ECDIN

Data on the effects of Parathion in the freshwater environment.

Input to ECDIN categories 8 & 9

8 Dispersion and transformation in the environment.

9 Effects of the chemical on the environment, including toxicity.

March 1984

Parathion

Acute effects on aquatic organisms

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| | Algae | | | | | | | | | | | | | | | |
| 3319 | Euglena gracilis | NI | Mortality | 1 hr | 31.6-71.4%: Increase | 10 | S | L | Growth medium | NI | 5.5 | 22 | NI | NI | NI | Continuous illumination. Mortality measured 14 days post-exposure |
| 3319 | Euglena gracilis | NI | Mortality | 2 hr | 29.1-91.0%: Increase | 10 | S | L | Growth medium | NI | 5.5 | 22 | NI | NI | NI | Continuous illumination. Mortality measured 14 days post-exposure. |
| | Annelids | | | | | | | | | | | | | | | |
| 3158 | Branchiura sowerbyi | Adult | Mortality | 72 hr | 100%: Increase | 0.5 | S | L | Tap | NI | NI | 21-32.2 | NI | NI | Acetone | Resistant population. Extreme contraction of tubificids |
| 3453 | Limnodrilus socialis | NI | LC50 | 24 hr | | 5.05 | S | L | Fresh | NI | NI | 25 | NI | 46.6 | NI | Emulsion |
| 3453 | Limnodrilus willeyi | NI | LC50 | 24 hr | | 22.60 | S | L | Fresh | NI | NI | 25 | NI | 46.6 | NI | Emulsion |
| 3288 | Tubifex tubifex | Adult | Mortality (ECO) | 72 hr | No effect | < 2.0 | S | L | Tap | NI | 7.8 | 24 | NI | NI | Acetone | Resistant population |
| | Molluscs | | | | | | | | | | | | | | | |
| 3415 | Lymnaea truncatula | NI | Mortality | 48 hr | 100%: Increase | > 1 | S | L | Fresh | NI | NI | NI | NI | NI | NI | |
| 4070 | Viviparus bengalensis | NI | LC50 | 24 hr | | 2.129 | S | L | Tap | 85 | 7.42 | 24 | 6.66 | 50 | NI | |
| 4070 | Viviparus bengalensis | NI | LC50 | 48 hr | | 1.362 | I | L | Tap | 85 | 7.42 | 24 | 6.66 | 50 | NI | |
| | Crustaceans | | | | | | | | | | | | | | | |
| 3159 | Asellus aquaticus | Adult | Mortality | 24 hr | No effect | < 0.01 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Asellus aquaticus | Adult | Mortality | 24 hr | 100%: Increase | 0.05 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3485 | Asellus aquaticus | NI | LC50 | 48 hr | | 12-20 | S | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14 hr L:10 hr D |
| 3060 | Asellus brevicaudus | Adult | LC50 | 24 hr | | 5.60 | S | L | Artif fresh | 35 | 7.1 | 21 | 8.0 | 98.5 | Ethanol | |
| 3488 | Cambarus sp. | Adult | LC50 | 24 hr | | 0.005 | S | L | Dist. | NI | NI | NI | NI | NI | Ethanol | |
| 3159 | Cambarus affinis | Adult | Mortality | 24 hr | No effect | < 0.05 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Cambarus affinis | Adult | Mortality | 24 hr | 100%: Increase | 0.2 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3159 | Carcinogammarus roeselii | Adult | Mortality | 24 hr | No effect | < 0.001 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Carcinogammarus roeselii | Adult | Mortality | 24 hr | 100%: Inreasee | 0.1 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Cyclops strenuus | Adult | Mortality | 24 hr | No effect | < 1.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Cyclops strenuus | Adult | Mortality | 24 hr | 100%: Increase | > 1.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3385 | Daphnia magna | Juven-ile (lst instar) | LC50 | 24 hr | | 0.0027 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juven-ile (lst instar) | LC50 | 24 hr | | 0.00321 | S | L | Well | 295 | NI | 22 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juven-ile (lst instar) | LC50 | 48 hr | | 0.001 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juven-ile (lst instar) | LC50 | 48 hr | | 0.00127 | S | L | Well | 295 | NI | 22 | NI | 99 | NI | Triton X-100 emulsifier |
| 3004 | Daphnia pulex | Juven-ile (lst instar) | LC50 | 48 hr | | 0.0006 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 15 | < 10.1 | 98.7 | Acetone | |
| 3494 | Daphnia pulex | Adult | LC50 | 48 hr | | 0.00076 | S | L | Fresh | NI | NI | 22 | NI | NI | Acetone | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 24 hr | | 0.0032 | S | L | Artif fresh | 35 | 7.1 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 24 hr | | 0.006 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 24 hr | | 0.0086 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 48 hr | | 0.004 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 48 hr | | 0.0051 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |
| 3385 | Gammarus fasciatus | Juven-ile | LC50 | 24 hr | | 0.0021 | F | L | Well | 295 | NI | 20 | NI | 99 | Acetone | Triton X-100 emulsion |
| 3385 | Gammarus fasciatus | Juven-ile | LC50 | 48 hr | | 0.00062 | F | L | Well | 295 | NI | 20 | NI | 99 | Acetone | Triton X-100 emulsion |
| 3075 | Gammarus lacustris | NI | LC50 | 24 hr | | 0.012 | S | L | Artif. fresh | NI | 7.1 | 21 | NI | NI | Ethanol | Alkalinity = 30 mg/l |
| 3075 | Gammarus lacustris | NI | LC50 | 48 hr | | 0.0060 | S | L | Artif. fresh | NI | 7.1 | 21 | NI | NI | Ethanol | Alkalinity = 30 mg/l |
| 3060 | Orconectes nais | Juven-ile (3-5 wk) | LC50 | 24 hr | | 0.0001 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Orconectes nais | Adult | LC50 | 24 hr | | 0.086 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3404 | Orconectes rusticus | NI | Mortality | 48 hr | 100%: Increase | 0.0001 | S | L | Dist. | NI | NI | NI | NI | NI | Ethanol | |
| 3060 | Palaemonetes kadiakensis | Adult | LC50 | 24 hr | | 0.010 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Palaemonetes kadiakensis | Adult | LC50 | 24 hr | | 0.010 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Palaemonetes kadiakensis | Adult | LC50 | 48 hr | | 0.005 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Palaemonetes kadiakensis | Adult | LC50 | 48 hr | | 0.008 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |
| 3004 | Simocephalus serrulatus | Juven-ile (1st instar) | LC50 | 48 hr | | 0.00047 | S | L | Artif. fresh | 40-50 | 7.2-7.5 | 21 | < 8.9 | 98.7 | Acetone | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| | Insects | | | | | | | | | | | | | | | |
| 3418 | Aedes sp. | Larva | Mortality | 48 hr | 85-100%: Increase | NI | NI | F | Fresh | NI | NI | NI | NI | NI | NI | 0.025-0.075 lb/acre spray application |
| 3418 | Aedes sp. | Larva | Mortality | 48 hr | 98%: Increase | NI | NI | F | Fresh | NI | NI | NI | NI | NI | NI | 0.1 lb/acre granular application |
| 3095 | Aedes aegypti | Larva (3 day) | LC50 | 24 hr | | 0.0101 | S | L | Dist. | NI | NI | 24 | NI | 93.7 | Ethanol | Tech.grade |
| 3095 | Aedes aegypti | Larva (3 day) | LC50 | 48 hr | | 0.0069 | S | L | Dist. | NI | NI | 24 | NI | 93.7 | Ethanol | Tech.grade |
| 3095 | Aedes aegypti | Larva (3 day) | LC90 | 24 hr | | 0.0220 | S | L | Dist. | NI | NI | 24 | NI | 93.7 | Ethanol | Tech.grade |
| 3095 | Aedes aegypti | Larva (3 day) | LC90 | 48 hr | | 0.0140 | S | L | Dist. | NI | NI | 24 | NI | 93.7 | Ethanol | Tech.grade |
| 3148 | Aedes aegypti | Larva (3rd instar) | Mortality | 24 hr | 85%: Increase | 0.035 | S | L | Dist. | NI | 6.3 | 28 | NI | NI | Acetone | |
| 3419 | Aedes aegypti | Larva (4th instar) | LC50 | 24 hr | | 0.008 | S | L | Dist. | NI | NI | 20 | NI | 98.8 | Acetone | Susceptible strain |
| 3419 | Aedes aegypti | Larva (4th instar) | LC50 | 24 hr | | 0.027 | S | L | Dist. | NI | NI | 20 | NI | 98.8 | Acetone | Resistant strain |
| 3435 | Aedes aegypti | Larva (4th instar) | LC50 | 24 hr | | 0.0048 | S | L | Fresh | NI | NI | NI | NI | NI | NI | |
| 3473 | Aedes nigromaculis | Larva 3rd-4th instar | LC50 | 24 hr | | 0.0006-0.170 | S | L | Dist. | NI | NI | 21 | NI | NI | Acetone | Range due to different susceptibility of strains tested |
| 3435 | Aedes taeniorhynchus | Larva (4th instar) | LC50 | 24 hr | | 0.0036 | S | L | Fresh | NI | NI | NI | NI | NI | NI | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3346 | Anopheles albimanus | Larva (4th instar) | LC50 | 24 hr | | 0.0031 | S | L | Fresh | NI | NI | NI | NI | NI | Acetone | Susceptible strain |
| 3346 | Anopheles albimanus | Larva (4th instar) | LC50 | 24 hr | | 0.01-0.49 | S | L | Tap | NI | NI | NI | NI | NI | NI | Resistant strain |
| 3467 | Anopheles albimanus | Larva 4th instar | LC50 | 24 hr | | 0.075-0.67 | S | L | Tap | NI | NI | 25-28 | NI | NI | Acetone | Range due to selection for resistance in successive generations |
| 4165 | Anopheles albimanus | Larva (4th instar) | LC50 | 24 hr | | 0.007 | S | L | Fresh | NI | NI | NI | NI | NI | Acetone | Susceptible strain |
| 4165 | Anopheles albimanus | Larva (4th instar) | LC50 | 24 hr | | 0.25 | S | L | Fresh | NI | NI | NI | NI | NI | Acetone | Resistant strain |
| 3435 | Anopheles quadri-maculatus | Larva (th instar) | LC50 | 24 hr | | 0.0060 | S | L | Fresh | NI | NI | NI | NI | NI | NI | |
| 3471 | Chaoborus astictopus | Larva (1st instar) | LC50 | 24 hr | | 0.0018 | S | L | Lake | NI | NI | 23 | NI | NI | Acetone | Tech.grade |
| 3471 | Chaoborus astictopus | Larva (1st instar) | LC90 | 24 hr | | 0.0028 | S | L | Lake | NI | NI | 23 | NI | NI | Acetone | Tech.grade |
| 3471 | Chaoborus astictopus | Larva (4th instar) | LC50 | 24 hr | | 0.017 | S | L | Lake | NI | NI | 23 | NI | NI | Acetone | Tech.grade |
| 3471 | Chaoborus astictopus | Larva (4th instar) | LC90 | 24 hr | | 0.029 | S | L | Lake | NI | NI | 23 | NI | NI | Acetone | Tech.grade |
| 3485 | Chaoborus crystallinus | Larva | LC50 | 48 hr | | 1.0 | S | L | Artif fresh | NI | NI | 18 | NI | NI | Acetone | Photoperiod 14hr L:10hr D |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Acute effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3448 | Culex pipiens quinquefasciatus | Larva (2nd - 3rd instar) | LC50 | 24 hr | | 0.0022 | S | L | Tap | NI | NI | 25.5-26.6 | NI | NI | Acetone | |
| 3448 | Culex pipiens quinquefasciatus | Larva (1st instar) | LC90 | 24 hr | | 0.00096 | S | L | Tap | NI | NI | 25.5-26.6 | NI | NI | Acetone | |
| 3448 | Culex pipiens quinquefasciatus | Larva (2nd-3rd instar) | LC90 | 24 hr | | 0.0040 | S | L | Tap | NI | NI | 25.5-26.6 | NI | NI | Acetone | |
| 3448 | Culex pipiens quinquefasciatus | Larva (4th instar) | LC50 | 24 hr | | 0.0043 | S | L | Tap | NI | NI | 25.5-26.6 | NI | NI | Acetone | |
| 3448 | Culex pipiens quinquefasciatus | Larva (4th instar) | LC90 | 24 hr | | 0.0081 | S | L | Tap | NI | NI | 25.5-26.6 | NI | NI | Acetone | |
| 3461 | Culex pipiens fatigans | Larva (3-4th instar) | LC50 | 24 hr | | 0.00045-0.005 | S | L | Fresh | NI | NI | 24-30 | NI | NI | Ethanol | Tech.grade. Range due to different strains tested |
| 3461 | Culex pipiens fatigans | Larva (3-4th instar) | LC95 | 24 hr | | 0.00094-0.036 | S | L | Tap | NI | NI | 28 | NI | NI | Ethanol | Tech.grade. Range due to different strains tested |
| 3454 | Culicoides variipennis | Larva | LC50 | 24 hr | | 0.096 | S | L | Lake | NI | NI | 23.8 | NI | NI | NI | |
| 3389 | Lestes congener | Nymph | LC50 | 48 hr | | 0.02 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Lestes congener | Nymph | LC50 | 72 hr | | 0.01 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Notonecta undulata | Adult | LC50 | 24 hr | | 0.02 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Notonecta undulata | Adult | LC50 | 48 hr | | 0.01 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Notonecta undulata | Adult | LC50 | 72 hr | | 0.008 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Peltodytes sp. | Adult | LC50 | 72 hr | | 0.01 | S | L | Tap | NI | 7.4 | 25 | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3079 | Pteronarcella badia | Naiad | LC50 | 24 hr | | 0.008 | S | L | Artif fresh | NI | 7.1 | 15.5 | 5-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length = 15-20 mm |
| 3079 | Pteronarcella badia | Naiad | LC50 | 48 hr | | 0.0056 | S | L | Artif fresh | NI | 7.1 | 15.5 | 3-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length = 15-20 mm. |
| 3079 | Pteronarcys californica | Naiad | LC50 | 24 hr | | 0.028 | S | L | Artif fresh | NI | 7.1 | 15.5 | 5-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length 30-35 mm |
| 3079 | Pterocarcys californica | Naiad | LC50 | 48 hr | | 0.011 | S | L | Artif fresh | NI | 7.1 | 15.5 | 3-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length 30-35 mm |
| | Fish | | | | | | | | | | | | | | | |
| 3366 | Barbus machecola | Fry | LC50 | 48 hr | | 2.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Barbus machecola | Fry | LC100 | 48 hr | | 2.5 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3323 | Carassius auratus | Juven-ile | LC50 | 24 hr | | 3.8 | S | L | Sprin | NI | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3323 | Carassius auratus | Juven-ile | LC50 | 24-72 hr | | 2.7 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3323 | Carassius auratus | Juven-ile | LC50 | 48-72 hr | | 2.6 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3366 | Cirrhinus mrigale | Early fry | LC50 | 48 hr | | 5.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Cirrhinus mrigale | Early fry | LC100 | 48 hr | | 8.5 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3159 | Cyprinus carpio | Larva | LC50 | 48 hr | | 3.5 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Cyprinus carpio | Larva | Mortality | 48 hr | No effect | < 3.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Acute effects on aquatic organisms 

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3159 | Cyprinus carpio | Larva | Mortality | 48 hr | 100%: Increase | 4.5 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3163 | Cyprinus carpio | Adult | LD50 | 48 hr | | > 4000 mg/kg BW | S | L | Fresh | NI | NI | 20-22 | NI | > 98 | | Mortality observed 48 hr post-treatment. Fish BW 2.5 gm. Oral dose |
| 3163 | Cyprinus carpio | Adult | LD50 | 48 hr | | 1800 mg/kg BW | S | L | Fresh | NI | NI | 20-22 | NI | > 98 | Acetone | Fish BW 2.5 gm. Added to water |
| 3163 | Cyprinus carpio | Adult | LD50 | 48 hr | | > 40.0 mg/kg BW | S | L | Fresh | NI | NI | 20-22 | NI | > 98 | Acetone | One topical application to gill lamellae. Mortality observed 48 hr post-treatment. Fish BW 2.5 gm |
| 3366 | Cyprinus carpio | Fry | LC50 | 48 hr | | 6.5 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Cyprinus carpio | Fry | LC100 | 48 hr | | 9.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3103 | Esox lucius | >1 yr | Mortality | 24 hr | No effect | < 1 | S | L | Fresh | 13 | 7.1-7.8 | 18-21 | NI | NI | Ethanol | |
| 3103 | Esox lucius | >1 yr | Mortality | 24 hr | 100%: Increase | 3.0 | S | L | Fresh | 13 | 7.1-7.8 | 18-21 | NI | NI | Ethanol | |
| 3159 | Esox lucius | Fingerling | Mortality | 24 hr | No effect | < 1.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Esox lucius | Fingerling | Mortality | 24 hr | 100%: Increase | 3.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | < 2: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.1 lb/acre. Exposure 3-5 days post-application |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | 22%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.1 lb/acre |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | 30%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.1 lb/acre. Exposure 24 hrs post-application |

