

Toxicity to terrestrial organisms, initial tests (2 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference | |
|--|--|---|---|----------|--|------|---------------------|---------|--|-------------------------------|
| | | | Design | Duration | NOEC | LOEC | EC/LC ₅₀ | | | |
| No set guideline followed. Refer to "Exposure Design" for summary of methodology followed. | Earthworm (test species was a natural population of surface casting earthworm. Exact species not given) | Rather than investigating acute toxicity <i>per se</i> , this study investigated the effects of increased CO ₂ on cast production. | Carbon dioxide was added to soil plots using a screen aided CO ₂ control facility. Control plots contained 350µm CO ₂ while test plots contained an increased level of CO ₂ (610 µm) in natural soil | 2 years. | NOEC, LOEC, EC ₅₀ or LC ₅₀ not given because test was not investigating acute toxicity <i>per se</i> . Exposure to increased levels of CO ₂ caused rates of surface cast production to increase 6 fold. Cumulative surface cast production after 1 year was 35% greater in communities with elevated CO ₂ . CO ₂ induced stimulation of earthworms which increased soil turnover and N and C cycling. | | | | This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance. Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems (outside normal atmospheric ranges). In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system. Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on earthworms. Notwithstanding this, the study summarised here gives an indication about the possible effects increased CO ₂ may have on cast production by earthworms. ¹ | Document IIIA Section 7.5.1.2 |

Footnotes

1. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the toxicity to earthworms and the fact that there is no exposure to the terrestrial environment, it is not necessary to submit further studies on the effects of carbon dioxide on the reproduction of earthworms or other soil non-target macro-organisms (the data requirements detailed in Document III-A, 7.5.2.1).

Toxicity to terrestrial organisms, initial tests (3 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|---|-------------------------------|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Plants | N/A | N/A | N/A | N/A | N/A | N/A | <p>This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems (outside normal atmospheric ranges). In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system.</p> <p>Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on plants.</p> <p>Notwithstanding this, it should be noted that carbon dioxide plays a vital role in the photosynthesis pathway of plants. It is widely accepted that commercial horticulturists, such as tomato growers, use carbon dioxide to enrich the atmospheres of their greenhouses to accelerate the growth of their crops.¹</p> | Document IIIA Section 7.5.1.3 |

Footnotes

1. Due to the results available in the core base set of environmental toxicity data for carbon dioxide, particularly that available on the toxicity to plants and the fact that there is no exposure to the terrestrial environment, it is not necessary to submit further studies on the long term effects of carbon dioxide on plants (the data requirements detailed in Document III-A, 7.5.2.2).

Toxicity to terrestrial organisms, initial tests (4 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|---|--|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Birds | N/A | N/A | N/A | N/A | N/A | N/A | <p>An acute oral toxicity study for carbon dioxide cannot be submitted because it is not technically possible to determine the acute toxicity of carbon dioxide by the oral route. This is because there is no approved guideline for testing the acute toxicity of a gas by the oral route.</p> <p>In addition to the above, it should be noted that carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere, outside normal atmospheric ranges. Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on birds.</p> <p>Given the fact that there will be no elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges) when carbon dioxide is used as a biocide in Rentokil Initial's rodenticide (PT14) products, it is also not necessary to determine the effect of increased carbon dioxide on the reproduction of birds, and it's short-term toxicity to birds.</p> | <p>Document IIIA Section 7.5.1.1</p> <p>Document IIIA Section 7.5.1.2</p> <p>Document IIIA Section 7.5.1.3</p> |

