

Introduction to exercise 1

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1. Use your example product and the EFSA conclusion report

Product	Super plus
Active substance	Methomyl
Concentration of active substance	200 g/L
Intended use	Tomatoes
Application rate	400 g a.s./ha
Number of applications	2
Interval between applications	14 days
Application method	Sprayer

2. Find acute toxicity to earthworm


Effects on earthworms, other soil macro-organisms and soil micro-organisms (Annex IIA points 8.4 and 8.5. Annex IIIA, points, 10.6 and 10.7)

Test organism	Test substance	Time scale	End point ¹
Earthworms			
	a.s. ‡	Acute 14 days	Methomyl: LC ₅₀ = 19 mg/kg soil dry weight (Report No. DuPont-3926)
	Preparation	Chronic	Methomyl 20SL: NOEL = 7.5 mg formulation /kg artificial soil (1.5 mg a.s./kg) (Report No. DuPont-5503)
Other soil macro-organisms : Not applicable			
Soil micro-organisms			
Nitrogen mineralisation	Methomyl 20 SL		Methomyl 20SL: No significant effect (<25% effect) after 28 days at a rate equivalent to 4.5 kg a.s./ha. (Report No. DuPont-4113)
Carbon mineralisation	Methomyl 20 SL		Methomyl 20SL: No significant effect (<25% effect) after 28 days at a rate equivalent to 4.5 kg a.s./ha. (Report No. DuPont-4113)

¹ indicate where end point has been corrected due to log Pow >2.0 (e.g. LC_{50corr}): Not applicable for methomyl.


EFSA Scientific Report (2008) 222, 94-99

2. Find acute toxicity aquatic organisms


Peer review of the pesticide risk assessment of the active substance
methomyl

Toxicity data for aquatic species (most sensitive species of each group) (Annex IIA, point 8.2, Annex IIIA, point

Group	Test substance	Time-scale	Endpoint	Toxicity (mg/L)
Laboratory tests †				
Acute, static – bluegill sunfish (Report No. SPL 282/571)	Methomyl	96-hour	LC ₅₀	0.63
Acute, static – bluegill sunfish (Report No. HLR 30-91)	Methomyl 20SL	96-hour	LC ₅₀	1.1
Fish early life stage – fathead minnow (Report No. HLO 702-91)	Methomyl	-	NOEC	0.073
Fish life cycle – fathead minnow (Report No. HLO 47-93)	Methomyl	-	NOEC	0.076
Acute, static-renewal <i>D. magna</i> (Report No. SPL 282/572)	Methomyl	48-hour	EC ₅₀	0.017
Acute, static-renewal <i>D. magna</i> , neonates and adults (Report No. DuPont-3726)	Methomyl 20SL	48-hour	EC ₅₀	0.0193 (<24-hour old <i>D. magna</i>) 0.0362 (12-day old <i>D. magna</i>)
<i>Daphnia magna</i>	Methomyl 20SL	48 hr	EC ₅₀	28-day old adult > 0.123
<i>Daphnia magna</i>	Methomyl 20SL	96 hr	EC ₅₀	27-day old adults = 0.098; neonate = 0.084
			NOEC	0.026
<i>Gammarus italicus</i>	Methomyl	96 hr	EC ₅₀	0.047
<i>Echinogammarus tibaldii</i>	Methomyl	96 hr	EC ₅₀	0.250
<i>Daphnia longispina</i>	Methomyl	96 hr	EC ₅₀	0.220
<i>Cyclops strenuous</i>	Methomyl	96 hr	EC ₅₀	0.190
<i>Gammarus pulex</i>	Methomyl	96 hr	EC ₅₀	0.760


Peer review of the pesticide risk assessment of the active substance
methomyl

Group	Test substance	Time-scale	Endpoint	Toxicity (mg/L)
<i>Chironomus plumosus</i>	Methomyl	96 hr	EC ₅₀	0.088
Life-cycle, static-renewal <i>D. magna</i> (Report No. HLR 46-82)	Methomyl	21-day	NOEC	0.0016
Aquatic algae, <i>S. capricornutum</i> (Report No. SPL 282/573)	Methomyl	72-hour	EC ₅₀	>100
			NOEC	100
Aquatic algal inhibition, <i>S. subspicatus</i> (Report No. SPL 282/594)	Methomyl	72-hour	EC ₅₀	>100
			NOEC	100
Microcosm or mesocosm tests				
None				

Table of toxicity data

Organism	Acute toxicity
Earthworm	0.19 mg/kg
Fish	630 µg/L (0.63 mg/L)
Algae	17 µg/L (0.017 mg/L)
Aquatic invertebrates	>100 000 µg/L >100 mg/L

Calculate PEC (soil)

Compartment: **SOIL** Assumed rate: **1st order**

APP RATE (g/ha) **400** No. APPS/YEAR **2**
% CROP COVER **0** INTERVAL (days) **14**
DT50 (days) **17,3**

ASSUMED RATE
1st order
1.5 order
2nd order
root 1st order
root 1.5 order
root 2nd order

Days after last appl'n	PECsoil (mg/kg)	Av. PECsoil (mg/kg)
0	0,84	0,84
1	0,80	0,82
2	0,77	0,81
4	0,71	0,77
7	0,63	0,73
14	0,48	0,64
21	0,36	0,57
28	0,27	0,50
42	0,16	0,41

COMPARTMENT
soil
water
sediment

Maximum accumulated conc'n (mg/kg) **0,84** = 1 × annual rate **COPY TABLE**

Predicted Environmental Concentration (PEC)

Organism	Acute toxicity	PEC
Earthworm	0.19 mg/kg	0.84 mg/kg
Fish	630 µg/L (0.63 mg/L)	5.86 µg/L
Algae	17 µg/L (0.017 mg/L)	5.86 µg/L
Aquatic invertebrates	>100 000 µg/L >100 mg/L	5.86 µg/L

Risk assessment

$$\text{TER} = \frac{\text{Toxicity (mg/kg dw or } \mu\text{g/L)}}{\text{PEC}}$$

TER < Trigger = **RISK**

Organism	Acute toxicity	PEC	TER	TER trigger	Risk
Earthworm	0.19 mg/kg	0.84 mg/kg	0.23	10	Yes
Fish	630 $\mu\text{g/L}$ (0.63 mg/L)	5.86 $\mu\text{g/L}$	107.5	100	No
Algae	17 $\mu\text{g/L}$ (0.017 mg/L)	5.86 $\mu\text{g/L}$	2.9	100	Yes
Aquatic invertebrates	>100 000 $\mu\text{g/L}$ >100 mg/L	5.86 $\mu\text{g/L}$	>17 000	10	No