Freshwater Biological Association, Windermere

CHEMICAL : PARATHION

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | 92%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.4 lb/acre |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | 100%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.4 lb/acre. Exposure 24 hrs post application |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | 16-44%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.4 lb/acre. Exposure 2.5 days post application |
| 3355 | Gambusia affinis | NI | Mortality | 24 hr | < 2%: Increase | NI | S | F | Pond | NI | 7.5-8.0 | 25-34 | NI | 50 | NI | One spray application of emulsion 0.4 lb/acre. Exposure 6-8 days post-application |
| 3366 | Gambusia affinis | Fry | LC50 | 48 hr | | 0.1 | S | L | Fresh | 64-96 | 7.0 | 30.5 | 6.8-11.4 | 5 | NI | Folidol E.605 formulation |
| 3366 | Gambusia affinis | Fry | LC100 | 48 hr | | 0.2 | S | L | Fresh | 64-96 | 7.0 | 30.5 | 6.8-11.4 | 5 | NI | Folidol E.605 formulation |
| 3386 | Gambusia affinis | NI | LC50 | 48 hr | | 0.35-0.61 | S | L | Tap | NI | NI | NI | NI | NI | Methoxy-acetaldy-hyde | Susceptible popu-lation. Range due to time of testing; higher value in spring |
| 3386 | Gambusia affinis | NI | LC50 | 48 hr | | 0.39-0.95 | S | L | Tap | NI | NI | NI | NI | NI | Methoxy-acetaldy-hyde | Resistant population. Range due to time of testing; higher value in spring |
| 3403 | Gambusia affinis | Adult | Mortality | 72 hr | >10%: Increase | NI | NI | F | Fresh | NI | NI | NI | NI | NI | NI | Application 0.4 lb/acre |
| 3403 | Gambusia affinis | Adult | LC50 | 24 hr | | NI | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Gambusia affinis | Adult | LC50 | 48 hr | | 0.26 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Gambusia affinis | Adult | LC50 | 72 hr | | 0.20 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3403 | Gambusia affinis | Adult | LC90 | 24 hr | | 3.71 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Gambusia affinis | Adult | LC90 | 48 hr | | 1.43 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Gambusia affinis | Adult | LC90 | 72 hr | | 1.78 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3426 | Gambusia affinis | NI | Mortality | 24 hr | 18%: Increase | NI | S | F | Pond | NI | NI | NI | NI | 2 | NI | One spray application as emulsion 0.1 lb/ acre. EC2 formu- lation |
| 3426 | Gambusia affinis | NI | Mortality | 24 hr | 96%: Increase | NI | S | F | Pond | NI | NI | NI | NI | 2 | NI | One spray application as emulsion 0.4 lb/ acre. EC2 formu- lation |
| 3426 | Gambusia affinis | NI | Mortality | 48 hr | 32%: Increase | NI | S | F | Pond | NI | NI | NI | NI | 2 | NI | One spray application as emulsion 0.4 lb/ acre. EC2 formu- lation. Exposure 24hr post-application |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | No effect | 0.050 | S | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Susceptible fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | 40%: Increase | 0.10 | S | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Susceptible fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | 20%: Increase | 0.040 | S | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Resistant fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | No effect | 0.080 | S | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Resistant fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | 50%: Increase | 0.160 | S | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Resistant fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | 60-70%: Increase | 0.025-0.050 | F | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Susceptible fish |
| 3452 | Gambusia affinis | NI | Mortality | 36 hr | No effect | 0.080 | F | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Resistant fish |
| 3452 | Gambusia affinis | NI | Mortaltiy | 36 hr | 50%: Increase | 0.160 | F | L | Fresh | 28 | 7.8 | 24 | NI | NI | Acetone | Resistant fish |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow (Static, Intermittent Flowthrough) | Place (Laboratory, Field) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3496 | Gambusia affinis | Adult | LC50 | 48 hr | | 0.05 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Susceptible strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | LC50 | 48 hr | | 0.2 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Resistant strain. Length 2.8-4.5 cm |
| 3366 | Labeo fimbriatus | Early fry | LC50 | 48 hr | | 7.5 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Labeo fimbriatus | Early fry | LC100 | 48 hr | | 10.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3323 | Lebistes reticulatus | Juvenile | LC50 | 24 hr | | 0.082 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 0.1-0.2 gm |
| 3323 | Lebistes reticulatus | Juvenile | LC50 | 48 hr | | 0.068 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 0.1-0.2 gm |
| 3461 | Lebistes reticulatus | Juvenile (7 wk) | Mortality | 30 min | 92%: Increase | 7 | S | L | Tap | NI | NI | 28 | NI | NI | Ethanol | Tech.grade. Remaining organisms lose equilibrium |
| 3461 | Lebistes reticulatus | Juvenile (7 wk) | LC5 | 24 hr | | 0.0135-0.028 | S | L | Fresh | NI | NI | 24-30 | NI | NI | Ethanol | Tech.grade. Range due to different strains tested |
| 3461 | Lebistes reticulatus | Juvenile (7 wk) | LC50 | 24 hr | | 0.045-0.08 | S | L | Fresh | NI | NI | 24-30 | NI | NI | Ethanol | Tech.grade. Range due to different strains tested |
| 3021 | Lepidocephalus thermalis | Juvenile | LC50 | 24 hr | | 1.361 | S | L | Fresh | NI | NI | 27 | NI | 50 | NI | |
| 3021 | Lepidocephalus thermalis | Adult | LC50 | 24 hr | | 1.858 | S | L | Fresh | NI | NI | 27 | NI | 50 | NI | |
| 3021 | Lepidocephalus thermalis | Adult | LC50 | 48 hr | | 1.269 | S | L | Fresh | NI | NI | 27 | NI | 50 | NI | |
| 3323 | Lepomis cyanellus | Adult | LC50 | 24 hr | | 3.6 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 15 gm |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3323 | Lepomis cyanellus | Adult | LC50 | 48 hr | | 2.6 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 15 gm |
| 3396 | Lepomis cyanellus | NI | LC30 | 48 hr | | 0.189 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Lepomis cyanellus | NI | LC50 | 48 hr | | 0.207 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Lepomis cyanellus | NI | LC70 | 48 hr | | 0.225 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Lepomis cyanellus | NI | LC30 | 48 hr | | 0.200 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |
| 3396 | Lepomis cyanellus | NI | LC50 | 48 hr | | 0.275 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |
| 3396 | Lepomis cyanellus | NI | LC70 | 48 hr | | 0.345 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |
| 3403 | Lepomis cyanellus | Adult | LC50 | 24 hr | | 0.18 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Lepomis cyanellus | Adult | LC50 | 48 hr | | 0.06 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Lepomis cyanellus | Adult | LC50 | 72 hr | | 0.02 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Lepomis cyanellus | Adult | LC90 | 24 hr | | 2.00 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Lepomis cyanellus | Adult | LC90 | 48 hr | | 0.61 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3403 | Lepomis cyanellus | Adult | LC90 | 72 hr | | 0.06 | S | L | Well | NI | NI | NI | NI | NI | Acetone | |
| 3422 | Lepomis cyanellus | NI | LC50 | 24 hr | | 0.155 | S | L | Fresh | NI | NI | NI | NI | 98 | Acetone | |
| 3399 | Lepomis gibbosus | NI | LD50 | 24 hr | | NI | S | L | Fresh | NI | NI | NI | NI | 99 | Corn oil | 1 I.P. Injection of 110 mg/kg BW |
| 3294 | Lepomis macrochirus | NI | LC50 | 24 hr | | 0.83-2.8 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |
| 3294 | Lepomis macrochirus | NI | LC50 | 48 hr | | 0.71-1.5 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |
| 3323 | Lepomis macrochirus | Juvenile | LC50 | 24-72 hr | | 0.26 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow (Static / Intermittent Flowthrough) | Place (Laboratory / Field) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3323 | Lepomis macrochirus | Adult | LC50 | 24 hr | | 1.1 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 10 gm |
| 3323 | Lepomis macrochirus | Adult | LC50 | 48 hr | | 0.93 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 10 gm |
| 3323 | Lepomis macrochirus | Juven-ile | LC50 | 24-48 hr | | 0.10 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3385 | Lepomis macrochirus | Juven-ile | LC50 | 24 hr | | 2.25 | F | L | Well | 297 | NI | 22 | >5.2 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Lepomis macrochirus | Juven-ile | LC50 | 48 hr | | 1.15 | F | L | Well | 297 | NI | 22 | >5.2 | 99 | NI | Triton X-100 emulsifier |
| 3422 | Lepomis macrochirus | NI | LC50 | 24 hr | | 0.141 | S | L | Fresh | NI | NI | NI | NI | 98 | Acetone | |
| 3423 | Lepomis macrochirus | Juven-ile | LC50 | 48 hr | | 0.090 | F | L | Tap | NI | 7.2-7.5 | 25 | 8.0-11.0 | NI | Acetone | BW 12-20 gm. Alkalinity 30-60 mg/l. Triton X-100 emulsifier |
| 3323 | Micropterus salmoides | Juven-ile | LC50 | 24 hr | | 1.0 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 5 gm |
| 3323 | Micropterus salmoides | Juven-ile | LC50 | 48 hr | | 0.82 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 5 gm |
| 3443 | Micropterus salmoides | NI | LT50 | 24 hr | | 0.5 | S | L | Tap | NI | 6.5 | 20-21 | < 8.9 | NI | Acetone | |
| 3445 | Micropterus salmoides | Adult | LC50 | 48 hr | | 1.07 | F | L | Tap | 60 | 7.0 | 22 | NI | NI | NI | |
| 3396 | Notemigonus crysoleucas | NI | LC30 | 48 hr | | 1.700 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Notemigonus crysoleucas | NI | LC50 | 48 hr | | 1.895 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Notemigonus crysoleucas | NI | LC70 | 48 hr | | 2.075 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Susceptible population |
| 3396 | Notemigonus crysoleucas | NI | LC30 | 48 hr | | 2.225 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |
| 3396 | Notemigonus crysoleucas | NI | LC50 | 48 hr | | 2.800 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |
| 3396 | Notemigonus crysoleucas | NI | LC70 | 48 hr | | 3.4 | S | L | Tap | NI | NI | 20 | NI | NI | Acetone | Resistant population |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3422 | Notemigonus crysoleucas | NI | LC50 | 24 hr | | 0.931 | S | L | Fresh | NI | NI | NI | NI | 98 | Acetone | |
| 3076 | Pimephales promelas | Adult | LC50 | 48 hr | | 1.490 | F | L | Fresh | 116 | 7.85 | 18 | < 9.5 | 98.5 | Acetone | |
| 3294 | Pimephales promelas | Adult | LC50 | 24 hr | | 4.8-5.2 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 96.5 | Acetone | Tech.grade |
| 3294 | Pimephales promelas | Adult | LC50 | 48 hr | | 2.9-3.7 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 96.5 | Acetone | Tech.grade |
| 3294 | Pimephales promelas | Adult | LC50 | 24 hr | | 1.6-1.7 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |
| 3294 | Pimephales promelas | Adult | LC50 | 48 hr | | 1.6 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |
| 3323 | Pimephales promelas | Juven-ile | LC50 | 24-72 hr | | 3.0 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3323 | Pimephales promelas | Juven-ile | LC50 | 24 hr | | 2.1 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3323 | Pimephales promelas | Juven-ile | LC50 | 48 hr | | 1.8 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3385 | Pimephales promelas | Adult | LC50 | 24 hr | | 2.28 | S | L | Well | 238 | 7.94 | 22 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Pimephales promelas | Adult | LC50 | 48 hr | | 2.02 | S | L | Well | 238 | 7.94 | 22 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Pimephales promelas | Adult | LC50 | 24 hr | | 2.20 | F | L | Well | 238 | 7.94 | 24 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Pimephales promelas | Adult | LC50 | 48-72 hr | | 0.50 | F | L | Well | 238 | 7.94 | 24 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3159 | Salmo gairdneri | Finger-ling | Mortality | 24 hr | No effect | < 0.8 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Salmo gairdneri | Finger-ling | Mortality | 24 hr | 100%: Increase | 2.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow (Static / Intermittent Flowthrough) | Place (Laboratory / Field) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3353 | Salmo gairdneri | Alevin (1 wk) | Mortality | 24-72 hr | No effect | 0.2-2.0 | S | L | River | NI | NI | 8 | NI | NI | Acetone | |
| 3353 | Salmo gairdneri | Fry (1 month) | Mortality | 24-72 hr | No effect | 0.2 | S | L | River | NI | NI | 8 | NI | NI | Acetone | |
| 3353 | Salmo gairdneri | Fry (1 month) | Mortality | 24-72 hr | 70-80%: Increase | 2.0 | S | L | River | NI | NI | 8 | NI | NI | Acetone | Food pretreated with 2.0 mg/l parathion |
| 3423 | Salmo gairdneri | Finger-ling | LC50 | 24 hr | | 2.0 | F | L | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | NI | Acetone | BW 10-15 gm. Alkalinity 30-60 mg/l. Triton X-100 emulsifier |
| 3423 | Salmo gairdneri | Finger-ling | LC50 | 48 hr | | 1.3 | F | L | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | NI | Acetone | BW 10-15 gm Alkalinity 30-60 mg/l. Triton X-100 emulsifier |
| 3423 | Salmo gairdneri | Finger-ling | LC50 | 72 hr | | 0.92 | F | L | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | NI | Acetone | BW 10-15 gm. Alkalinity 30-60 mg/l. Triton X-100 emulsifier |
| 3103 | Salmo irideus | Fry | Mortality | 24 hr | No effect | < 1.0 | S | L | Fresh | 13 | 7.1-7.8 | 18-21 | NI | NI | Ethanol | |
| 3103 | Salmo irideus | Fry | Mortality | 24 hr | 100%: Increase | 3.0 | S | L | Fresh | 13 | 7.1-7.8 | 18-21 | NI | NI | Ethanol | |
| 3385 | Salmo trutta | Juven-ile (1 yr) | LC50 | 24 hr | | 2.15 | F | L | Well | 295 | 7.81 | 12 | 8.2 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Salmo trutta | Juven ile (1 yr) | LC50 | 48 hr | | 1.93 | F | L | Well | 295 | 7.81 | 12 | 8.2 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juven-ile (1 yr) | LC50 | 24 hr | | 2.25 | S | L | Well | 297 | NI | 12 | >6.5 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juven-ile (1 yr) | LC50 | 48 hr | | 2.57 | F | L | Well | 297 | NI | 12 | >6.5 | 99 | NI | Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Acute effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3366 | Tilapia mossambica | Fry | LC50 | 48 hr | | 0.6 | S | L | Fresh | 64-96 | 7.0 | 30.5 | 6.8-11.4 | 5 | NI | Folidol E.605 formulation |
| 3366 | Tilapia mossambica | Fry | LC100 | 48 hr | | 6.0-7.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Tilapia mossambica | Fry | LC50 | 48 hr | | 4.0-5.0 | S | L | Fresh | 64-96 | 7.0-7.5 | 25.7-29.9 | 5.4-14.2 | 50 | NI | Paramar-50 formulation |
| 3366 | Tilapia mossambica | Fry | LC100 | 48 hr | | 0.8 | S | L | Fresh | 64-96 | 7.0 | 30.5 | 6.8-11.4 | 5 | NI | Folidol E.605 formulation |
| 3415 | Tinca vulgaris | NI | LC0 | 24 hr | | < 0.1 | S | L | Fresh | NI | NI | NI | NI | NI | NI | Fish length 8-10 cm |
| | Amphibians | | | | | | | | | | | | | | | |
| 2870 | Acris crepitans | Adult | Mortality | 5-55 hr | No effect | 0.1-10.0 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 3426 | Bufo boreas | Larva | Mortality | 24 hr | No effect | NI | S | F | Pond | NI | NI | NI | NI | 2 | NI | One spray application of emulsion 0.1-0.4 lb/acre. EC2 formulation |
| 3159 | Bufo bufo | Larva | Mortality | 48 hr | No effect | < 0.2 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Bufo bufo | Larva | Mortality | 48 hr | 100%: Increase | 0.4 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3366 | Ranidae sp. | Larva | LC100 | 48 hr | | >50.0 | S | L | Fresh | 64-96 | 7.0 | 30.5 | 6.8-11.4 | 5 | NI | Folidol E.605 formulation |

Freshwater Biological Association, Windermere

Parathion

Chronic effects on aquatic organisms

CHEMICAL : Parathion

TITLE Chronic effects on aquatic organisms



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| | Annelids | | | | | | | | | | | | | | | |
| 3159 | Tubifex tubifex | Adult | Mortality | 96 hr | No effect | < 10 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Tubifex tubifex | Adult | Mortality | 96 hr | 100%: Increase | 100 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| | Molluscs | | | | | | | | | | | | | | | |
| 3159 | Dreissena polymorpha | Adult | Mortality | 96 hr | No effect | < 1.0 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 3159 | Dreissena polymorpha | Adult | Mortality | 96 hr | 100%: Increase | 10 | S | L | Fresh | NI | NI | 18-20 | NI | NI | Acetone | |
| 4070 | Viviparus bengalensis | NI | LC50 | 96 hr | | 0.787 | I | L | Tap | 85 | 7.42 | 24 | 6.66 | 50 | NI | |
| 3404 | Viviparus malleatus | NI | Mortality | 96 hr | No effect | 250 | S | L | Dist. | NI | NI | NI | NI | NI | Ethanol | |
| 3404 | Viviparus malleatus | NI | Mortality | 96 hr | No effect | > 1000 | S | L | Dist. | NI | NI | NI | NI | NI | Ethanol | |
| 3488 | Viviparus malleatus | Adult | Mortality | 96 hr | No effect | 12.0 | S | L | Dist. | NI | NI | NI | NI | NI | Ethanol | |
| | Crustacea | | | | | | | | | | | | | | | |
| 3485 | Asellus aquaticus | NI | LCO | 21 day | | 1.0 | I | L | Artif fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14 hr L :10 hr D |
| 3485 | Asellus aquaticus | NI | LC50 | 21 day | | 4.8 | I | L | Artif fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14 hr L 10 hr D |
| 3004 | Asellus brevicaudus | Adult | LC50 | 96 hr | | 2.130 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 15 | < 10.1 | 98.7 | Acetone | Increase in toxicity at 21°C |
| 3060 | Asellus brevicaudus | Adult | LC50 | 96 hr | | 0.600 | S | L | Artif fresh | 35 | 7.1 | 21 | 8.0 | 98.5 | Ethanol | |
| 3385 | Daphnia magna | Juvenile (1st instar) | LC50 | 96 hr | | 0.00065 | S | L | Well | 295 | NI | 22 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juvenile (1st instar) | LC50 | 96 hr | | 0.00062 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |

