**APPENDIX 1-11: Multi-A.I. Formulation Analysis for Chlorpyrifos**

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| --- |
| This analysis is based on the acute oral rat studies submitted to EPA by registrants. The analysis includes data for technical grade active ingredient (TGAI) and typical end-use products (TEP) that have flowable formulations. Therefore, data are not available on all registered multi-a.i. formulations. If there are multiple studies with the technical formulation for which confidence intervals (CI) are provided for the LD50, then the CI with the smallest lower CI for the LD50 (*i.e*., most toxic LD50,) after correcting for %AI, is compared to the LD50 upper CI for each formulation, after correcting for %AI. If these confidence intervals do not overlap, then the formulated mixture is considered to be more toxic to mammals on an acute exposure basis.  |
| "Percent Active Ingredient" (column I) and the "Oral LD50 Lower/Upper CIs" must be numeric values for the toxicity comparison to be done. If any of these values are non-numeric (e.g., "<50", "N/A", "highest dose"), the corresponding study will not be included in the comparison. If the CIs overlap, the conclusion will be “Formulation not more toxic than single a.i.”. If CIs are not available, the conclusion will be “Insufficient data to establish different toxicity”. If the results are from an up-and-down study (OECD Test Guideline 425 Acute Oral Toxicity-Up-and-Down Procedure), there is lower confidence in the results due to the lower number of animals used in testing. Therefore, the conclusion for any differences in the CIs based on up-and-down studies will also be “Insufficient data to establish different toxicity”. If a mixture formulation is more toxic than the technical formulation (*i.e*., CIs do not overlap), then the conclusion "Formulation more toxic than single AI" will be highlighted red with red text. See **Tables B 1-11.1**, **B 1-11.2**, and **B 1-11.3**. |

**Table B 1-11.1. Rat LD50 comparison for technical grade chlorpyrifos and multi-a.i. formulations that contain chlorpyrifos**

| **Current Registration No.** | **Name** | **Percent Active Ingredient** | **Active Ingredient** | **MRID(s) for Acute Oral Study** | **Male Oral LD50 (mg/kg) (CI)1** | **Female Oral LD50 (mg/kg) (CI)1** | **Combined Oral LD50 (mg/kg) (CI)1** | **Is Formulation more toxic to males** | **Is Formulation more toxic to females** | **Is formulation more toxic to combined sexes** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LD50 Information on Technicals** |
| 4787-40  | CHLORPYRIFOS TECHNICAL | 98.50% | Chlorpyrifos | 46066201 | 276 (167 – 455) | 350 (285 – 429) | 320 (260 – 393) |   |   |   |
| 62719-4462719-15 | DURSBAN F INSECTIDAL CHEMICALDURSBAN R | 97.60% | Chlorpyrifos | 44209101 | 223  | 223  |     |   |   |   |
| **LD50 Information**  |
| 1381-243  | TUNDRA SUPREME | 9.00% | Bifenthrin | 477921032 |     | 98 (55 – 175) | 98 (55 – 175) | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|  | TUNDRA SUPREME | 28.60% | Chlorpyrifos |   |  |   |   |  |  |  |
| 279-9545  | F9047-2 EC INSECTICIDE | 3.08% | Zeta-Cypermethrin | 481394022 |     | 98.11 (55 – 175) | 98.11 (55 – 175) | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|    | F9047-2 EC INSECTICIDE | 30.80% | Chlorpyrifos |   |     |     |     |   |   |   |
| 34704-1086  | MATCH-UP INSECTICIDE | 9.00% | Bifenthrin | 491586042 |     | 550 (197 – 863) | 550 (197 – 863) | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|  | MATCH-UP INSECTICIDE | 28.60% | Chlorpyrifos |   |  |   |   |   |   |   |
| 499-405  | WHITMIRE PT 1920 TOTAL RELEASE INSECTICIDE | 1.60% | Cyfluthrin | 429063023 | 920 (530 – 1590)  | 340 (160 – 730) | 630 (450 – 880) | Formulation more toxic than single a.i. | Formulation more toxic than single a.i. | Formulation more toxic than single a.i. |
|    | WHITMIRE PT 1920 TOTAL RELEASE INSECTICIDE | 8.00% | Chlorpyrifos |   |     |     |     |   |   |   |
| 62719-575  | COBALT | 0.54% | gamma-Cyhalothrin | 470064032 |     | 320 (0 – 20000) | 320 | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|   | COBALT | 30.00% | Chlorpyrifos |   |  |  |   |   |   |   |
|    | COBALT | 0.54% | gamma-Cyhalothrin | 470064092  |     | 320 (0 – 20000) | 320 | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|  | COBALT | 30.00% | Chlorpyrifos |  |   |  |   |  |  |  |
| 62719-615  | Cobalt Advanced | 1.44% | lambda-Cyhalothrin | 479011032 |     | 179.8 (101 – 320) | 179.8 | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity | Insufficient data to establish different toxicity |
|  | Cobalt Advanced | 28.12% | Chlorpyrifos |  |  |  |  |   |   |   |
| 8329-36 | ULV Mosquito Master 412 | 4.00% | Permethrin | 40969402 | 2654 (1776 – 3966) | 1836 (1476 – 2285) | 2245 | Formulation not more toxic than single a.i. | Formulation more toxic than single a.i. | Insufficient data to establish different toxicity |
|  |  | 12.00% | Chlorpyrifos |  |  |  |  |  |  |  |

1 Endpoints are based on percent a.i. of chlorpyrifos.

2 The results are from an up-and-down study (OECD Test Guideline 425 Acute Oral Toxicity-Up-and-Down Procedure).

3 This product is only for use in enclosed greenhouses.

**Table B 1-11.2. Intermediate calculations used to compare rat LD50 values for technical grade (TGAI) chlorpyrifos and multi-a.i. formulations that contain chlorpyrifos – TGAI data**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Male LD50 Lower CI** | **%AI CorrectedMale LD50 Lower CI** | **Female LD50 Lower CI** | **%AI CorrectedFemale LD50 Lower CI** | **Combined LD50 Lower CI** | **%AI CorrectedCombined LD50 Lower CI** | **%AI for Correction** |
| **Single AI Study** | 167.00 | 164.50 | 285.00 | 280.73 | 260.00 | 256.10 | 98.50% |

**Table B 1-11.3. Intermediate calculations used to compare rat LD50 values for technical grade (TGAI) chlorpyrifos and multi-a.i. formulations that contain chlorpyrifos – formulated product data**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Male LD50 Upper CI** | **%AI CorrectedMale LD50 Upper CI** | **Female LD50 Upper CI** | **%AI CorrectedFemale LD50 Upper CI** | **Combined LD50 Upper CI** | **%AI CorrectedCombined LD50 Upper CI** | **Reg No. & AI** | **%AI** | **%AI for Correction** |
| 1590.00 | 127.200 | 730.00 | 58.40 | 880.00 | 70.40 | 499-405 Cyfluthrin | 1.60 | 8.00 |
|   |   |   |   |   |   | 499-405 Chlorpyrifos | 8.00 | 8.00 |
| 3966.00 | 475.920 | 2285.00 | 274.20 |   |   | 8329-36 Permethrin | 4.00 | 12.00 |
|   |   |   |   |   |   | 8329-36 Chlorpyrifos | 12.00 | 12.00 |