

Dimefuron (Ref: RP 23465)

(Not known by any other names)



Last updated:
04/02/2024



SUMMARY

Dimefuron is a herbicide used for the control of annual broad-leaved weeds. It has a low aqueous solubility and a low volatility. It may be persistent in soil and aquatic systems depending on local conditions. Based on its physico-chemical properties it has potential to leach to groundwater. It is highly toxic to algae, moderately toxic to earthworms but appears to be less toxic to other organisms for which data is available. Dimefuron has a low oral mammalian toxicity.

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	A herbicide applied pre- and post-emergence to control annual broad-leaved weeds
Example pests controlled	Chickweed; Scented mayweed; Charlock
Example applications	Legumes including peas, beans; Lucerne; Oilseed rape; Cruciferous vegetables
Efficacy & activity	-
Availability status	-
Introduction & key dates	circa 1975, introduced

UK regulatory status

UK COPR regulatory status	Not approved
Date COPR inclusion expires	Expired
UK LERAP status	No UK approval for use

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	Expired								
EU Candidate for substitution (Cfs)	-								
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	-
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Chemical structure

Isomerism	None
Chemical formula	C ₁₅ H ₁₉ ClN ₄ O ₃
Canonical SMILES	CC(C)(C)C1=NN(C(=O)O1)C2=C(C=C(C=C2)NC(=O)N(C)C)Cl
Isomeric SMILES	No data
International Chemical Identifier key (InChIKey)	DHWRNDJOGMTCPB-UHFFFAOYSA-N
International Chemical Identifier (InChI)	InChI=1S/C15H19ClN4O3/c1-15(2,3)12-18-20(14(22)23-12)11-7-6-9(8-10(11)16)17-13(21)19(4)5/h6-8H,1-5H3,(H,17,21)
2D structure diagram/image available?	Yes

General status

Pesticide type	Herbicide
Substance groups	Oxadiazolone herbicide; Phenylurea herbicide
Minimum active substance purity	-
Known relevant impurities	-
Substance origin	Synthetic
Mode of action	Selective, absorbed mainly through the roots. Photosystem II inhibitor.
CAS RN	34205-21-5
EC number	251-879-4
CIPAC number	279
US EPA chemical code	-
PubChem CID	91612
CLP index number	No data found
Molecular mass	338.79
PIN (Preferred Identification Name)	N ¹ -[4-(5-tert-butyl-2-oxo-1,3,4-oxadiazol-3(2H)-yl)-3-chlorophenyl]-N,N-dimethylurea
IUPAC name	3-[4-(5-tert-butyl-2,3-dihydro-2-oxo-1,3,4-oxadiazol-3-yl)-3-chlorophenyl]-1,1-dimethylurea
CAS name	N ¹ -[3-chloro-4-[5-(1,1-dimethylethyl)-2-oxo-1,3,4-oxadiazol-3(2H)-yl]phenyl]-N,N-dimethylurea
Other status information	PAN Listed as Highly Hazardous Chemical
Relevant Environmental Water Quality Standards	-
Herbicide Resistance Class (HRAC MoA class)	C2
Herbicide Resistance Class (WSSA MoA class)	7
Insecticide Resistance Class (IRAC MoA class)	Not applicable
Fungicide Resistance Class (FRAC MOA class)	Not applicable
Examples of recorded resistance	-
Physical state	Colourless crystals

Formulations

Property	Value
Example manufacturers & suppliers of products using this active now or historically	-
Example products using this active	<ul style="list-style-type: none"> Pradone
Formulation and application details	-

ENVIRONMENTAL FATE



Property		Value	Source; quality score; and other information	Interpretation
Solubility - In water at 20 °C (mg l ⁻¹)		16	B5	Low
Solubility - In organic solvents at 20 °C (mg l ⁻¹)		-	-	-
Melting point (°C)		193	L3	-
Boiling point (°C)		-	-	-
Degradation point (°C)		-	-	-
Flashpoint (°C)		-	-	-
Octanol-water partition coefficient at pH 7, 20 °C	P	3.24 X 10 ⁰²	Calculated	-
	Log P	2.51	B5	Low
Fat solubility of residues	Solubility	-	-	-
	Data type	-	-	-
Density (g ml ⁻¹)		1.3	Q2	-
Dissociation constant pKa) at 25 °C		Not applicable	B5	-
		No dissociation		
Vapour pressure at 20 °C (mPa)		0.01	B5	Low volatility
Henry's law constant at 25 °C (Pa m ³ mol ⁻¹)		2.12 X 10 ⁻⁰³	L3	Non-volatile
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		-		
Soil degradation (days) (aerobic)	DT ₅₀ (typical)	65	B4	Moderately persistent
	DT ₅₀ (lab at 20 °C)	129	B4	Persistent
	DT ₅₀ (field)	-	-	-
	DT ₉₀ (lab at 20 °C)	-	-	-
	DT ₉₀ (field)	-	-	-
	DT ₅₀ modelling endpoint	-	-	-
	Note	Lab studies DT ₅₀ range 100-203 days		
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	226	B5	Persistent
	Note	-		
Water-sediment DT ₅₀ (days)	97	Q3	Moderately fast	
Water phase only DT ₅₀ (days)	82	Q3	Stable	
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)	-		
	K_{oc} (mL g ⁻¹)	-		
	Notes and range	-		
Freundlich	K_f (mL g ⁻¹)	2.54	B4	Moderately mobile
	K_{foc} (mL g ⁻¹)	206		
	$1/n$	0.91		
	Notes and range	-		
pH sensitivity		-		