**CHEMICAL :** Parathion **TITLE** Chronic effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static Intermittent Flowthrough | Place: Laboratory Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3385 | Daphnia magna | Juvenile (1st instar) | LC50 | 1 wk | | 0.00028 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juvenile (1st instar) | LC50 | 2 wk | | 0.00025 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Daphnia magna | Juvenile (1st instar) | LC50 | 3 wk | | 0.00014 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3390 | Daphnia magna | Adult (14-21 day) | LC50 | 3 wk | | 0.0003-0.00035 | S | L | Growth | NI | 7.9 | 18 | NI | NI | Acetone | |
| 3004 | Gammarus fasciatus | Adult | LC50 | 96 hr | | 0.0013 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 21 | < 8.9 | 98.7 | Acetone | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 96 hr | | 0.0013 | S | L | Artif fresh | 35 | 7.1 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 96 hr | | 0.0021 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 96 hr | | 0.0045 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 120 hr | | 0.0016 | S | L | Well | 260 | 7.4 | 21 | 8.0 | 98.5 | Ethanol | |
| 3060 | Gammarus fasciatus | Adult | LC50 | 120 hr | | 0.0039 | I | L | Well | 260 | 7.4 | 18-21 | 8.0 | 98.5 | Ethanol | |
| 3385 | Gammarus fasciatus | Juvenile | LC50 | 96 hr | | 0.00043 | F | L | Well | 295 | NI | 20 | NI | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Gammarus fasciatus | Juvenile | LC50 | 35 day | | 0.00009 | F | L | Well | 295 | NI | 19 | NI | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Gammarus fasciatus | Juvenile | LC50 | 43 day | | 0.00007 | F | L | Well | 295 | NI | 20 | NI | 99 | Acetone | Triton X-100 emulsifier |
| 3004 | Gammarus lacustris | Adult | LC50 | 96 hr | | 0.0035 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 21 | < 8.9 | 98.7 | Acetone | |

**CHEMICAL :** Parathion **TITLE** Chronic effects on aquatic organisms 

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3424 | Chironomidae | Larva | Mortality | 1 wk | 48-83%: Increase | NI | S | F | Lake | NI | 8.0-8.2 | NI | NI | NI | NI | Formulation: 2% impregnated 15/30 mesh volclay G and EC4 lb/gallon. Application rate 0.25-0.5 lb/acre |
| 3385 | Chironomus tentans | Larva (4th instar) | LC50 | 96 hr | | 0.031 | F | L | Well | 295 | NI | 21 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Chironomus tentans | Larva (2nd instar) | LC50 | 5 day | | 0.0073 | F | L | Well | 295 | NI | 21 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Chironomus tentans | Larva (2nd instar) | LC50 | 8 day | | 0.0022 | F | L | Well | 295 | NI | 21 | NI | 99 | NI | Triton X-100 emulsifier |
| 3385 | Chironomus tentans | Larva (2nd instar) | LC50 | 14 day | | 0.0023 | F | L | Well | 295 | NI | 21 | NI | 99 | NI | Triton X-100 emulsifier |
| 3004 | Claassenia sabulosa | Larva (2nd year class) | LC50 | 96 hr | | 0.0015 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 15 | < 10.1 | 98.7 | Acetone | |
| 3079 | Claassenia sabulosa | Naiad | LC50 | 96 hr | | 0.0015 | S | L | Artif. fresh | NI | 7.1 | 15.5 | 3-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length = 20-25 mm |
| 3485 | Cloeon dipterum | Larva | LCO | 21 day | | 0.15 | I | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |
| 3485 | Cloeon dipterum | Larva | LC50 | 21 day | | 0.38 | I | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |
| 3090 | Ephemerella grandis | Nymph | LC50 | 4 day | | 0.003 | S | L | Stream | NI | NI | 8.9-10.0 | NI | NI | Acetone | |
| 3004 | Hexagenia bilineata | Juvenile | LC50 | 96 hr | | 0.015 | S | L | Artif. fresh | 40-50 | NI | 24 | < 8.4 | 98.7 | Acetone | |
| 3090 | Hydropsyche californica | Larva | LC50 | 4 day | | 0.00043 | S | L | Stream | NI | NI | 10-12.2 | NI | NI | Acetone | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Chronic effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow (Static / Intermittent Flowthrough) | Place (Laboratory / Field) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3004 | Ishnura venticalis | Juven-ile | LC50 | 96 hr | | 0.00064 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 24 | < 8.4 | 98.7 | Acetone | |
| 3389 | Lestes congener | Nymph | LC50 | 96 hr | | 0.003 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Notonecta undulata | Adult | LC50 | 96 hr | | 0.007 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3389 | Peltodytes sp. | Adult | LC50 | 96 hr | | 0.007 | S | L | Tap | NI | 7.4 | 25 | NI | >94 | Acetone | |
| 3004 | Pteronarcella badia | Naiad | LC50 | 96 hr | | 0.0042 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 15 | <10.1 | 98.7 | Acetone | |
| 3079 | Pteronarcella badia | Naiad | LC50 | 96 hr | | 0.0042 | S | L | Artif fresh | NI | 7.1 | 15.5 | 3-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length = 15-20 mm |
| 3004 | Pteronarcys californica | Larva (2nd year class) | LC50 | 96 hr | | 0.0054 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 15 | <10.1 | 98.7 | Acetone | |
| 3079 | Pteronarcys californica | Naiad | LC50 | 96 hr | | 0.0054 | S | L | Artif fresh | NI | 7.1 | 15.5 | 3-7 | NI | Ethanol | Tech.grade. Alkalinity = 35 mg/l. Length 30-35 mm |
| 3090 | Pteronarcys californica | Naiad | LC50 | 4 day | | 0.032 | S | L | Fresh | NI | NI | 10-12.2 | NI | NI | Acetone | |
| 3472 | Tendipes plumosus | Larva (4th instar | Mortality | 5 day | 97%: Increase | NI | S | L | Fresh | NI | NI | 20 | NI | NI | NI | Granules 1 lb/acre. 34% control mortality |
| | Fish | | | | | | | | | | | | | | | |
| 3004 | Carassius auratus | Finger-ling | LC50 | 96 hr | | 1.830 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | < 9.5 | 98.7 | Acetone | |
| 3323 | Carassius auratus | Juven-ile | LC50 | 96 hr | | 2.6 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3323 | Carassius auratus | Juven-ile | LC50 | 96 hr | | 2.7 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech. grade. BW 1-2 gm |
| 3451 | Cyprinus carpio | Juven-ile | LCO | 168 hr | | 0.64 | I | L | Well | 165 | 7.3 | 20-25 | > 6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |
| 3451 | Cyprinus carpio | Juven-ile | LC50 | 168 hr | | 1.00 | I | L | Well | 165 | 7.3 | 20-25 | > 6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Chronic effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3451 | Cyprinus carpio | Juven-ile | LC100 | 168 hr | | 2.50 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |
| 3004 | Gambusia affinis | Finger-ling | LC50 | 96 hr | | 0.320 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 17 | < 9.7 | 98.7 | Acetone | |
| 3437 | Heteropneustes fossilis | Adult | LCO | 96 hr | | >0.63 | S | L | Fresh | NI | NI | 25-27 | NI | NI | NI | Gravid females.BW = 37-42 g. Commercial Paramar M50 |
| 3437 | Heteropneustes fossilis | Adult | LC50 | 96 hr | | 26-29 | I | L | Fresh | NI | NI | 25-27 | NI | NI | NI | Gravid females.BW = 37-42 g. Commercial paramar M50 |
| 3437 | Heteropneustes fossilis | Adult | LC50 | 96 hr | | 32 | S | L | Fresh | NI | NI | 25-27 | NI | NI | NI | Gravid females.BW = 37-42 g. Commercial paramar M50 |
| 3451 | Heteropneustes fossilis | Juven-ile | LCO | 168 hr | | 0.10 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=10.2 gm |
| 3451 | Heteropneustes fossilis | Juven-ile | LC50 | 168 hr | | 0.358 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=10.2 gm |
| 3451 | Heteropneustes fossilis | Juven-ile | LC100 | 168 hr | | 1.60 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=10.2 gm |
| 3004 | Ictalurus punctatus | Finger-ling | LC50 | 96 hr | | 2.650 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | <9.5 | 98.7 | Acetone | |
| 3004 | Ictalurus punctatus | Finger-ling | LC50 | 96 hr | | 3.3 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | <9.5 | 100 | Acetone | Thioate analogue |
| 3323 | Lebistes reticulatus | Juven-ile | LC50 | 96 hr | | 0.056 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 0.1-0.2 gm |
| 3004 | Lepomis cyanellus | Finger-ling | LC50 | 96 hr | | 0.930 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | < 9.5 | 98.7 | Acetone | Increase in toxicity at 272 mg/l $CaCO_3$ |
| 3004 | Lepomis macrochirus | Finger-ling | LC50 | 96 hr | | 0.4 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | < 9.5 | 98.7 | Acetone | Pathological changes in gills, liver and kidneys |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Chronic effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3004 | Lepomis macrochirus | Finger-ling | LC50 | 96 hr | | 0.024 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 18 | < 9.5 | 100 | Acetone | Thioate analogue. Pathological changes in gills, liver and kidneys |
| 3294 | Lepomis macrochirus | NI | LC50 | 96 hr | | 0.71 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |
| 3323 | Lepomis macrochirus | Juven-ile | LC50 | 96 hr | | 0.095 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3323 | Lepomis macrochirus | Juven-ile | LC50 | 96 hr | | 0.26 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3323 | Lepomis macrochirus | Adult | LC50 | 96 hr | | 0.58 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 10 gm |
| 3385 | Lepomis macrochirus | Juven-ile | LC50 | 96 hr | | 0.51 | F | L | Well | 297 | NI | 22 | >5.2 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Lepomis macrochirus | Juven-ile | LC50 | 144 hr | | 0.46 | F | L | Well | 297 | NI | 22 | >5.2 | 99 | NI | Triton X-100 emulsifier |
| 3471 | Lepomis macrochirus | NI | LC50 | 9 day | | 0.021 | S | L | Lake | NI | NI | NI | NI | NI | Acetone | Tech.grade |
| 3004 | Micropterus salmoides | Finger-ling | LC50 | 96 hr | | 0.620 | S | L | Artif fresh | 162-272 | 7.2-7.5 | 18 | < 9.5 | 98.7 | Acetone | |
| 3323 | Micropterus salmoides | Juven-ile | LC50 | 96 hr | | 0.76 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 5 gm |
| 3493 | Oryzias latipes | Embryo stage 5-10 | Mortality | NI | 80%: Increase | 9.0 | S | L | Artif fresh | NI | NI | NI | NI | 91 | Acetone | |
| 3004 | Pimephales promelas | Finger-ling | LC50 | 96 hr | | 2.35 | S | L | Artif fresh | 40-50 | NI | 18 | < 9.5 | 98.7 | Acetone | |
| 3076 | Pimephales promelas | Adult | LC50 | 96 hr | | 1.410 | F | L | Fresh | 116 | 7.85 | 18 | < 9.5 | 98.5 | Acetone | |
| 3294 | Pimephales promelas | Adult | LC50 | 96 hr | | 1.4-1.6 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 99 | Acetone | Tech.grade |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Chronic effects on aquatic organisms

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3294 | Pimephales promelas | Adult | LC50 | 96 hr | | 2.8-3.7 | S | L | Spring | 20-400 | 7.4-8.2 | 25 | 8.0 | 96.5 | Acetone | Tech.grade |
| 3323 | Pimephales promelas | Juven-ile | LC50 | 96 hr | | 1.3 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 99 | Acetone | Tech.grade. BW 1-2 gm |
| 3323 | Pimephales promelas | Juven-ile | LC50 | 96 hr | | 3.0 | S | L | Spring | 20 | 7.4-7.5 | 25 | 4-8 | 25 | NI | Emulsion. BW 1-2 gm |
| 3385 | Pimephales promelas | Adult | LC50 | 96 hr | | 1.60 | S | L | Well | 298 | 7.94 | 22 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Pimephales promelas | Adult | LC50 | 96 hr | | 0.50 | F | L | Well | 238 | 7.94 | 24 | 7.1 | 99 | NI | Triton X-100 emulsifier |
| 3472 | Pimephales promelas | NI | Mortality | 5 day | 8%: Increase | NI | S | L | Fresh | NI | NI | 20 | NI | 5 | NI | Granules 10 lb/acre |
| 3472 | Pimephales promelas | NI | Mortality | 5 day | 100%: Increase | NI | S | L | Fresh | NI | NI | 20 | NI | 5 | NI | Granules 100lb/acre |
| 3494 | Pimephales promelas | NI | LC50 | 96 hr | | 1.786 | S | L | Fresh | NI | NI | 22 | NI | NI | Acetone | |
| 3004 | Salmo clarki | Finger-ling | LC50 | 96 hr | | 1.560 | S | L | Artif fresh | 162-272 | 7.2-7.5 | 12 | < 10.8 | 98.7 | Acetone | |
| 3004 | Salmo gairdneri | Finger-ling | LC50 | 96 hr | | 1.43 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 12 | < 10.8 | 98.7 | Acetone | |
| 3004 | Salmo gairdneri | Finger-ling | LC50 | 96 hr | | 0.750 | S | L | Artif fresh | 40-50 | 7.2-7.5 | 12 | < 10.8 | 100 | Acetone | Thioate analogue |
| 3423 | Salmo gairdneri | Finger-ling | Mortality | 96 hr | 15%: Increase | 0.8 | F | L | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | 99 | Acetone | |
| 3385 | Salmo trutta | Juven-ile (1 yr) | LC50 | 96 hr | | 1.51 | F | L | Well | 295 | 7.81 | 12 | 8.2 | 99 | NI | Triton X-100 emulsifier |
| 3385 | Salmo trutta | Juven-ile (1 yr) | LC50 | 144 hr | | 1.13 | F | L | Well | 295 | 7.81 | 12 | 8.2 | 99 | NI | Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow (Static / Intermittent Flowthrough) | Place (Laboratory / Field) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3385 | Salvelinus fontinalis | Egg (19 day) | Mortality | NI | 32.2-50.5%: Increase | 0.01-0.1 | F | L | Well | 297 | 7.81 | 10 | 8.2 | 99 | NI | Abnormal development >0.01 mg/l. Triton X-100 emulsifier. Measured at hatch |
| 3385 | Salvelinus fontinalis | Juvenile (1 yr) | LC50 | 96 hr | | 1.76 | F | L | Well | 297 | NI | 12 | >6.5 | 99 | NI | Triton X-100 emulsifier |
| 3004 | Salvelinus namaycush | Fingerling | LC50 | 96 hr | | 1.920 | S | L | Artif fresh | 162-272 | 7.2-7.5 | 12 | < 10.8 | 98.7 | Acetone | |
| 3451 | Tilapia mossambica | Juvenile | LC0 | 168 hr | | 0.1 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |
| 3451 | Tilapia mossambica | Juvenile | LC50 | 168 hr | | 0.279 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |
| 3451 | Tilapia mossambica | Juvenile | LC100 | 168 hr | | 0.40 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm |
| | Amphibians | | | | | | | | | | | | | | | |
| 2870 | Acris crepitans | Adult | Mortality | 67-79 hr | 4.2-6.7%: Increase | 0.1 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 2870 | Acris crepitans | Adult | Mortality | 91-96 hr | 13.6-16.9%: Increase | 0.1 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 2870 | Acris crepitans | Adult | Mortality | 67-96 hr | 19.0-23.9%: Increase | 1.0 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 2870 | Acris crepitans | Adult | Mortality | 67-79 hr | 28.0-35.2%: Increase | 10.0 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 2870 | Acris crepitans | Adult | Mortality | 91-97 hr | 42.4-49.2%: Increase | 10.0 | S | L | Fresh | 80 | 7.6 | 23-24 | NI | NI | Acetone | Graphical results |
| 3350 | Rana catesbeiana | Larva | Mortality | 96 hr | 95%: Increase | 5.0 | F | L | Fresh | 100 | 7.4 | 20 | NI | 98.5 | Acetone | |
| | Reptiles | | | | | | | | | | | | | | | |
| 4511 | Mauremys caspica rivulata | Adult 2-4 yr | LD50 | 4 day | | 10 mg/kg WW | S | L | Fresh | NI | NI | 27 | NI | NI | Soybean oil | Calculated as total BW. Estimated LD50 per soft tissue 15 mg/kg. Oral |

