}'. Where data is available, this can be found in the Fate Indices section below.		
Decay in stored produce DT_{50}		-		

Soil adsorption and mobility

Property		Value	Source; quality score; and other information	Interpretation
Linear	K_d (mL g^{-1})	-	Q2	Non-mobile
	K_{oc} (mL g^{-1})	25000		
	Notes and range	Estimated		
Freundlich	K_f (mL g^{-1})	-	-	-
	K_{foc} (mL g^{-1})	-		
	$^1/_n$	-		
	Notes and range	-		
pH sensitivity		-		

Fate indices

Property		Value	Source; quality score; and other information	Interpretation
GUS leaching potential index		0.40	Calculated	Low leachability
SCI-GROW groundwater index (µg l^{-1}) for a 1 kg ha^{-1} or 1 l ha^{-1} application rate	Value	5.35 X 10^{-03}	Calculated	-
	Note	Estimated concentrations of chemicals with Koc values greater than 9995 ml g^{-1} are beyond the scope of the regression data used in SCI-GROW development. If there are concerns for such chemicals, a higher tier groundwater exposure assessment should be considered, regardless of the concentration returned by SCI-GROW		
Potential for particle bound transport index		Low	Calculated	-
Potential for loss via drain flow		Non-mobile	Calculated	-
Photochemical oxidative DT_{50} (hrs) as indicator of long-range air transport risk		-	-	-
Bio-concentration factor	BCF (l kg^{-1})	20	Q3 Low risk	Low potential
	CT_{50} (days)	Not available		-

Known metabolites

None

ECOTOXICOLOGY

Terrestrial ecotoxicology

Property		Value	Source; quality score; and other information	Interpretation
Mammals - Acute oral LD_{50} (mg kg^{-1})		> 2000	A5 Rat	Low
Mammals - Short term dietary NOEL	(mg kg^{-1})	-	-	-
	(ppm diet)	-		-
Mammals - Chronic 21d NOAEL (mg kg^{-1} bw d^{-1})		-	-	-
Birds - Acute LD_{50} (mg kg^{-1})		> 1000	Q3 Unknown species	Moderate
Birds - Short term dietary (LC_{50}/LD_{50})		-	-	-
Birds - Chronic 21d NOEL (mg kg^{-1} bw d^{-1})		-	-	-
Earthworms - Acute 14 day LC_{50} (mg kg^{-1})		> 1000	Q2 Expert judgement	Low
Earthworms - Chronic NOEC, reproduction (mg kg^{-1})		-	-	-
Soil micro-organisms		-	-	-
Collembola	Acute LC_{50} (mg kg^{-1})	-	-	-
	Chronic NOEC (mg kg^{-1})	-	-	-
Non-target plants		-	-	-
		-	-	-
Honeybees (*Apis* spp.)	Contact acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	-	-	-
	Oral acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	-	-	-
	Unknown mode acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	> 100	Q2 Expert judgement	Low
	Chronic	-	-	-
	Notes	-		
Bumblebees (*Bombus* spp.)	Contact acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	-	-	-
		-		
	Oral acute LD_{50} (worst case from 24, 48 and	-	-	-
		-		

Property		Value	Source; quality score; and other information	Interpretation
	72 hour values - µg bee⁻¹)			
Mason bees (*Osmia* spp.)	Contact acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	-	-	-
	Oral acute LD_{50} (worst case from 24, 48 and 72 hour values - µg bee^{-1})	-	-	-
Other bee species (1)	Acute LD_{50} (worst case from 24, 48 and 72 hour values - µg insect^{-1})	-	-	-
	Mode of exposure	-		
Other bee species (2)	Acute LD_{50} (worst case from 24, 48 and 72 hour values - µg insect^{-1})	-	-	-
	Mode of exposure	-		
Beneficial insects (Ladybirds)		-	-	-
Beneficial insects (Lacewings)		-	-	-
Beneficial insects (Parasitic wasps)		-	-	-
Beneficial insects (Predatory mites)		-	-	-
Beneficial insects (Ground beetles)		-	-	-