Fate indices

Property		Value	Source; quality score; and other information	Interpretation
GUS leaching potential index		3.56	Calculated	High leachability
SCI-GROW groundwater index ($\mu\text{g l}^{-1}$) for a 1 kg ha ⁻¹ or 1 l ha ⁻¹ application rate	Value	7.07×10^{-01}	Calculated	
	Note			
Potential for particle bound transport index		Medium	Calculated	-
Potential for loss via drain flow		Moderately mobile	Calculated	-
Photochemical oxidative DT ₅₀ (hrs) as indicator of long-range air transport risk		-	-	-
Bio-concentration factor	BCF (l kg ⁻¹)	Low risk	Q3 Based on LogP < 3	Low risk
	CT ₅₀ (days)	-		-

Known metabolites

None

ECOTOXICOLOGY



Terrestrial ecotoxicology

Property		Value	Source; quality score; and other information	Interpretation
Mammals - Acute oral LD ₅₀ (mg kg ⁻¹)		> 2000	B5 Rat	Low
Mammals - Short term dietary NOEL	(mg kg ⁻¹)	15.5	B5 Rat	High
	(ppm diet)	250		-
Mammals - Chronic 21d NOAEL (mg kg ⁻¹ bw d ⁻¹)		-	-	-
Birds - Acute LD ₅₀ (mg kg ⁻¹)		3350	B5 <i>Colinus virginianus</i>	Low
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)		300	Q3	Moderate
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 (<i>Apis</i> spp.)	Contact acute LD ₅₀ (worst case from 24, 48 and 72 hour values - µg bee ⁻¹)	500	B5	Low
	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)	-	-	-
	Chronic	-	-	-
Bumblebees (<i>Bombus</i> 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)	-	-	-
		-		

Property		Value	Source; quality score; and other information	Interpretation
Mason bees (<i>Osmia</i> 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)	1000	B5 <i>Lepomis macrochirus</i>	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)	575	K3 Unknown species	Low
Temperate Freshwater Aquatic invertebrates - Chronic 21 day NOEC (mg l ⁻¹)	-	-	-
Tropical Freshwater Aquatic invertebrates - Acute 48 hour EC ₅₀ (mg l ⁻¹)	-	-	-
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 - Acute 7 day EC ₅₀ , biomass (mg l ⁻¹)	-	-	-
Algae - Acute 72 hour EC ₅₀ , growth (mg l ⁻¹)	0.008	K2 Unknown species	High
Algae - Chronic 96 hour NOEC, growth (mg l ⁻¹)	-	-	-
Mesocosm study data	NOEAEC mg l ⁻¹	-	-
	NOEAEC mg l ⁻¹	-	-



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	B5 Rat	Low
Mammals - Dermal LD ₅₀ (mg kg ⁻¹ body weight)	2000	L3 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
	No data found	A3; B3; C3; D0; E0	No data found
	Reproduction / development effects	Acetyl cholinesterase inhibitor	Neurotoxicant
	No data found	X	No data found
	Respiratory tract irritant	Skin irritant	Skin sensitiser
	No data found	No data found	No data found
	Eye irritant	Phototoxicant	
	No data found	No data found	
General human health issues	No further information available		

Handling issues

Property	Value and interpretation
General	No information available
CLP classification 2013	Health: H302
WHO Classification	III (Slightly hazardous)
UN Number	-
Waste disposal & packaging	-
Shelf-life, storage, stability and reactivity	-

**TRANSLATIONS**

Language	Name
English	dimefuron
French	diméfuron
German	Dimefuron
Danish	dimefuron
Italian	dimefuron
Spanish	dimefuron
Greek	-
Polish	dimefuron
Swedish	-
Hungarian	-
Dutch	-
Norwegian	-

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Contact:

aeru@herts.ac.uk

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