Freshwater Biological Association, Windermere

Parathion

Other test parameters

CHEMICAL : Parathion

TITLE Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| | Algae | | | | | | | | | | | | | | | |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 48%: Increase | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 95%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 57%: Increase | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 10 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 88%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 10 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 5%: Increase | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 100 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 70%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 100 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 58%: Increase | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1000 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Photo-synthesis | 7 day | 25%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1000 mg/l DW |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 53%: Decrease | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D Initial algal conc. 1 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 71%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 33%: Decrease | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 10 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 80%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 10 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 6%: Decrease | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 100 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 30%: Decrease | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 100 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | 8%: Decrease | 1.0 | S | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1000 mg/l DW |
| 3475 | Chlorella pyrenoidosa | NI | Growth | 7 day | No effect | 1.0 | I | L | Growth | NI | NI | 18-24 | NI | NI | Acetone | Tech.grade. Photo-period 12hr L:D. Initial algal conc. 1000 mg/l DW |
| 3130 | Euglena gracilis | Log. phase | Growth | 24 hr | 16%: Decrease | 1 | S | L | Growth | NI | NI | 25 | NI | 99.7 | Ethanol | Continuous illumination |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3130 | Euglena gracilis | Log. phase | Growth | 24 hr | No effect | 5-100 | S | L | Growth | NI | NI | 25 | NI | 99.7 | Ethanol | Continuous illumination |
| 3130 | Euglena gracilis | Log. phase | Growth | 7 day | 44.7-90.4%: Increase | 10-100 | S | L | Growth | NI | NI | 25 | NI | 99.7 | Ethanol | Continuous illumination |
| 3319 | Euglena gracilis | NI | Growth | 5 day | 14.1%: Decrease | 1.20 | S | L | Growth | NI | 5.5 | 22 | NI | NI | NI | Continuous illumination |
| 3319 | Euglena gracilis | NI | Growth | 9 day | 8%: Increase | 0.01-0.05 | S | L | Growth | NI | 5.5 | 22 | NI | NI | NI | Dark (heterotrophic) growth conditions |
| 3319 | Euglena gracilis | NI | Growth | 9 day | 22.1-44.8%: Increase | 0.24-1.20 | S | L | Growth | NI | 5.5 | 22 | NI | NI | NI | Dark (heterotrophic) growth conditions |
| 3312 | Microcystis aeruginosa | Log. phase | Growth (ECO) | 8 day | No effect | < 0.034 | S | L | Growth | NI | 7.0 | 27 | NI | NI | NI | Continuous illumination 2800 Lux |
| 3312 | Scenedesmus quadricauda | Log. phase | Growth | 8 day | No effect | < 0.39 | S | L | Growth | NI | 7.0 | 27 | NI | NI | NI | Continuous illumination 2800 Lux |
| | Protozoa | | | | | | | | | | | | | | | |
| 3002 | Colpidium campylum | NI | Growth (ECO) | 43 hr | No effect | < 10 | S | L | Growth | NI | NI | 20 | NI | NI | Acetone | |
| | Crustaceans | | | | | | | | | | | | | | | |
| 3320 | Daphnia carinata | Juvenile (1st-2nd instar) | Immobilization (EC50) | 32 hr | | 0.0005 | I | L | Well | NI | NI | 25 | NI | NI | NI | Emulsion |
| 3485 | Daphnia magna | Juvenile <24 hr | Immobilization (EC50) | 48 hr | 50%: Increase | 0.7-1.4 | S | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |
| 3485 | Daphnia magna | Juvenile <24 hr | Immobilization (EC0) | 21 day | No effect | 0.2 | I | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3485 | Daphnia magna | Juvenile <24 hr | Immobilization (EC50) | 21 day | 50%: Increase | 0.33-0.35 | I | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |
| 3466 | Daphnia magna | Adult (10 day) | Carboxylesterase activity in vivo | 48 hr | 50%: Decrease | 0.0002 | S | L | Artif. fresh | NI | NI | NI | NI | NI | Acetone | Daphnia not fed during exposure. Fed animals had less inhibition of enzyme activity |
| 3466 | Daphnia magna | Adult (10 day) | Carboxylesterase activity in vivo | 48 hr | 75%: Decrease | 0.0004 | S | L | Artif. fresh | NI | NI | 18 | NI | NI | Acetone | Daphnia not fed during exposure |
| 3466 | Daphnia magna | Adult (10 day) | Carboxylesterase activity in vivo | 48 hr | 88%: Decrease | 0.0008-0.0016 | S | L | Artif. fresh | NI | NI | 18 | NI | NI | Acetone | Daphnia not fed during exposure |
| 3390 | Daphnia magna | Adult (14-21 day | Carboxylesterase activity in vivo | 24 hr | 30-70%: Decrease | 0.001-0.005 | S | L | Growth | NI | 7.9 | 18 | NI | NI | Acetone | |
| 3390 | Daphnia magna | Adult (14-21 day | Carboxylesterase activity in vivo | 48 hr | 5-85%: Decrease | 0.00005-0.001 | S | L | Growth | NI | 7.9 | 18 | NI | NI | Acetone | |
| 3390 | Daphnia magna | Adult (14-21 day | Carboxylesterase activity in vivo | 48 hr | 90%: Decrease | >0.0015 | S | L | Growth | NI | 7.9 | 18 | NI | NI | Acetone | |
| 3385 | Daphnia magna | Juvenile (1st instar | Reproduction | >3 wk | 50%: Decrease | 0.00024 | F | L | Well | 295 | NI | 18 | NI | 99 | NI | Triton X-100 emulsifier |
| 3485 | Daphnia magna | Juvenile <24 hr | Reproduction (EC0) | 21 day | No effect | 0.3 | I | L | Artif. fresh | NI | NI | 18 | NI | 99 | Acetone | Photoperiod 14hr L: 10hr D |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3084 | Daphnia pulex | Juvenile (1st instar) | Immobilization (EC50) | 48 hr | 50%: Increase | 0.00060 | S | L | Artif. fresh | NI | 7.4-7.8 | 15.6 | NI | NI | Ethanol | |
| 3450 | Paratelphusa mansoniana | Adult | Behaviour | 25-60 min | Abnormal | 1.56 mg/kg BW | S | L | Fresh | NI | NI | NI | NI | NI | NI | Hyperexcitability 25 min post-treatment. Total paralysis 60 min post-injection |
| 3450 | Paratelphusa mansoniana | Adult | Thoracic ganglion acid phosphatase activity in vivo | 25 min | 3%: Decrease | 1.56 mg/kg BW | S | L | Fresh | NI | NI | NI | NI | NI | NI | Injection |
| 3450 | Paratelphusa mansoniana | Adult | Thoracic ganglion acid phosphatase activity in vivo | 60 min | 17%: Decrease | 1.56 mg/kg BW | S | L | Fresh | NI | NI | NI | NI | NI | NI | Injection |
| 3450 | Paratelphusa mansoniana | Adult | Thoracic ganglion alkaline phosphatase activity in vivo | 25 min | 1%: Decrease | 1.56 mg/kg BW | S | L | Fresh | NI | NI | NI | NI | NI | NI | Injection |
| 3450 | Paratelphusa mansoniana | Adult | Thoracic ganglion alkaline phosphatase activity in vivo | 60 min | 14%: Decrease | 1.56 mg/kg BW | S | L | Fresh | NI | NI | NI | NI | NI | NI | Injection |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3084 | Simocephalus serrulatus | Juvenile (1st instar) | Immobilization (EC50) | 48 hr | 50%: Increase | 0.00037 | S | L | Artif fresh | NI | 7.4-7.8 | 15.6 | NI | NI | Ethanol | |
| 3084 | Simocephalus serrulatus | Juvenile (1st instar) | Immobilization (EC50) | 48 hr | 50%: Increase | 0.00047 | S | L | Artif fresh | NI | 7.4-7.8 | 21.1 | NI | NI | Ethanol | |
| | Fish | | | | | | | | | | | | | | | |
| 3383 | Carassius auratus | NI | Brain acetylcholinesterase activity in vitro | NI | 40-50%: Decrease | 100 | NI | NI | NI | NI | NI | NI | NI | NI | NI | |
| 3443 | Carassius auratus | NI | Brain acetylcholinesterase activity in vivo | 4-12 day | 10-52%: Decrease | 0.1 | S | L | Tap | NI | 6.5 | 20-21 | < 8.9 | NI | Acetone | Enzyme activity normal 24-26 day post exposure |
| 3459 | Carassius auratus | NI | Brain acetylcholinesterase activity in vivo | 1 hr | 50-60%: Decrease | 1.0 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Measurements made 1-20 days post-exposure. Recovery of activity beginning day 10, 70% normal at day 20. Length 45-65mm |
| 3459 | Carassius auratus | NI | Brain acetylcholinesterase activity in vivo | 3-4 hr | 20%: Decrease | 0.1 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Length 45-65mm. Graphical results |

Freshwater Biological Association, Windermere

**CHEMICAL :** Parathion **TITLE** Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3459 | Carassius auratus | NI | Brain acetyl-cholin-esterase activity in vivo | 6-24 hr | 45-60%: Decrease | 0.1 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Length 45-65 mm. Graphical results |
| 3393 | Carassius auratus | Adult | Behaviour | 24 hr | Abnormal | 0.33 | F | L | Fresh | NI | NI | 21 | < 8.9 | 97 | Acetone | Impairment of general locomotory activity. Decrease in turning ability |
| 3480 | Carassius auratus | NI | Feeding activity | 24 hr | Decrease | 0.33 | F | L | Fresh | NI | 8.4 | 21 | NI | 97 | Acetone | Decrease in response to food odour |
| 4096 | Carassius auratus | NI | Learning ability | 24 hr | Inhibition | >0.1 | S | L | Tap | NI | NI | 21 | NI | 99 | Acetone | |
| 3433 | Colisa fasciatus | Juven-ile | Metabolic rate | 24 hr | 95%: Increase | 0.02 | S | L | Tap | 90 | 8.2 | 20 | 8.2 | 50 | NI | BW 1.8-1.9 gm |
| 3433 | Colisa fasciatus | Juven-ile | Metabolic rate | 24 hr | 40%: Increase | 0.02 | S | L | Tap | 90 | 8.2 | 30 | 8.2 | 50 | NI | BW 1.8-1.9 gm |
| 3433 | Colisa fasciatus | Juven-ile | Metabolic rate | 48 hr | 140%: Increase | 0.02 | S | L | Tap | 90 | 8.2 | 20 | 8.2 | 50 | NI | BW 1.8-1.9 gm |
| 3433 | Colisa fasciatus | Juven-ile | Metabolic rate | 48 hr | 81%: Increase | 0.02 | S | L | Tap | 90 | 8.2 | 30 | 8.2 | 50 | NI | BW 1.8-1.9 gm |
| 3451 | Cyprinus carpio | Juven-ile | Feeding rate | 1-10 day | No effect | 0.066-0.265 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm. Live food exposed to pesticide for 24 hrs |
| 3451 | Cyprinus carpio | Juven-ile | Histopath-ology | 62 day | Abnormal | 0.066-0.265 | I | L | Well | 165 | 7.0-7.5 | 27-32 | 2.8-12.0 | 46.7 | NI | Emulsion. BW=2.8 gm. Buccal epithelium distortion. Stomach villi degeneration. Sensory cell shrink-age. Swelling of mucous cells |

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3490 | Cyprinus carpio | NI | Brain cell histo-pathology | 4 day | Abnormal | 3.0 | S | L | Fresh | 233 | 7.2-7.8 | NI | NI | NI | NI | |
| 3406 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 3 day | 91.4-92.1%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Acetyl thiocholine substrate |
| 3406 | Gambusia affinis | Adult | Muscle acetyl-cholin-esterase activity in vivo | 3 day | 89.1-95.6%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Acetyl thiocholine substrate |
| 3406 | Gambusia affinis | Adult | Brain arylester-ase activity in vivo | 3 day | 74.6-81.3%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Phenyl thioacetate substrate |
| 3406 | Gambusia affinis | Adult | Liver arylester-ase activity in vivo | 3 day | 82.7-87.6%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Phenyl thioacetate substrate |
| 3406 | Gambusia affinis | Adult | Muscle arylester-ase activity in vivo | 3 day | 81.0-85.4%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Phenyl thioacetate substrate |
| 3406 | Gambusia affinis | Adult | Brain carboxyl-esterase activity in vivo | 3 day | 25.4-49.0%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | 1-Naphthyl acetate substrate |

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3406 | Gambusia affinis | Adult | Liver carboxyl-esterase activity in vivo | 3 day | 87.5-92.8%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | Phenol thiobenzoate substrate |
| 3406 | Gambusia affinis | Adult | Liver carboxyl-esterase activity in vivo | 3 day | 81.8-87.3%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | 1-Naphthyl acetate substrate |
| 3406 | Gambusia affinis | Adult | Muscle carboxyl-esterase activity in vivo | 3 day | 62.8-66.9%: Decrease | 0.1 | S | L | Tap | NI | NI | NI | NI | NI | 2-methoxyethanol | 1-Naphthyl acetate substrate |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 6 hr | 33%: Decrease | 0.025 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Susceptible strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 6 hr | 63%: Decrease | 0.050 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Susceptible strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 6 hr | 84-94%: Decrease | 0.1-0.4 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Susceptible strain. Length 2.8-4.5 cm |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 12-24 hr | 88-95%: Decrease | 0.05-0.4 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Suscep-tible strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 24-48 hr | 80-93%: Decrease | 0.025 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Suscep-tible strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 6 hr | 13-31%: Decrease | 0.025-0.05 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Resistant strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 6 hr | 75-89%: Decrease | 0.1-0.4 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Resistant strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 12-24 hr | 89-95%: Decrease | 0.1-0.4 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Resistant strain. Length 2.8-4.5 cm |
| 3496 | Gambusia affinis | Adult | Brain acetyl-cholin-esterase activity in vivo | 24 hr | 76%: Decrease | 0.025 | S | L | Fresh | NI | NI | NI | NI | 98 | Ethanol | Triton X-100 emulsifier. Resistant strain. Length 2.8-4.5 cm |

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3447 | Lepomis gibbosus | Adult | Brain cholin-esterase activity in vivo | 2 hr | No effect | 15 mg/kg BW | S | L | Fresh | NI | NI | 18-22 | < 8.5 | 99.8 | Corn oil | BW 40-80 gm. IP injection |
| 3447 | Lepomis gibbosus | Adult | Brain cholin-esterase activity in vivo | 2 hr | < 2%: Decrease | 30-40 mg/kg BW | S | L | Fresh | NI | NI | 18-22 | < 8.5 | 99.8 | Corn oil | BW 40-80 gm. IP injection |
| 3447 | Lepomis gibbosus | Adult | Brain cholin-esterase activity in vivo | 6 hr | 7%: Decrease | 40 mg/kg BW | S | L | Fresh | NI | NI | 18-22 | < 8.5 | 99.8 | Corn oil | BW 40-80 gm. IP injection |
| 3447 | Lepomis gibbosus | Adult | Brain cholin-esterase activity in vivo | 6 hr | No effect | 40 mg/kg BW | S | L | Fresh | NI | NI | 18-22 | < 8.5 | 99.8 | Ethanol | BW 40-80 gm. Oral |
| 3399 | Lepomis gibbosus | NI | Brain acetyl-cholin-esterase activity in vivo (ID50) | 24 hr | 50%: Decrease | 5.8 mg/kg | S | L | Fresh | 160 | NI | 18-20 | NI | 99 | Corn oil | IP injection |
| 3399 | Lepomis gibbosus | NI | Muscle acetyl-cholin-esterase activity in vivo (ID50) | 24 hr | 50%: Decrease | 10.7 mg/kg | S | L | Fresh | NI | NI | 18-20 | NI | 99 | Corn oil | IP injection |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3385 | Lepomis macrochirus | Juvenile | Brain acetylcholinesterase activity in vivo | 64 day | 89%: Decrease | 0.008 | F | L | Well | 297 | NI | 25 | >5.0 | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Lepomis macrochirus | Juvenile | Morphology | 6-23 mth | Abnormal | 0.0005-0.004 | F | L | Well | 297 | NI | 25 | >5.0 | 99 | Acetone | Triton X-100 emulsifier. Scoliosis. Extended pectoral fins. Protrusion in hyal region |
| 3385 | Lepomis macrochirus | Juvenile | Morphology (EC0) | 6-23 mth | No effect | 0.00017-0.00034 | F | L | Well | 297 | NI | 25 | >5.0 | 99 | Acetone | Triton X-100 emulsifier |
| 3394 | Lepomis macrochirus | NI | Brain acetylcholinesterase activity in vivo | 10 hr | 80.1%: Decrease | 0.2 | S | L | Fresh | NI | NI | NI | NI | NI | Acetone | |
| 3422 | Lepomis macrochirus | NI | Brain acetylcholinesterase activity in vivo | 10 hr | 67.6-80.1%: Decrease | 0.2 | S | L | Fresh | NI | NI | NI | NI | 98 | Acetone | |
| 3443 | Lepomis macrochirus | NI | Brain acetylcholinesterase activity in vivo | 2-7 hr | 40-85%: Decrease | 0.1 | S | L | Tap | NI | 6.5 | 20-21 | < 8.9 | NI | Acetone | Enzyme activity still inhibited 30 day post exposure |
| 3459 | Lepomis macrochirus | NI | Brain acetylcholinesterase activity in vivo | 1.5 hr | 35-45%: Decrease | 1.0 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Measurements made 1-3 days post-exposure. Graphical results. Length 50-90mm |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent / Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3047 | Lepomis macrochirus | Adult | Liver mitochondria oxygen uptake in vitro | NI | No effect | 290 | S | L | Fresh | NI | NI | 25 | NI | NI | NI | Alpha-ketoglutarate substrate |
| 3047 | Lepomis macrochirus | Adult | Liver mitochondria phosphate uptake in vitro | NI | No effect | 290 | S | L | Fresh | NI | NI | 25 | NI | NI | NI | Alpha-ketoglutarate substrate |
| 3047 | Lepomis macrochirus | Adult | Liver mitochondria oxygen uptake in vitro | NI | 22.4%: Decrease | 290 | S | L | Fresh | NI | NI | 25 | NI | NI | NI | Succinate substrate |
| 3047 | Lepomis macrochirus | Adult | Liver mitochondria phosphate uptake in vitro | NI | 69.8%: Decrease | 290 | S | L | Fresh | NI | NI | 25 | NI | NI | NI | Succinate substrate |
| 3439 | Lepomis macrochirus | Adult | Swimming activity | 24 hr | Decrease | 0.01 | S | L | Fresh | NI | NI | 21 | NI | 97 | Acetone | Hypersensitivity to visual stimulation. Observations made up to 2 wks post-exposure |
| 3457 | Lepomis macrochirus | NI | Critical flicker frequency response | 3 hr | Abnormal | 0.032-0.087 | S | L | Artif. fresh | 55 | < 7 | 20 | 5-9 | NI | NI | Measured 24 hr post exposure |
| 3459 | Micropterus salmoides | NI | Brain ecetyl-cholin-esterase activity in vivo | 1.5 hr | 80-90%: Decrease | 1.0 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Measurements made 1-4 days post-exposure. 80% activity recovered at day 15. Length 65-85mm. graphical results |