Toxicity to terrestrial organisms, initial tests (5 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | Results | | | Remarks | Reference |
|---------------------------|---------------------------------------|----------------------------|----------|----------|---------|------|---------------------|--|-------------------------------|
| | | | Design | Duration | NOEC | LOEC | EC/LC ₅₀ | | |
| N/A. | Honeybees | N/A | N/A | N/A | N/A | N/A | N/A | Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges). Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on honeybees or other beneficial arthropods. | Document IIIA Section 7.5.4.1 |
| N/A | Other terrestrial non-target organism | N/A | N/A | N/A | N/A | N/A | N/A | <p>This data is only required if a concern for the terrestrial compartment is indicated by the risk assessment or if there is likely to be long-term exposure to the active substance.</p> <p>Carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in terrestrial systems, outside normal atmospheric ranges. In addition, there is no mechanism for the carbon dioxide to be released directly into the terrestrial system.</p> <p>Consequently, there will be no increased carbon dioxide levels in the terrestrial system, so it is not necessary to determine the effect of increased carbon dioxide on terrestrial non-target organisms.</p> | Document IIIA Section 7.5.6 |

Toxicity to terrestrial organisms, initial tests (6 of 6)

| Guideline/ Test method | Species | Endpoint / Type of test | Exposure | | NOEC | Results | | Remarks | Reference |
|---------------------------|---------|----------------------------|----------|----------|------|---------|---------------------|---|--|
| | | | Design | Duration | | LOEC | EC/LC ₅₀ | | |
| N/A. | Mammals | N/A | N/A | N/A | N/A | N/A | N/A | <p>An acute oral toxicity study for carbon dioxide cannot be submitted because it is not technically possible to determine the acute toxicity of carbon dioxide by the oral route. This is because there is no approved guideline for testing the acute toxicity of a gas by the oral route.</p> <p>In addition to the above, it should be noted that carbon dioxide, under normal conditions of use in Rentokil Initial's rodenticide (PT14) products will not cause any elevation in the levels of carbon dioxide naturally found in the atmosphere, outside normal atmospheric ranges. Consequently, there will be no increased carbon dioxide levels in the atmosphere, so it is not necessary to determine the effect of increased carbon dioxide on mammals.</p> <p>Given the fact that there will be no elevation in the levels of carbon dioxide naturally found in the atmosphere (outside normal atmospheric ranges) when carbon dioxide is used as a biocide in Rentokil Initial's rodenticide (PT14) products, it is also not necessary to determine the effect of increased carbon dioxide on the reproduction of mammals, and its short-term toxicity to mammals.</p> | <p>Document IIIA Section 7.5.7.1.1</p> <p>Document IIIA Section 7.5.7.1.2</p> <p>Document IIIA Section 7.5.7.1.3</p> |

4.2.4 Non compartment specific effects relevant to the food chain (secondary poisoning)

Result

Carbon dioxide does not have any intrinsic properties which suggest it will bioaccumulate in the environment. In addition, carbon dioxide is not classified as hazardous to health according to EC Directive 67/548/EEC, nor are there any indications of toxicity such as endocrine disruption. The toxicity profile of carbon dioxide, coupled with the fact that it is unlikely to accumulate in the environment, means that there is a low risk of secondary poisoning.

5. HAZARD IDENTIFICATION FOR PHYSICO-CHEMICAL PROPERTIES

a. Thermal stability and identity of relevant breakdown products

At all pressures, there is a fairly wide range of temperatures in which carbon dioxide disassociates directly into CO and O₂ without precipitation of carbon. Refer to equation below. At higher temperatures C is also formed (in addition to CO and O₂).



For further details refer to Document III-A3 Section 3.10.

b. Flammability and flash point

Carbon dioxide is a non-flammable gas which does not support combustion. The flash-point of carbon dioxide cannot be determined because it is a gas at the normal temperatures and pressures which it will be used as a biocide. (Flash point data can only be determined for liquids).

For further details refer to Document III-A3 Section 3.11 and 3.12.

c. Explosive properties

Carbon dioxide is thermodynamically stable, so does not exhibit explosive properties.

For further details refer to Document III-A3 Section 3.15

d. Oxidising properties

Oxidising properties of carbon dioxide cannot be determined because it is a gas at the normal temperatures and pressures which it will be used as a biocide. (Oxidising properties can only be determined for solids).

For further details refer to Document III-A3 Section 3.16

e. Reactivity towards container material

Carbon dioxide is supplied in containers designed and manufactured [REDACTED]. Containers manufactured to this specification will ensure that there is no reactivity between contents and containers.

For further details, refer to Document III-A3 Section 3.17