Aquatic ecotoxicology

Property		Value	Source; quality score; and other information	Interpretation
Temperate Freshwater Fish - Acute 96 hour LC_{50} (mg l^{-1})		> 10240	F4 *Lepomis macrochirus*	Low
Temperate Freshwater Fish - Chronic 21 day NOEC (mg l^{-1})		-	-	-
Tropical Freshwater Fish - Acute 96 hour LC_{50} (mg l^{-1})		-	-	-
Temperate Freshwater Aquatic invertebrates - Acute 48 hour EC_{50} (mg l^{-1})		> 3076	F4 *Daphnia magna*	Low
Temperate Freshwater Aquatic invertebrates - Chronic 21 day NOEC (mg l^{-1})		-	-	-
Tropical Freshwater Aquatic invertebrates - Acute 48 hour EC_{50} (mg l^{-1})		> 500	F4 *Ceriodaphnia dubia*	Low
Aquatic crustaceans - Acute 96 hour LC_{50} (mg l^{-1})		-	-	-
Sediment dwelling organisms - Acute 96 hour LC_{50} (mg l^{-1})		-	-	-
Sediment dwelling organisms - Chronic 28 day NOEC, static, water (mg l^{-1})		-	-	-
Sediment dwelling organisms - Chronic 28 day NOEC, sediment (mg kg^{-1})		-	-	-
Aquatic plants (free-floating, growth) - Acute 7 day EC_{50}, biomass (mg l^{-1})		5550	F4 *Lemna minor*	Low
Aquatic plants (rooted, growth) - Acute 14 day EC_{50}, biomass (mg l^{-1})		-	-	-
Algae - Acute 72 hour EC_{50}, growth (mg l^{-1})		> 3130	AC3 *Nitzschia linearis*	Low
Algae - Chronic 96 hour NOEC, growth (mg l^{-1})		-	-	-
Mesocosm study data	NOEAEC mg l^{-1}	-	-	-
	NOEAEC mg l^{-1}	-	-	-
Marine bivalves		-	-	-

HUMAN HEALTH AND PROTECTION

General

Property		Value	Source; quality score; and other information	Interpretation
Threshold of Toxicological Concern (Cramer Class)		High (class III)	-	-
Mammals - Acute oral LD_{50} (mg kg^{-1})		> 2000	A5 Rat	Low
Mammals - Dermal LD_{50} (mg kg^{-1} body weight)		2630	AC4 Rat	-
Mammals - Inhalation LC_{50} (mg l^{-1})		-	-	-
Other Mammal toxicity endpoints		-	-	-
ADI - Acceptable Daily Intake (mg kg^{-1} bw day^{-1})		-	-	-
ARfD - Acute Reference Dose (mg kg^{-1} bw day^{-1})		-	-	-
AAOEL - Acute Acceptable Operator Exposure Level (mg kg^{-1} bw day^{-1})		-	-	-
AOEL - Acceptable Operator Exposure Level - Systemic (mg kg^{-1} bw day^{-1})		-	-	-
Dermal penetration studies (%)		-	-	-
Dangerous Substances Directive 76/464		-	-	-
Exposure Routes	Public	-		
	Occupational	-		
MRLs	European	EU MRL pesticide database		
	Great Britain	GB MRL Register		
	Notes	-		
Drinking Water Standards		-	-	-
Drinking Water MAC (µg l^{-1})		-	-	-
Mammalian dose elimination route and rate		-	-	-

Health issues

Specific human health issues

Carcinogen	Genotoxic	Endocrine disruptor
X	A0; B0; C0; D0; E0	X
Reproduction / development effects	**Acetyl cholinesterase inhibitor**	**Neurotoxicant**
X	X	X
Respiratory tract irritant	**Skin irritant**	**Skin sensitiser**
✓	X	X
Eye irritant	**Phototoxicant**	
?	X	

General human health issues

May cause serious eye irritation
Consumption can lead to hypercalcemia

Handling issues

Property	Value and interpretation
General	Prevent generation of dust Hygroscopic
CLP classification 2013	Health: H319
WHO Classification	Not listed (Not listed)
UN Number	-
Waste disposal & packaging	-
Shelf-life, storage, stability and reactivity	-

TRANSLATIONS

Language	Name
English	calcium chloride
French	chlorure de calcium
German	Calciumchlorid
Danish	calciumklorid
Italian	cloruro di calcio
Spanish	cloruro de calcio
Greek	-
Polish	chlorek wapnia
Swedish	-
Hungarian	-
Dutch	-
Norwegian	-

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