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3443 | Micropterus salmoides | NI | Brain acetyl-cholin-esterase activity in vivo | 24 hr | 75.7%: Decrease | 0.5 | S | L | Tap | NI | 6.5 | 20-21 | < 8.9 | NI | Acetone | Activity measured in surviving fish |
| 3445 | Micropterus salmoides | Adult | Venti-lation rate (ECO) | < 4 hr | No effect | < 0.16 | F | L | Tap | 60 | 7.0 | 22 | NI | NI | NI | |
| 3439 | Micropterus salmoides | Adult | Swimming activity | 24 hr | Decrease | 0.025 | S | L | Fresh | NI | NI | 21 | NI | 97 | Acetone | Hypersensitivity to visual stimulation. Observations made up to 2 wks post-exposure |
| 3394 | Notemigonus chrysoleucas | NI | Brain acetyl-cholin-esterase activity in vivo | 10 hr | 58.6%: Decrease | 0.2 | S | L | Fresh | NI | NI | NI | NI | NI | Acetone | |
| 3422 | Notemigonus chrysoleucas | NI | Brain acetyl-cholin-esterase activity in vivo | 10 hr | 58.5-64.3%: Decrease | 0.2 | S | L | Fresh | NI | NI | NI | NI | 98 | Acetone | |
| 3443 | Notemigonus chrysoleucas | NI | Brain acetyl-cholin-esterase activity in vivo | 8-12 day | 15-45%: Decrease | 0.1 | S | L | Tap | NI | 6.5 | 20-21 | < 8.9 | NI | Acetone | Enzyme activity normal 60 day post exposure |
| 3459 | Notemigonus chrysoleucas | NI | Brain acetyl-cholin-esterase activity in vivo | 1 hr | 30-75%: Decrease | 1.0 | S | L | Tap | 40 | 6.5 | 20 | < 9.0 | >95 | Ethanol | Measurements made 1-20 days post-exposure. Minimum activity at day 6. Recovery of 50% activity at day 20. Length 40-75mm |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3397 | Notemigonus chrysoleucas | NI | Blood total leucocyte count | 24-48 hr | 56%: Decrease | 0.5 | S | L | Tap | 28 | 7.8 | NI | NI | NI | Acetone | Tech.grade |
| 3397 | Notemigonus chrysoleucas | NI | Blood lympho-cyte count | 24-48 hr | 50%: Decrease | 0.5 | S | L | Tap | 28 | 7.8 | NI | NI | NI | Acetone | Tech.grade |
| 3397 | Notemigonus chrysoleucas | NI | Blood hetero-phil count | 24-48 hr | 58%: Decrease | 0.5 | S | L | Tap | 28 | 7.8 | NI | NI | NI | Acetone | Tech.grade |
| 3397 | Notemigonus chrysoleucas | NI | Haemato-crit | 24-48 hr | 16.8-17.5%: Decrease | 0.5 | S | L | Tap | 28 | 7.8 | NI | NI | NI | Acetone | P<0.05. Tech.grade |
| 3493 | Oryzias latipes | Embryo stage 5-10 | Develop-ment | NI | Abnormal | 3 | S | L | Artif. fresh | NI | NI | NI | NI | 91 | Acetone | Heart and circulatory abnormalities |
| 3443 | Pimephales promelas | NI | Brain acetyl-cholin-esterase activity in vivo | 6-24 hr | 15-30%: Decrease | 0.1 | S | L | Tap | NI | 6.5 | 20-21 | <8.9 | NI | Acetone | |
| 3443 | Pimephales promelas | NI | Brain acetyl-cholin-esterase activity in vivo | 24 hr | 18.5%: Decrease | 0.5 | S | L | Tap | NI | 6.5 | 20-21 | <8.9 | NI | Acetone | Activity measured in surviving fish |
| 3443 | Pimephales promelas | NI | Brain acetyl-cholin-esterase activity in vivo | 72 hr | 57.8%: Decrease | 0.5 | S | L | Tap | NI | 6.5 | 20-21 | <8.9 | NI | Acetone | Activity measured in surviving fish |

CHEMICAL : Parathion

TITLE Other test parameters



| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3385 | Pimephales promelas | Adult | Morphology | 8.5 mth | 7.7-50%: Abnormal | 0.0044-0.0494 | F | L | Well | 194-281 | 7.78-8.05 | 23.2-24.8 | 6.3-8.1 | 99 | Acetone | Triton X-100 emulsifier. Scoliosis, lordosis and head malformation |
| 4671 | Pseudorasbora parva | NI | Brain acetyl-cholin-esterase activity in vivo | 24 hr | 70-92%: Decrease | 1 | I | L | Tap | 65.8 | 6.5 | 25 | NI | NI | Acetone | BW 1-5 gm |
| 3465 | Salmo gairdneri | Adult | Olfactory bulb response | NI | >12%: Increase | 0.000001-1.0 | S | L | Fresh | NI | NI | 15 | NI | NI | NI | Increase in amplitude and frequency of neurological response BW 300-400 gm. Top. appl. |
| 3385 | Salvelinus fontinalis | Juven-ile (1 yr) | Brain acetyl-cholin-esterase activity in vivo | 6 mth | 8.7%: Decrease | 0.0006 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juven-ile (1 yr) | Brain acetyl-cholin-esterase activity in vivo | 6 mth | 17%: Decrease | 0.0014 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juven-ile (1 yr) | Brain acetyl-cholin-esterase activity in vivo | 6 mth | 33.5% Decrease | 0.0026 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |

**CHEMICAL :** Parathion **TITLE** Other test parameters

| REFERENCE | ORGANISM | LIFE STAGE | TEST PARAMETER | TIME | EFFECT | CONCENTRATION | Water Flow: Static / Intermittent Flowthrough | Place: Laboratory / Field | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | COMPOUND PURITY | SOLVENT | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | mg/L | SIF | LF | | mg/L | | °C | mg/L | % | | |
| 3385 | Salvelinus fontinalis | Juvenile (1 yr) | Brain acetylcholinesterase activity in vivo | 6 mth | 29.8%: Decrease | 0.004 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juvenile (1 yr) | Brain acetylcholinesterase activity in vivo | 6 mth | 56.1%: Decrease | 0.0067 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |
| 3385 | Salvelinus fontinalis | Juvenile (1 yr) | Brain acetylcholinesterase activity in vivo | 9 mth | 15.9-38.4%: Decrease | 0.0083-0.0087 | F | L | Well | 256-342 | 7.47-8.06 | 13.1-15 | 6.7-10.5 | 99 | Acetone | Triton X-100 emulsifier |
| 3451 | Tilapia mossambica | Juvenile | Feeding rate | 1-10 day | Decrease | 0.017-0.07 | I | L | Well | 165 | 7.3 | 20-25 | >6.0 | 46.7 | NI | Emulsion. BW=2.8 gm. Live food exposed to pesticide for 24 hrs |
| 3451 | Tilapia mossambica | Juvenile | Histopathology | 62 day | Abnormal | 0.017-0.070 | I | L | Well | 165 | 7.0-8.0 | 20-32 | 9.9-18.2 | 46.7 | NI | Emulsion. BW=2.8 gm. Stomach epithelial shrinkage. Swelling of mucous cells |
| | Amphibians | | | | | | | | | | | | | | | |
| 3417 | Rana pipiens | Adult | Blood leucocyte count | 15 day | 22-56%: Decrease | 5-25 | I | L | Fresh | NI | 5.3-6.5 | 24 | NI | NI | NI | Frog 8.5 cm length |
| 3417 | Rana pipiens | Adult | Blood erythrocyte count | 15 day | 14-52%: Decrease | 5-25 | I | L | Fresh | NI | 5.3-6.5 | 24 | NI | NI | NI | Frog 8.5 cm length |

Parathion

Bioaccumulation

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 4543 | 3484 | 3484 | 3411 | 3462 | 3484 |
|---|---|---|---|---|---|---|
| LATIN NAME | Algae | Anacystis nidulans | Euglena gracilis | Oedogonium cardiacum | Oedogonium cardiacum | Paramecium bursaria |
| COMMON NAME | Algae | | | | | |
| LIFE STAGE | | | | | | |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.05 mg/l | 1 mg/l | 1 mg/l | 0.088 mg/l | 0.00036 mg/l | 1 mg/l |
| APPLICATION RATE | | | | | 1 lb/acre | |
| EXPOSURE TIME | < 3 wk | 7 day | 7 day | 38 day | 33 day | 7 day |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 4.2 mg/kg DW | 50 mg/kg DW | 62 mg/kg DW | 3.0253 mg/kg WW | 0.128 mg/kg WW | 94 mg/kg DW |
| BIOACCUMULATION FACTOR | | | | 34.4 | 355 | |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Pond | Growth medium | Growth medium | Artif.fresh | Pond | Growth medium |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | | 6.9-7.1 | 6.9-7.3 | | | 7.2 |
| TEMPERATURE °C | | 26 | 26 | 26.5 | 26 | 26 |
| DISSOLVED OXYGEN(mg/L) | | | | < 8.0 | | |
| OTHER DATA | | Continuous illumination | Continuous illumination | Photoperiod 12hr L:D. Artificial ecosystem. Application rate 0.22-1.1 kg/ha to terrestrial phase | BCF calc. on parathion conc. only. Metabolites also present in organism and water | Continuous illumination |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3484 | 3484 | 4543 | 3411 | 4543 | 4543 |
|---|---|---|---|---|---|---|
| LATIN NAME | Paramecium multimicronucleatum | Scenedesmus obliquus | Zooplankton | Crustacea | Insects | Ephemeroptera |
| COMMON NAME | | | Zooplankton | Daphnia magna | Chironomidae | |
| LIFE STAGE | | | | | | |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 1 mg/l | 1 mg/l | 0.05 mg/l | 0.088 mg/l | 0.05 mg/l | 0.05 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 7 day | 7 day | < 3 wk | 38 day | < 3 wk | < 3 wk |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 116 mg/kg DW | 72 mg/kg DW | 8.2 mg/kg DW | 0.6113 mg/kg WW | 1.25 mg/kg DW | 3·75 mg/kg DW |
| BIOACCUMULATION FACTOR | | | | 6.9 | | |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Growth medium | Growth medium | Pond | Artif. fresh | Pond | Pond |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | 7.1 | 6.9-7.1 | | | | |
| TEMPERATURE °C | 26 | 26 | | 26.5 | | |
| DISSOLVED OXYGEN(mg/L) | | | | < 8.0 | | |
| OTHER DATA | Continuous illumination | Continuous illumination | | Photoperiod 12hr L:D. Artificial ecosystem. Application rate 0.22-1.1 kg/ha to terrestrial phase | | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION

| REFERENCE | 4543 | 3411 | 3411 | 3462 | 3116 | 3116 |
|---|---|---|---|---|---|---|
| LATIN NAME | Hemiptera | Culex pipiens | Molluscs<br>Physa sp | Physa sp | Fish<br>Colisa fasciatus | Colisa fasciatus |
| COMMON NAME | | | | | | |
| LIFE STAGE | | Larva | Adult | | Adult | Adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.05 mg/l | 0.088 mg/l | 0.088 mg/l | 0.00036 mg/l | 1.35-4.9 mg/l | 1.35-4.9 mg/l |
| APPLICATION RATE | | | | 1 lb/acre | | |
| EXPOSURE TIME | < 3 wk | 4 day | 33 day | 33 day | 4 hr | 4 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Whole organism | Liver | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.75 mg/kg DW | 0.2031 mg/kg WW | 0.8519 mg/kg WW | 0.272 mg/kg WW | 4.37 mg/kg WW | 2.02 mg/kg WW |
| BIOACCUMULATION FACTOR | | 2.3 | 9.7 | 755 | 0.9-3.2 | 0.4-1.5 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Pond | Artif. fresh | Artif.fresh | Pond | Fresh | Fresh |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | | | | | | |
| TEMPERATURE °C | | 26.5 | 26.5 | 26 | 25 | 25 |
| DISSOLVED OXYGEN(mg/L) | | < 8.0 | < 8.0 | | | |
| OTHER DATA | | Photoperiod 12hr L:D. Artificial ecosystem. application rate 0.22-1.1 kg/ha to terrestrial phase | Photoperiod 12hr L:D. Artificial ecosystem. Application rate 0.22-1.1 kg/ha to terrestrial phase | BCF calc. on Parathion conc. only. Metabolites also present in organism and water | | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3116 | 3116 | 3116 | 3116 | 3116 | 3116 |
|---|---|---|---|---|---|---|
| LATIN NAME | Colisa fasciatus | Colisa fasciatus | Colisa fasciatus | Colisa fasciatus | Colisa fasciatus | Colisa fasciatus |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | Adult | Adult | Adult | Adult | Adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 1.35-4.9 mg/l | 1.35-4.9 mg/l | 1.35-4.9 mg/l | 1.35-4.9 mg/l | 1.35-4.9 mg/l | 1.35-4.9 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 4 hr | 4 hr | 5 hr | 5 hr | 5 hr | 5 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Kidney | Intestine | Liver | Muscle | Kidney | Intestine |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 1.57 mg/kg WW | 1.12 mg/kg WW | 2.12 mg/kg WW | 1.46 mg/kg WW | 0.96 mg/kg WW | 0.64 mg/kg WW |
| BIOACCUMULATION FACTOR | 0.3-1.2 | 0.2-0.8 | 0.4-1.6 | 0.3-1.1 | 0.2-0.7 | 0.1-0.5 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Fresh | Fresh | Fresh | Fresh | Fresh | Fresh |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | | | | | | |
| TEMPERATURE °C | 25 | 25 | 25 | 25 | 25 | 25 |
| DISSOLVED OXYGEN(mg/L) | | | | | | |
| OTHER DATA | | | | | | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

# TITLE: BIOLOGICAL ACCUMULATION

| REFERENCE | 3116 | 3464 | 4543 | 3464 | 3411 | 3462 |
|---|---|---|---|---|---|---|
| LATIN NAME | Colisa fasciatus | Ctenopharyngodon idella | Cyprinus sp. | Cyprinus carpio | Gambusia affinis | Gambusia affinis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | | | | | |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 1.35-4.9 mg/l | 0.070-0.0913 mg/l | 0.05 mg/l | 0.070-0.0913 mg/l | 0.088 mg/l | 0.00036 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 15 day | 3.5 wk | < 3 wk | 3.5 wk | 3 day | 33 day |
| TOTAL DOSE | | | | | | |
| TISSUE | Liver | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.32 mg/kg WW | 0.26 mg/kg DW | 21 mg/kg DW | 0.85 mg/kg DW | 0.3990 mg/kg WW | 0.032 mg/kg |
| BIOACCUMULATION FACTOR | 0.1-0.2 | | | | 4.5 | 88 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Fresh | Well | Pond | Well | Artif. fresh | Pond |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | | 8.0-9.0 | | 8.0-9.0 | | |
| TEMPERATURE °C | 25 | 17-22 | | 17-22 | 26.5 | 26 |
| DISSOLVED OXYGEN(mg/L) | | 9.2-19.0 | | 9.2-19.0 | < 8.0 | |
| OTHER DATA | | Average value | | Average value | Photoperiod 12hr L:D. Artificial ecosystem. Application rate 0.22-1.1 kg/ha to terres- trial phase. 25% resi- due as parent compound | BCF Cal. on Parathion conc. only. Metabolites also present in organism and water |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3464 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Hypothalmichthys molitrix | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus |
| COMMON NAME | | | | | | |
| LIFE STAGE | | Juvenile | Juvenile | Juvenile | Juvenile | Juvenile |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.070-0.0913 mg/l | 0.34 mg/l | 0.51 mg/l | 0.64 mg/l | 1.25 mg/l | 2.22 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 3.5 wk | 18-24 hr | 12 hr | 70-72 hr | 46 hr | 29 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.33 mg/kg DW | 49.9-61.4 mg/kg WW | 32.5-50.7 mg/kg WW | 197.8-294.1 mg/kg WW | 311.6-318.6 mg/kg WW | 338.3-430 mg/kg WW |
| BIOACCUMULATION FACTOR | | 145-173 | 63-98 | 311-462 | 250-256 | 152-193 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | | 297 | 297 | 297 | 297 | 297 |
| pH | 8.0-9.0 | | | | | |
| TEMPERATURE °C | 17-22 | 22 | 22 | 22 | 22 | 22 |
| DISSOLVED OXYGEN(mg/L) | 9.2-19.0 | >5.2 | >5.2 | >5.2 | >5.2 | >5.2 |
| OTHER DATA | Average value | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier |

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile-adult | Juvenile-adult | Juvenile-adult | Juvenile-adult | Juvenile-adult | Juvenile-adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00025 - 0.002 mg/l | 0.00025 - 0.002 mg/l | 0.00025 - 0.002 mg/l | 0.00025 - 0.002 mg/l | 0.004 mg/l | 0.004 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 18 mth | 18 mth | 18 mth | 18 mth | 18 mth | 18 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Muscle | Blood | Ovary | Egg | Muscle | Blood |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.0084 mg/kg WW | 0.0299 mg/l | 0.024 mg/kg WW | <0.0001 mg/kg WW | 0.0299 mg/kg WW | 0.0299 mg/l |
| FINAL CONCENTRATION TREATED | 0.0097 - 0.0227 mg/kg WW | 0.0175 - 0.0376 mg/l | 0.027 - 0.383 mg/kg WW | 0.036 - 0.399 mg/kg WW | 0.1095 mg/kg WW | 0.2255 mg/l |
| BIOACCUMULATION FACTOR | 11.4-38.8 | < 37.6 | 54.6 - 191.3 | 78.3 - 399 | 27.4 | 56.4 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 297 | 297 | 297 | 297 | 297 | 297 |
| pH | | | | | | |
| TEMPERATURE °C | 25 | 25 | 25 | 25 | 25 | 25 |
| DISSOLVED OXYGEN(mg/L) | >5.0 | >5.0 | >5.0 | >5.0 | >5.0 | >5.0 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3116 | 3116 |
|---|---|---|---|---|---|---|
| LATIN NAME | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Lepomis macrochirus | Notopterus notopterus | Notopterus notopterus |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile-adult | Juvenile-adult | Juvenile-adult | Juvenile-adult | Adult | Adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.004 mg/1 | 0.004 mg/1 | 0.00025-0.004 mg/1 | 0.00025-0.004 mg/1 | 0.28-1.0 mg/1 | 0.28-1.0 mg/1 |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 18 mth | 18 mth | 23 mth | 23 mth | 4 hr | 4 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Ovary | Egg | Blood | Muscle | Liver | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.0244 mg/kg WW | <0.0001 mg/kg WW | < 0.0009 mg/1 | < 0.0009 mg/kg WW | | |
| FINAL CONCENTRATION TREATED | 3.436 mg/kg WW | 0.777 mg/kg WW | 0.0036-0.1382 mg/1 | 0.0029-0.0174 mg/kg WW | 3.2 mg/kg WW | 1.07 mg/kg WW |
| BIOACCUMULATION FACTOR | 859 | 194 | 14.4-119.2 | 4.3-17.4 | 3.2-11.4 | 1.1-3.8 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Static | Static |
| WATER MEDIUM | Well | Well | Well | Well | Fresh | Fresh |
| HARDNESS ($CaCO_3$ mg/L) | 297 | 297 | 297 | 297 | | |
| pH | | | | | | |
| TEMPERATURE °C | 25 | 25 | 25 | 25 | 25 | 25 |
| DISSOLVED OXYGEN(mg/L) | >5.0 | >5.0 | >5.0 | >5.0 | | |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | | |

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3116 | 3116 | 3116 | 3116 | 3116 | 3116 |
|---|---|---|---|---|---|---|
| LATIN NAME | Notopterus notopterus | Notopterus notopterus | Notopterus notopterus | Notopterus notopterus | Notopterus notopterus | Notopterus notopterus |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | Adult | Adult | Adult | Adult | Adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.28-1.0 mg/l | 0.28-1.0 mg/l | 0.28-1.0 mg/l | 0.28-1.0 mg/l | 0.28-1.0 mg/l | 0.28-1.0 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 4 hr | 4 hr | 5 hr | 5 hr | 5 hr | 5 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Kidney | Intestine | Liver | Muscle | Kidney | Intestine |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.92 mg/kg WW | 0.76 mg/kg WW | 1.92 mg/kg WW | 0.76 mg/kg WW | 0.56 mg/kg WW | 0.32 mg/kg WW |
| BIOACCUMULATION FACTOR | 0.9-3.3 | 0.8-2.7 | 1.9-6.9 | 0.8-2.7 | 0.6-2.0 | 0.3-1.1 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Static | Static | Static | Static | Static | Static |
| WATER MEDIUM | Fresh | Fresh | Fresh | Fresh | Fresh | Fresh |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | | | | | | |
| TEMPERATURE °C | 25 | 25 | 25 | 25 | 25 | 25 |
| DISSOLVED OXYGEN(mg/L) | | | | | | |
| OTHER DATA | | | | | | |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Pimephales promelas | Pimephales promelas | Pimephales promelas | Pimephales promelas | Pimephales promelas | Pimephales promelas |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | Adult | Adult | Adult | Adult | Adult |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.0042-0.0155 | 0.0042-0.0155 mg/l | 0.0217-0.049 mg/l | 0.0217-0.049 mg/l | 0.0217-0.049 mg/l | 0.0042 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 70 day | 260 day | 70 day | 82-138 day | 260 day | 83-138 day |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | < 0.014 mg/kg WW | 0.014 mg/kg WW | <0.014 mg/kg WW | < 0.014 mg/kg WW | 0.014 mg/kg WW | < 0.014 mg/kg WW |
| FINAL CONCENTRATION TREATED | 0.214-0.256 mg/kg WW | 0.510-0.846 mg/kg WW | 0.615-1.040 mg/kg WW | 4.400-9.975 mg/kg WW | 2.270-8.300 mg/kg WW | 1.411 mg/kg WW |
| BIOACCUMULATION FACTOR | 16-61 | 33-201 | 21-28 | 203 | 105-169 | 336 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 194-281 | 194-281 | 194-281 | 194-281 | 194-281 | 194-281 |
| pH | 7.78-8.05 | 7.78-8.05 | 7.78-8.05 | 7.78-8.05 | 7.78-8.05 | 7.78-8.05 |
| TEMPERATURE °C | 23.2-24.8 | 23.2-24.8 | 23.2-24.8 | 23.2-24.8 | 23.2-24.8 | 23.2-24.8 |
| DISSOLVED OXYGEN(mg/L) | 6.3-8.1 | 6.3-8.1 | 6.3-8.1 | 6.3-8.1 | 6.3-8.1 | 6.3-8.1 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3423 | 3423 | 3423 | 3423 | 3423 |
|---|---|---|---|---|---|---|
| LATIN NAME | Pimephales promelas | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.009-0.0155 mg/l | 0.09 mg/l | 0.6 mg/l | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 82-138 day | 96 hr | 96 hr | 24 hr | 24 hr | 24 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | Whole organism | Blood | Liver | Skeletal muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | < 0.014 mg/kg WW | | | | | |
| FINAL CONCENTRATION TREATED | 1.796-2.256 mg/kg WW | 22 mg/kg WW | 120 mg/kg WW | 63.0 mg/l | 210 mg/kg WW | 75 mg/kg WW |
| BIOACCUMULATION FACTOR | 146-200 | 244 | 200 | 79 | 263 | 94 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Tap | Tap | Tap | Tap | Tap |
| HARDNESS ($CaCO_3$ mg/L) | 194-281 | | | | | |
| pH | 7.78-8.05 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 |
| TEMPERATURE °C | 23.2-24.8 | 16 | 16 | 16 | 16 | 16 |
| DISSOLVED OXYGEN(mg/L) | 6.3-8.1 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results | Alkalinity 30-60 mg/l Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3428 | 3428 | 3428 | 3423 | 3423 | 3423 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri |
| COMMON NAME | | | | | | |
| LIFE STAGE | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 24 hr | 48 hr | 48 hr | 48 hr | 48 hr | 96 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Intestine+pyloric caeca | Blood | Liver | Skeletal muscle | Intestine+pyloric caeca | Blood |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 230 mg/kg WW | 70 mg/l | 350 mg/kg WW | 130 mg/kg WW | 290 mg/kg WW | 94 mg/l |
| BIOACCUMULATION FACTOR | 288 | 88 | 438 | 163 | 363 | 118 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Tap | Tap | Tap | Tap | Tap | Tap |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | 7.2-7.4 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 |
| TEMPERATURE °C | 16 | 16 | 16 | 16 | 16 | 16 |
| DISSOLVED OXYGEN(mg/L) | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 |
| OTHER DATA | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3423 | 3423 | 3423 | 3423 | 3423 | 3423 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri |
| COMMON NAME | | | | | | |
| LIFE STAGE | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.8 mg/l | 0.8 mg/l | 0.8 mg/l | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 96 hr | 96 hr | 96 hr | 24 hr | 24 hr | 24 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Liver | Skeletal muscle | Intestine+pyloric caeca | Blood | Liver | Skeletal muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 430 mg/kg WW | 210 mg/kg WW | 350 mg/kg WW | 12 mg/l | 52 mg/kg WW | 13 mg/kg WW |
| BIOACCUMULATION FACTOR | 538 | 263 | 438 | 75 | 325 | 81 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Tap | Tap | Tap | Tap | Tap | Tap |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 |
| TEMPERATURE °C | 16 | 16 | 16 | 16 | 16 | 16 |
| DISSOLVED OXYGEN(mg/L) | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 |
| OTHER DATA | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3423 | 3423 | 3423 | 3423 | 3423 | 3423 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri |
| COMMON NAME | | | | | | |
| LIFE STAGE | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling | Fingerling |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 24 hr | 48 hr | 48 hr | 48 hr | 48 hr | 96 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Intestine+pyloric caeca | Blood | Liver | Skeletal muscle | Intestine+pyloric caeca | Blood |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 30 mg/kg WW | 20 mg/l | 55 mg/kg WW | 23 mg/kg WW | 52 mg/kg WW | 36 mg/l |
| BIOACCUMULATION FACTOR | 188 | 125 | 344 | 144 | 325 | 225 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Tap | Tap | Tap | Tap | Tap | Tap |
| HARDNESS ($CaCO_3$ mg/L) | | | | | | |
| pH | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 |
| TEMPERATURE °C | 16 | 16 | 16 | 16 | 16 | 16 |
| DISSOLVED OXYGEN(mg/L) | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 |
| OTHER DATA | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3423 | 3423 | 3423 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salmo gairdneri | Salmo gairdneri | Salmo gairdneri | Salmo trutta | Salmo trutta | Salmo trutta |
| COMMON NAME | | | | | | |
| LIFE STAGE | Fingerling | Fingerling | Fingerling | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.16 mg/l | 0.16 mg/l | 0.16 mg/l | 0.47 mg/l | 0.47 mg/l | 0.47 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 96 hr | 96 hr | 96 hr | 2 hr | 4 hr | 16 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Liver | Skeletal muscle | Intestine+pyloric caeca | Muscle | Muscle | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 77 mg/kg WW | 28 mg/kg WW | 69 mg/kg WW | 4.10-4.53 mg/kg WW | 4.87-6.48 mg/kg WW | 9.08-11.95 mg/kg WW |
| BIOACCUMULATION FACTOR | 481 | 175 | 431 | 8.7-9.6 | 10.4-13.8 | 19.3-25.4 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Tap | Tap | Tap | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | | | | 295 | 295 | 295 |
| pH | 7.2-7.5 | 7.2-7.5 | 7.2-7.5 | 7.81 | 7.81 | 7.81 |
| TEMPERATURE °C | 16 | 16 | 16 | 12 | 12 | 12 |
| DISSOLVED OXYGEN(mg/L) | 8.0-11.0 | 8.0-11.0 | 8.0-11.0 | 8.2 | 8.2 | 8.2 |
| OTHER DATA | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salmo trutta | Salmo trutta | Salmo trutta | Salmo trutta | Salmo trutta | Salmo trutta |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.47 mg/l | 0.47 mg/l | 0.68 mg/l | 0.68 mg/l | 0.68 mg/l | 0.68 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 32-64 hr | 90 day | 2 hr | 8 hr | 32 hr | 64 hr |
| TOTAL DOSE | | | | | | |
| TISSUE | Muscle | Muscle | Muscle | Muscle | Muscle | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 21.78-34.80 mg/kg WW | 250 mg/kg WW | 5.48-10.61 mg/kg WW | 10.91-12.45 mg/kg WW | 15.79-43.34 mg/kg WW | 46.49-57.99 mg/kg WW |
| BIOACCUMULATION FACTOR | 46.3-74.0 | 532 | 8.1-15.6 | 16.0-18.3 | 23.2-63.7 | 68.4-85.3 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 295 | 295 | 295 | 295 | 295 | 295 |
| pH | 7.81 | 7.81 | 7.81 | 7.81 | 7.81 | 7.81 |
| TEMPERATURE °C | 12 | 12 | 12 | 12 | 12 | 12 |
| DISSOLVED OXYGEN(mg/L) | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 |
| OTHER DATA | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.27 mg/l | 0.53 mg/l | 1.86 mg/l | 3.18 mg/l | 0.00003 mg/l | 0.00003 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 140 hr | 144 hr | 114 hr | 8 hr | 6 mth | 6 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Muscle | Muscle | Muscle | Muscle | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 70-93 mg/kg WW | 83-121 mg/kg WW | 165-215 mg/kg WW | 217-346 mg/kg WW | 0.021 mg/l | 0.0075 mg/kg WW |
| BIOACCUMULATION FACTOR | 259-344 | 157-228 | 89-116 | 68-109 | 700 | 250 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 297 | 297 | 297 | 297 | 256-342 | 256-342 |
| pH | 7.81 | 7.81 | 7.81 | 7.81 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 12 | 12 | 12 | 25 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | >6.5 | >6.5 | 8.2 | >6.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00003 mg/l | 0.00003 mg/l | 0.00003 mg/l | 0.0006 mg/l | 0.0006 mg/l | 0.0006 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Kidney | Gill | Gonad | Blood | Muscle | Kidney |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.0625 mg/kg WW | 0.013 mg/kg WW | 0.008 mg/kg WW | 0.058-0.078 mg/l | 0.171 mg/kg WW | 0.139 mg/kg WW |
| BIOACCUMULATION FACTOR | 2083 | 433 | 267 | 97-130 | 285 | 231 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.0006 mg/l | 0.0006 mg/l | 0.0014 mg/l | 0.0014 mg/l | 0.0014 mg/l | 0.0014 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Gonad | Blood | Muscle | Kidney | Gill |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.08 mg/kg WW | 0.088 mg/kg WW | 0.126 mg/l | 0.419 mg/kg WW | 0.062 mg/kg WW | 0.504 mg/kg WW |
| BIOACCUMULATION FACTOR | 133 | 147 | 90 | 299 | 44 | 360 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.0014 mg/l | 0.0026 mg/l | 0.0026 mg/l | 0.0026 mg/l | 0.0026 mg/l | 0.0026 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gonad | Blood | Muscle | Kidney | Gill | Gonad |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.093 mg/kg WW | 0.603 mg/l | 1.142 mg/kg WW | 1.148 mg/kg WW | 2.296 mg/kg WW | 1.667 mg/kg WW |
| BIOACCUMULATION FACTOR | 66 | 232 | 439 | 442 | 883 | 641 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X1-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.004 mg/l | 0.004 mg/l | 0.004 mg/l | 0.004 mg/l | 0.004 mg/l | 0.0067 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth | 6 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Blood | Muscle | Kidney | Gill | Gonad | Blood |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | | |
| FINAL CONCENTRATION TREATED | 0.788 mg/l | 1.884 mg/kg WW | 1.715 mg/kg WW | 2.742 mg/kg WW | 1.043 mg/kg WW | 1.302 mg/l |
| BIOACCUMULATION FACTOR | 197 | 471 | 429 | 686 | 261 | 194 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.0067 mg/l | 0.0067 mg/l | 0.0067 mg/l | 0.0067 mg/l | 0.00126-0.00145 mg/l | 0.00126-0.00145 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 6 mth | 6 mth | 6 mth | 6 mth | 9 mth | 9 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Muscle | Kidney | Gill | Gonad | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | | | | | 0.0403 mg/l | 0.0008 mg/kg WW |
| FINAL CONCENTRATION TREATED | 3.842 mg/kg WW | 1.749 mg/kg WW | 5.022 mg/kg WW | 1.776 mg/kg WW | 0.1033-0.1125 mg/l | 0.039-0.063 mg/kg WW |
| BIOACCUMULATION FACTOR | 573 | 261 | 750 | 265 | 78-82 | 31-43 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00126-0.00145 mg/l | 0.00126-0.00145 mg/l | 0.00126-0.00145 mg/l | 0.00126-0.00145 mg/l | 0.00276-0.00286 mg/l | 0.00276-0.00286 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Kidney | Gonad | Gastro-intestinal tract | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.00225 mg/kg WW | 0.00015 mg/kg WW | < 0.00001 mg/kg WW | 0.0144 mg/kg | 0.0403 mg/l | 0.0008 mg/kg WW |
| FINAL CONCENTRATION TREATED | 0.179-0.265 mg/kg WW | 0.011-0.053 mg/kg WW | 0.036 mg/kg WW | 0.106-0.110 mg/kg WW | 0.225-0.271 mg/l | 0.2593-0.3915 mg/kg WW |
| BIOACCUMULATION FACTOR | 123-210 | 7.6-42 | 25 | 73-87 | 81-95 | 91-142 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juveinle (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00276-0.00286 mg/l | 0.00276-0.00286 mg/l | 0.00276-0.00286 mg/l | 0.00276-0.00286 mg/l | 0.00424-0.00553 mg/l | 0.00424-0.00553 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Kidney | Gonad | Gastro-intestinal tract | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.00225 mg/kg WW | 0.00015 mg/kg WW | <0.00001 mg/kg WW | 0.0144 mg/kg WW | 0.0403 mg/l | 0.0008 mg/kg WW |
| FINAL CONCENTRATION TREATED | 0.703-1.021 mg/kg WW | 0.192-0.479 mg/kg WW | 0.006-7.728 mg/kg WW | 1.158-1.672 mg/kg WW | 0.358-0.362 mg/l | 0.366-0.484 mg/kg WW |
| BIOACCUMULATION FACTOR | 246-370 | 67-173 | 2.1-2800 | 419-585 | 65-85 | 87 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00424-0.00553 mg/l | 0.00424-0.00553 mg/l | 0.00424-0.00553 mg/l | 0.00424-0.00553 mg/l | 0.00044-0.00053 mg/l | 0.00044-0.00053 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Kidney | Gonad | Gastro-intestinal tract | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.00225 mg/kg WW | 0.00015 mg/kg WW | <0.00001 mg/kg WW | 0.0144 mg/kg WW | 0.0403 mg/l | 0.0008 mg/kg WW |
| FINAL CONCENTRATION TREATED | 1.284-2.358 mg/kg WW | 0.226-0.311 mg/kg WW | 0.612-1.054 mg/kg WW | 0.281-5.666 mg/kg WW | 0.0443-0.0478 mg/l | 0.0455-0.0545 mg/kg WW |
| BIOACCUMULATION FACTOR | 303-426 | 53-56 | 144-191 | 66-1025 | 84-109 | 85.8-124 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 3385 | 3385 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00044-0.00053 mg/l | 0.00044-0.00053 mg/l | 0.00044-0.00053 mg/l | 0.00044-0.00053 mg/l | 0.00830-0.00872 mg/l | 0.00830-0.00872 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth | 9 mth |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Kidney | Gonad | Gastro-intestinal tract | Blood | Muscle |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.00225 mg/kg WW | 0.00015 mg/kg WW | < 0.00001 mg/kg WW | 0.0144 mg/kg WW | 0.0403 mg/l | 0.00083 mg/kg WW |
| FINAL CONCENTRATION TREATED | 0.096-0.138 mg/kg WW | 0.016-0.063 mg/kg WW | 0.038-0.069 mg/kg WW | 0.028-0.135 mg/kg WW | 0.696-0.9147 mg/l | 1.560-1.925 mg/kg WW |
| BIOACCUMULATION FACTOR | 218-260 | 30-143 | 86-130 | 64-255 | 80-110 | 179-232 |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Flowthrough |
| WATER MEDIUM | Well | Well | Well | Well | Well | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 | 256-342 |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 3385 | 3385 | 3385 | 3385 | 4543 | 3464 |
|---|---|---|---|---|---|---|
| LATIN NAME | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Salvelinus fontinalis | Tilapia sp | Tilapia aurea |
| COMMON NAME | | | | | | |
| LIFE STAGE | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | Juvenile (1 yr) | | |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.00830-0.00872 mg/l | 0.00830-0.00872 mg/l | 0.00830-0.00872 mg/l | 0.00830-0.00872 mg/l | 0.05 mg/l | 0.070 -0.0913 mg/l |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 9 mth | 9 mth | 9 mth | 9 mth | < 3 wk | 3.5 wk |
| TOTAL DOSE | | | | | | |
| TISSUE | Gill | Kidney | Gonad | Gastro-intestinal tract | Whole organism | Whole organism |
| INITIAL CONCENTRATION | | | | | | |
| FINAL CONCENTRATION CONTROL | 0.00225 mg/kg WW | 0.00015 mg/kg WW | < 0.00001 mg/kg WW | 0.0144 mg/kg WW | | |
| FINAL CONCENTRATION TREATED | 1.435-3.172 mg/kg WW | 0.40-0.4155 mg/kg WW | 1.3595-1.812 mg/kg WW | 5.879-8.989 mg/kg WW | 10.75 mg/kg DW | 0.21 mg/kg DW |
| BIOACCUMULATION FACTOR | 165-382 | 48 | 164-208 | 674-1083 | | |
| % TOTAL ABSORPTION | | | | | | |
| WATER FLOW | Flowthrough | Flowthrough | Flowthrough | Flowthrough | Static | Static |
| WATER MEDIUM | Well | Well | Well | Well | Pond | Well |
| HARDNESS ($CaCO_3$ mg/L) | 256-342 | 256-342 | 256-342 | 256-342 | | |
| pH | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | 7.47-8.06 | | 8-9 |
| TEMPERATURE °C | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | 13.1-16.7 | | 17-22 |
| DISSOLVED OXYGEN(mg/L) | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | 6.7-10.5 | | 9.2-19.0 |
| OTHER DATA | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | Acetone/Triton X-100 emulsifier | | Average value |

Freshwater Biological Association, Windermere

CHEMICAL : Parathion

TITLE: BIOLOGICAL ACCUMULATION



| REFERENCE | 2870 | 3350 | | | | |
|---|---|---|---|---|---|---|
| LATIN NAME | Amphibians<br>Acris crepitans | Rana catesbeiana | | | | |
| COMMON NAME | | | | | | |
| LIFE STAGE | Adult | Larva | | | | |
| ROUTE | | | | | | |
| DOSE | | | | | | |
| NUMBER OF DOSES | | | | | | |
| CONCENTRATION | 0.92-11.0 | 0.01-1.0 mg/l | | | | |
| APPLICATION RATE | | | | | | |
| EXPOSURE TIME | 96 hr | 96 hr | | | | |
| TOTAL DOSE | | | | | | |
| TISSUE | Whole organism | Whole organism | | | | |
| INITIAL CONCENTRATION | < 0.05 | | | | | |
| FINAL CONCENTRATION CONTROL | <0.0 - 0.05 mg/kg | | | | | |
| FINAL CONCENTRATION TREATED | 0.08-4.6 mg/kg | < 96 mg/kg WW | | | | |
| BIOACCUMULATION FACTOR | 18.4-220 | 64 | | | | |
| % TOTAL ABSORPTION | 0.08-4.6 | | | | | |
| WATER FLOW | Static | Flowthrough | | | | |
| WATER MEDIUM | Fresh | Fresh | | | | |
| HARDNESS ($CaCO_3$ mg/L) | 80 | 100 | | | | |
| pH | 7.6 | 7.4 | | | | |
| TEMPERATURE °C | 23-24 | 20 | | | | |
| DISSOLVED OXYGEN(mg/L) | | | | | | |
| OTHER DATA | Acetone solvent. Final water concentration <0.05 mg/l at 96 hr | Bioaccumulation factor as mean of concentration range | | | | |

Freshwater Biological Association, Windermere

Parathion

Metabolism and elimination

CHEMICAL: Parathion

TITLE: METABOLISM &ELIMINATION

| REFERENCE | ORGANISM | TISSUE | INITIAL CONCENTRATION | TIME | % CHANGE | METABOLITES | | Water Flow | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IDENTIFIED | LOCATION | Static Intermittent Flowthrough | | | | | | |
| | | | mg/kg | | | | | SIF | | mg/L | | °C | mg/L | |
| | Algae | | | | | | | | | | | | | |
| 3463 | Chlorella pyrenoidosa proteose | Whole organism | NI | 7 day | 73.9 % Decrease | 57% Amino-parathion | Medium | S | Growth | NI | NI | NI | NI | 16.9% other metabolites |
| 3462 | Oedogonium cardiacum | Whole organism | 0.128 mg/kg | 33 day | 72.6 % Decrease | 5.7% Amino-parathion | Whole organism | S | Pond | NI | NI | 26 | NI | % decrease as total extract-able carbon 14 |
| | | | | | | 18% 4-Nitro-phenol | " " | | | | | | | |
| | | | | | | 4.7% Paraoxon | " " | | | | | | | |
| | | | | | | 6.5% P-amino-phenol | " " | | | | | | | |
| | | | | | | 7.1% unknown compounds | " " | | | | | | | |
| | | | | | | 30.4% Polar compounds | " " | | | | | | | |
| | Crustaceans | | | | | | | | | | | | | |
| 3462 | Daphnia magna | Whole organism | 0.177 mg/kg | 33 day | 100 % Decrease | 16.3% 4-Nitro-phenol | Whole organism | S | Pond | NI | NI | 26 | NI | % decrease as total extract-able carbon 14 |
| | | | | | | 37.8% P-amino-phenol | " " | | | | | | | |
| | | | | | | 46.3% Polar compounds | " " | | | | | | | |
| | Insects | | | | | | | | | | | | | |
| 3462 | Culex pipiens | Whole organism | 0.180 mg/kg WW | 33 day | 100 % Decrease | 1.2% Amino-parathion | Whole organism | S | Pond | NI | NI | 26 | NI | % decrease as total extract-able carbon 14 |
| | | | | | | 2% 4-nitro-phenol | " " | | | | | | | |
| | | | | | | 16.6% Para-oxon | " " | | | | | | | |
| | | | | | | 69.4% unknown compounds | " " | | | | | | | |
| | | | | | | 11% Polar compounds | " " | | | | | | | |

CHEMICAL: Parathion

TITLE: METABOLISM &ELIMINATION

| REFERENCE | ORGANISM | TISSUE | INITIAL CONCENTRATION | TIME | % CHANGE | METABOLITES | | Water Flow (Static / Intermittent / Flowthrough) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IDENTIFIED | LOCATION | | | | | | | |
| | | | mg/kg | | | | | SIF | | mg/L | | °C | mg/L | |
| | Molluscs | | | | | | | | | | | | | |
| 3462 | Physa sp | Whole organism | 1.44 mg/kg | 33 day | 81 % Decrease | 3.1% Amino-parathion | Whole organism | S | Pond | NI | NI | 26 | NI | % decrease as total extract-able carbon 14 |
| | | | | | | 11.4% 4-nitro-phenol | " " | | | | | | | |
| | | | | | | 4.1% Paraoxon | " " | | | | | | | |
| | | | | | | 2% P-Amino-phenol | " " | | | | | | | |
| | | | | | | 5.6% unknown compounds | " " | | | | | | | |
| | | | | | | 55% Polar compounds | " " | | | | | | | |
| | Fish | | | | | | | | | | | | | |
| 3462 | Gambusia affinis | Whole organism | 0.122 mg/kg WW | 33 day | 73 % Decrease | 7% Amino-parathion | Whole organism | S | Pond | NI | NI | 26 | NI | % decrease as total extract-able carbon 14 |
| | | | | | | 26.2% 4-nitro-phenol | " " | | | | | | | |
| | | | | | | 5.8% Paraoxon | " " | | | | | | | |
| | | | | | | 13.9% P-Amino-phenol | " " | | | | | | | |
| | | | | | | 19.6% Polar compounds | " " | | | | | | | |
| | | | | | | 5% unknown compounds | " " | | | | | | | |
| 3423 | Salmo gairdneri | Whole organism | 22 mg/kg WW | 1 day | 34 % Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. 92-95% residue as parent compound, 1-2% as Paraoxon |

CHEMICAL: Parathion

TITLE: METABOLISM &ELIMINATION



| REFERENCE | ORGANISM | TISSUE | INITIAL CONCENTRATION | TIME | % CHANGE | METABOLITES | | Water Flow (Static, Intermittent Flowthrough) | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IDENTIFIED | LOCATION | | | | | | | |
| | | | mg/kg | | | | | SIF | | mg/L | | °C | mg/L | |
| 3423 | Salmo gairdneri | Whole organism | 22 mg/kg WW | 2 day | 59 % Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. >83% residue as parent compound 0.6-2.0% as Paraoxon |
| 3423 | Salmo gairdneri | Whole organism | 22 mg/. kg WW | 4-11 day | 82-90 % Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. >83% residue as parent compound 0.6-2.0% as Paraoxon |
| 3423 | Salmo gairdneri | Whole organism | 120 mg/kg WW | 1 day | 46 % Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. 92-95% residue as parent compound, 1-2% as Paraoxon |
| 3423 | Salmo gairdneri | Whole organism | 120 mg/kg WW | 2 day | 79 % Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. >83% residue as parent compound 0.6-2.0% as Paraoxon |

CHEMICAL: Parathion

TITLE: METABOLISM &ELIMINATION

| REFERENCE | ORGANISM | TISSUE | INITIAL CONCENTRATION | TIME | % CHANGE | METABOLITES | | Water Flow | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IDENTIFIED | LOCATION | Static Intermittent Flowthrough | | | | | | |
| | | | mg/kg | | | | | SIF | | mg/L | | °C | mg/L | |
| 3423 | Salmo gairdneri | Whole organism | 120 mg/kg WW | 3 day | 89% Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. >83% residue as parent compound, 0.6-2.0% as Paraoxon |
| 3423 | Salmo gairdneri | Whole organism | 120 mg/kg WW | 7-11 day | 96-97% Decrease | Paraoxon | Urine | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | Alkalinity 30-60 mg/l. Acetone solvent. Length 3-5 in. Graphical results. >83% residue as parent compound, 0.6-2.0% as Paraoxon |
| 3423 | Salmo gairdneri | NI | NI | 14 day | NI | Paraoxon<br>16.3-23% Phos-phoric acid<br>0.7-1.2% Diethylphosphoric acid<br>58.4-63.6% Diethylphosphorothioic acid<br>2.8-5.0% Desethylphosphorothionate | Whole body<br>Urine<br>"<br>"<br>" | F | Tap | NI | 7.2-7.5 | 16 | 8.0-11.0 | BW 250-300 gm. Alkalinity 30-60 mg/l |
| 3385 | Salmo trutta | Muscle | 22.88-34.80 mg/kg WW | 78-79 hr | 6-49% Decrease | NI | NI | F | Well | 295 | 7.81 | 12 | 8.2 | |
| 3385 | Salmo trutta | Muscle | 46.49-57.99 mg/kg WW | 16 hr | 10-23% Decrease | NI | NI | F | Well | 295 | 7.47 | 12 | 8.2 | |

CHEMICAL: Parathion

TITLE: METABOLISM &ELIMINATION



| REFERENCE | ORGANISM | TISSUE | INITIAL CONCENTRATION | TIME | % CHANGE | METABOLITES | | Water Flow | WATER MEDIUM | HARDNESS ($CaCO_3$) | pH | TEMPERATURE | DISSOLVED OXYGEN | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IDENTIFIED | LOCATION | Static Intermittent Flowthrough | | | | | | |
| | | | mg/kg | | | | | SIF | | mg/L | | °C | mg/L | |
| 3385 | Salmo trutta | Muscle | 46.49-57.99 mg/kg WW | 79 hr | 17-22 % Decrease | NI | NI | F | Well | 295 | 7.81 | 12 | 8.2 | |
| 3385 | Salvelinus fontinalis | Muscle | 0.259-0.392 mg/kg WW | 48 hr | 26-28 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.6 | |
| 3385 | Salvelinus fontinalis | Blood | 0.271 mg/l | 48 hr | 33 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.5 | |
| 3385 | Salvelinus fontinalis | Muscle | 0.366-0.484 mg/kg WW | 48 hr | 1-56 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.6 | |
| 3385 | Salvelinus fontinalis | Blood | 0.358-0.362 mg/l | 48 hr | 37-38 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.6 | |
| 3385 | Salvelinus fontinalis | Blood | 0.696-0.915 mg/l | 48 hr | 43-45 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1-16.7 | 6.7-10.6 | |
| 3385 | Salvelinus fontinalis | Muscle | 1.560-1.925 mg/kg WW | 48 hr | 59-70 % Decrease | NI | NI | F | Well | 256-342 | 7.47-8.06 | 13.1 16.7 | 6.7-10.5 | |

Parathion

Biodegradation

CHEMICAL: Parathion

TITLE: BIODEGRADATION



| REFERENCE | ORGANISM | ACCLIMATED / NON ACCLIMATED | MEDIUM | TEST METHOD | ACCESSORY NUTRIENTS | PARAMETER MEASURED | TIME | CONCENTRATION | % CONVERSION | TEMPERATURE | HARDNESS ($CaCO_3$) | pH | METABOLITES | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acc. Non acc. | | | | | | mg/L | | °C | mg/L | | | |
| 3005 | Natural microbial community | Non acc. | Natural fresh water | Incubation | NI | Degradation | 2 wk | 5.0 | >90 % | 21 | 424 | 7.8 | Aminoparathion | Aerobic |
| 3409 | Pseudomonas aeruginosa | Acc. | NI | Incubation | NI | 4-Nitro-phenol production | 21 day | 92-98 | 80-90 % | 30 | NI | 7.0 | 4-Nitrophenol Phenol 4-Aminophenol Paraoxon | Aerobic 98.7% purity No sig. effect by daylight |
| 3414 | Pseudomonas aeruginosa | Non acc. | Growth | Incubation | Mineral salts | Degradation | 7 day | 10 | 50 % | NI | NI | 7.0 | Paraoxon P-nitrophenol P-aminophenol Phenol | Ethanol solvent Aerobic |
| 3414 | Pseudomonas aeruginosa | Non acc. | Growth | Incubation | Mineral salts | Degradation | 21 day | 10 | 85% | NI | NI | 7.0 | Paraoxon P-nitrophenol P-aminophenol Phenol | Aerobic |
| 3460 | Natural microbial population | Acc. | Lake water | Incubation | 1% Peptone | NI | 20 hr | 2.5 | 100% | 23 | NI | NI | 100% Aminopara-thion | Anaerobic |
| 3460 | Natural microbial population | Acc. | Lake water | Incubation | 1% Peptone | Degradation | 35 hr | 2.5 | 100% | 23 | NI | NI | 55% Aminopara-thion | Aerobic |
| 3460 | Natural microbial population | Acc. | Lake sedi-ment | Incubation | 2% Peptone | Degradation | 300 hr | NI | 61.8% | 23 | NI | NI | 58% Aminopara-thion | Approx 35% added Para-thion adsorbed onto sedi-ment Aerobic |
| 3460 | Natural microbial population | Acc | Lake sedi-ment | Incubation | 2% Peptone | NI | 700 hr | NI | 64.4 % | 23 | NI | NI | 30% Aminopara-thion | Approx 35% added Para-thion adsorbed onto sedi-ment Aerobic |

Freshwater Biological Association, Windermere

Parathion

Abiotic Degradation

| REF | PROCESS | MEDIUM | TIME | CONC. | CONVERSION | TEMP | HARD-NESS $CaCO_3$ | pH | LIGHT | BREAKDOWN PRODUCTS | | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/l | % | °C | mg/l | | | | % | |
| 2662 | Hydrolysis | Fresh water | 39 wk | 1 | 50 | 25 | | 4.5 | Dark | | | Ethanol solvent |
| 2662 | Hydrolysis | Fresh water | 43 wk | 1 | 50 | 25 | | 5.0 | Dark | | | Ethanol solvent |
| 2662 | Hydrolysis | Fresh water | 33 wk | 1 | 50 | 25 | | 6.0 | Dark | | | Ethanol solvent |
| 2662 | Hydrolysis | Fresh water | 24 wk | 1 | 50 | 25 | | 7.0 | Dark | | | Ethanol solvent |
| 2662 | Hydrolysis | Fresh water | 15 wk | 1 | 50 | 25 | | 8.0 | Dark | | | Ethanol solvent |
| 3005 | Hydrolysis | Fresh water | 16 wk | 5.0 | < 5 | 21 | | 7.8 | Dark | | | 95% Purity Ethanol solvent |
| 3033 | Photo-oxidation | Dist. water | 15.1 hr | 160.4 | 25 | 90-95 | | | UV | | | |
| 3033 | Photo-oxidation | Dist. water | 57.6 hr | 160.4 | 50 | 90-95 | | | UV | | | |
| 3033 | Photo-oxidation | Dist. water | 148.8 hr | 160.4 | 75 | 90-95 | | | UV | | | |
| 3340 | Hydrolysis | Fresh water | 170 day | | 50 | 20 | | 6.1 | | | | |
| 3340 | Hydrolysis | Fresh water | 130 day | | 50 | 20 | | 7.4 | | | | |
| 3340 | Hydrolysis | Fresh water | 27 day | | 50 | 37.5 | | 7.4 | | | | |
| 3372 | Hydrolysis | Dist. water | 24 hr | 0.149 | 4 | | | 6.0 | | | | Acetone solvent |
| 3372 | Hydrolysis | Dist. water | 1 wk | 0.149 | 18.2 | | | 6.0 | | | | Acetone solvent |
| 3372 | Hydrolysis | Dist. water | 3 wk | 0.149 | 32.7 | | | 6.0 | | | | Acetone solvent |
| 3372 | Hydrolysis | Dist. water | 6 wk | 0.149 | 82.2 | | | 6.0 | | | | Acetone solvent |
| 3400 | Photolysis | | 45 hr | 1% | 100 | | | | Artif. 2537 Å | | | Ethanol solvent Anaerobic conditions |
| 3400 | Photolysis | | 10 hr | 1% | 34 | | | | Artif. 2537 Å | paraoxon<br>triethylphosphate<br>0,0,0-triethylthiophosphate<br>0,0,S-triethylthiophosphate<br>4-nitrophenol<br>ethanethiol | 3<br>2<br>0.5<br>15<br>1 | Ethanol solvent Anaerobic conditions. |

| REF | PROCESS | MEDIUM | TIME | CONC. | CONVERSION | TEMP | HARD-NESS $CaCO_3$ | pH | LIGHT | BREAKDOWN PRODUCTS | | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/l | % | °C | mg/l | | | | % | |
| 3400 | Photolysis | | 20 hr | 1% | 71 | | | | Artif. 2537 Å | paraoxon<br>triethylphosphate<br>0,0,0-triethylthio-phosphate<br>0,0,S-triethylthio-phosphate<br>4-nitrophenol<br>ethanethiol | 1<br>8<br>1<br>39<br>1 | Ethanol solvent<br>Anaerobic conditions |
| 3400 | Photolysis | | 13 hr | 1% | 100 | | | | Artif. 2537 Å | | | Tetrahydrofuran solvent.<br>Anaerobic conditions |
| 3400 | Photolysis | | 3 hr | 1% | 69 | | | | | paraoxon<br>triethylphosphate<br>0,0,0-triethylthio-phosphate<br>0,0,S-triethylthio-phosphate | 1<br>5<br>1<br>12 | Tetrahydrofuran solvent<br>Anaerobic conditions |
| 3400 | Photolysis | | 7 hr | 1% | 96 | | | | Artif. 2537 Å | triethylphosphate<br>0,0,0-triethylthio-phosphate<br>0,0,S-triethylthio-phosphate | 6<br>3<br>36 | Tetrahydrofuran solvent<br>Anaerobic conditions |
| 3405 | Hydrolysis | Distilled | 4182 hr | 11.5 | 50 | 20 | | 3.1 | Diffused | | | Rate Constant = $1.65 \times 10^{-4}$ ($hr^{-1}$) |
| 3405 | Hydrolysis | Distilled | 3670 hr | 11.5 | 50 | 20 | | 5.0 | Diffused | | | Rate Constant = $1.88 \times 10^{-4}$ ($hr^{-1}$) |
| 3405 | Hydrolysis | Distilled | 2594 hr | 11.5 | 50 | 20 | | 7.4 | Diffused | | | Rate Constant = $2.66 \times 10^{-4}$ ($hr^{-1}$) |
| 3405 | Hydrolysis | Distilled | 523 hr | 11.5 | 50 | 20 | | 9.0 | Diffused | | | Rate Constant = $1.32 \times 10^{-3}$ ($hr^{-1}$) |
| 3405 | Hydrolysis | Distilled | 33.2 hr | 11.5 | 50 | 20 | | 10.4 | Diffused | | | Rate Constant = $2.08 \times 10^{-2}$ ($hr^{-1}$) |

| REF | PROCESS | MEDIUM | TIME | CONC. | CONVERSION | TEMP | HARD-NESS $CaCO_3$ | pH | LIGHT | BREAKDOWN PRODUCTS | | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/l | % | $^{o}C$ | mg/l | | | | % | |
| 3413 | Hydrolysis | Distilled | 13327 hr | 11.5 | 50 | 10 | | 3.1 | Diffused | | | Rate constant = $5.20 \times 10^{-5}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 4182 hr | 11.5 | 50 | 20 | | 3.1 | Diffused | | | Rate constant = $1.65 \times 10^{-4}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 808 hr | 11.5 | 50 | 40 | | 3.1 | Diffused | | | Rate constant = $8.58 \times 10^{-4}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 181 hr | 11.5 | 50 | 60 | | 3.1 | Diffused | | | Rate constant = $3.83 \times 10^{-3}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 1281 hr | 11.5 | 50 | 10 | | 9.0 | Diffused | | | Rate constant = $5.41 \times 10^{-4}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 523 hr | 11.5 | 50 | 20 | | 9.0 | Diffused | | | Rate constant = $1.32 \times 10^{-3}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 127 hr | 11.5 | 50 | 40 | | 9.0 | Diffused | | | Rate constant = $5.47 \times 10^{-3}$ ($hr^{-1}$) |
| 3413 | Hydrolysis | Distilled | 26.2 hr | 11.5 | 50 | 60 | | 9.0 | Diffused | | | Rate constant = $2.65 \times 10^{-2}$ ($hr^{-1}$) |
| 3429 | Hydrolysis/ Photolysis | Ricefield water | 0.67 day | | 50 | | | | | | | Field expt. |
| 3440 | Hydrolysis | Water + kaolinite | 15 day | 500 | <40 | 22 | | 7 | Dark | p-nitrophenol<br>alkyl thiophosphate | | |
| 3460 | Hydrolysis | Lake water | 62 day | 5 mg/l | <10 | 23 | | | | | | approx 60% ads-orbed onto sediment |
| 3460 | Hydrolysis | Lake sedi-ment | 62 day | 5 mg/l | 24.8 | 23 | | | | | | Hydrolysis of parathion adsorbed onto lake sediment |
| 3477 | Hydrolysis | Dist. water | 16 day | 20 | 5 | 27 | | 3.0 | | | | Buffer solu. |
| 3477 | Hydrolysis | Dist. water | 16 day | 20 | 10-25 | 27 | | 4.0-10.0 | | | | Buffer solu. |
| 4037 | Photolysis | Dist. water | 2 hr | 10 | 19 | 20-25 | | | 290 nm | Nitrophenol<br>Paraoxon | 1.5<br>2 | Aerated |
| 4037 | Photolysis | Dist. water | 5 hr | 10 | 80 | 20-25 | | | 290 nm | Nitrophenol<br>Paraoxon | 4<br>0.5 | Aerated |
| 4037 | Photolysis | Dist. water | 10 hr | 10 | 88 | 20-25 | | | 290 nm | Nitrophenol | 8 | Aerated |

| REF | PROCESS | MEDIUM | TIME | CONC. | CONVERSION | TEMP | HARD-NESS $CaCO_3$ | pH | LIGHT | BREAKDOWN PRODUCTS | | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/l | % | °C | mg/l | | | | % | |
| 4037 | Photolysis | Dist. water + methanol | 10 hr | 10 | 14 | 20-25 | | | 290 nm | Nitrophenol<br>Paraoxon | 8.0<br>0.5 | Aerated<br>40:60 V/V |
| 4037 | Photolysis | Dist. water + propanol | 10 hr | 10 | 9 | 20-25 | | | 290 nm | Nitrophenol<br>Paraoxon | 2<br>1.3 | Degassed<br>30:70 V/V |
| 4037 | Photolysis | Methanol | 10 hr | 10 | 21 | 20-25 | | | 290 nm | Nitrophenol<br>Paraoxon | 5.4<br>1.8 | Degassed |
| 4037 | Photolysis | Dist. water | 1 hr | 10 | 45 | 26 | | 6.4 | 290 nm | | | |
| 4037 | Photolysis | Dist. water | 2 hr | 10 | 55 | 26 | | 6.4 | 290 nm | | | |
| 4037 | Photolysis | Dist. water | 5 hr | 10 | 70 | 26 | | 6.4 | 290 nm | | | |
| 4037 | Photolysis | Dist. water | 10 hr | 10 | 85 | 26 | | 6.4 | 290 nm | | | |
| 4037 | Hydrolysis | River water | 65 hr | | 50 | | | 7.8 | | | | |

Freshwater Biological Association, Windermere.

Parathion

Abiotic Partitioning

| REF | PROCESS | MEDIUM | CHEM. CONC. | SORBENT | Conc. | TIME | AMOUNT TRANSFORMED | TEMP °C | HARDNESS $CaCO_3$ mg/l | pH | DISSOLVED $O_2$ mg/l | OTHER DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3166 | Volatilisation | Distilled | | | | 9.3 day | 50% | 24 | | | | Glass dish diameter 6.5 cm depth 4.8 cm. Stirring rate 130 rpm |
| 3166 | Volatilisation | Distilled | | | | 14 day | 50% | 24 | | | | Glass dish diameter 6.5 cm depth 4.8 cm Not stirred |
| 3408 | Biosorption | Fresh water | | Mixed microbial culture | | | | 25 | | 7.0 | | Biosorption coeff. = 200-242 g/ml |
| 3460 | Adsorption | Lake water | 5 mg/l | Lake sediment | 0.5 g | 12 hr | 55-59% | | | | | |
| 3460 | Adsorption | Distilled water | 1 mg/l | Lake sediment (<2µ fraction) Organic carbon 7.1-21.2% | 2 g/l | 3 hr | 21.2-47.8% | | | | | Parathion:sediment Ratio = 0.5 µg/mg |
| 3460 | Adsorption | Distilled water | 1 mg/l | Lake sediment Organic carbon 7.1-21.2% | 1 g/l | 3 hr | 12.8-31.7% | | | | | Parathion:sediment Ratio = 1 µg/mg |
| 3460 | Adsorption | Distilled water | 1 mg/l | Lake sediment Organic carbon 7.1-21.2% | 0.4 g/l | 3 hr | 7.2-16.7% | | | | | Parathion:sediment Ratio = 2.5 µg/mg |
| 3460 | Adsorption | Distilled water | 1 mg/l | Lake sediment Organic carbon 7.1-21.2% | 0.2 g/l | 3 hr | 2.9-9.3% | | | | | Parathion:sediment Ratio = 5.0 µg/mg |
| 3485 | Persistence | Pond water | 0.98mg/l | | | 112 hr | 50% | 20 | | 7.4 | 8.0 | Aquarium containing bottom material and water plants |
| 3485 | Persistence | Pond water | 0.92mg/l | | | 333 hr | 50% | 20 | | 8.2 | 9.2 | Aquarium with water only |
| 4543 | Persistence | Pond water | 0.05mg/l | | | 2.7 day | 50% | | | | | Field experiments Conc. measured in water |

Freshwater Biological Association, Windermere.

References

PARATHION


2129 SINGH H. & SINGH T.P. 1982
Effect of some pesticides on hypothalamo-hypophyseal-ovarian axis in the freshwater catfish Heteropneustes fossilis (Bloch.)
Environ. Pollut. A. 27, 283-288.

2662 CHAPMAN R.A. & COLE C.M. 1982
Observations on the influence of water and soil pH on the persistence of insecticides.
J. Environ. Sci. Hlth B. 17, 487-504.

2870 FLEMING W.J., CHACIN H. de. et al 1982
Parathion accumulation in cricket frogs and its effect on American kestrels.
J. Toxicol. Environ. Hlth 10, 921-927.

3002 DIVE D., LECLERC H. & PERSOONE G. 1980
Pesticide toxicity on the ciliate protozoan Colpidium campylum : Possible consequences of the effects in the aquatic environment.
Ecotoxicol. Environ. Saf. 4, 129-133.

3004 JOHNSON W.W. & FINLEY M.T. 1980
Handbook of acute toxicity of chemicals to fish and aquatic invertebrates.
Resour. Publ. U.S. Fish Wildl. Serv. 137, 98pp.

3005 SHARON M.L., MILES J.R.W., HARRIS C.R. & MCEWEN F.L. 1980
"Persistence of 12 insecticides in water".
Wat. Res. 14, 1089-1093.

3021 KUMARI S.D.R. & NAIR N.B. 1978
Toxicity of some insecticides to Lepidocephalus thermalis (Cuv.& Val).
Proc. Indian Natn. Sci. Acad. B. 44, 122-132.

3033 KNOEVENAGEL K. & HIMMELREICH R. 1976
Degradation of compounds containing carbon atoms by photo-oxidation in the presence of water.
Arch. Environ. Contam. Toxicol. 4, 324-333.

3047 HILTIBRAN R.C. 1974
Oxygen and phosphate metabolism of bluegill liver mitochondria in the presence of some insecticides.
Trans. Ill. St. Acad. Sci. 67, 228-237.

3060 SANDERS H.O. 1972
The toxicities of some insecticides to 4 species Malacostracan Crustacea.
Tech. Pap. U.S. Bur. Sport Fish. Wildl. 66, 1-19.

3075 SANDERS H.O. 1969
Toxicity of pesticides to the crustacean Gammarus lacustris.
Tech. Pap. U.S. Bur. Sport Fish. Wildl. 25, 1-18.

3076 SOLON J.M. et al 1969
The effect of sublethal concentrations of LAS on the acute toxicity of various insecticides to the fathead minnow Pimephales promelas Rafinesque.
Wat. Res. 3, 767-779.

3079 SANDERS H.O. & COPE O.B. 1968
The relative toxicities of several pesticides to naiads of three species of stoneflies.
Limnol. Oceanogr. 13, 112-117.

3084 WOHLGEMUTH E. 1977(1980)
Toxicity of endrin to some species of aquatic vertebrates.
In: Proc. Int. Conf. Bioindic. Deterior. Reg. 1977, 263-267.
Ed. J. Spaleny. Academia, Prague.

3090 GAUFIN A.R., JENSEN L.D. et al. 1965
Toxicity of ten organic insecticides to various aquatic invertebrates.
Wat. Sewage Wks 112, 276-279.

3094 NEBEKER A.V. & GAUFIN A.R. 1964
Bioassays to determine pesticide toxicity to the amphipod crustacean Gammarus lacustris.
Proc. Utah Acad. Sci. 41, 64-67.

3095 SUTHERLAND D.J. 1964
Toxicity of insecticides to Aedes aegypti larvae.
Proc. New Jers. Mosq. Exterm. Ass. 51, 107-110.

3103 LUEDEMANN D. & NEUMANN H. 1961
Acute toxicity of present contact insecticides for freshwater animals.
Z. Angew. Zool. 48, 87-96.

3116 VERMA S.R. & GUPTA S.P. 1976
Pesticides in relation to water pollution (accumulation of aldrin and ethyl parathion in the few tissues of Colisia fasciatus and Notopterus notopterus).
Indian J. Environ. Hlth. 18, 10-14.

3130 POORMAN A.E. 1973
Effects of pesticides on Euglena gracilis 1. Growth studies.
Bull. Environ. Contam. Toxicol. 10, 25-28.

3148 LICHTENSTEIN E.P., SCHULZ K.R. et al 1966
Toxicity and fate of insecticide residues in water.
Arch. Environ. Hlth. 12, 199-212.

3158 NAQVI S.M.Z. 1973
Toxicity of twenty-three insecticides to a tubificid worm Branchiura sowerbyi from the Mississippi delta.
J. Econ. Ent. 66, 70-74.

3159 LÜDEMAN D. & NEUMANN H. 1962
Über die Wirkung der neuzeitlichen Kontaktinsektizide auf die Tiere des Suβwassers.
Anz. Schadlingskunde 35, 5-9.

3166 CHIOU C.T., FREED V.H., PETERS L.J. & KOHNERT R.L. 1980
Evaporation of solutes from water.
Environ. Int. 3, 231-236

3169 ANDERSON B.G. 1944
The toxicity thresholds of various substances found in industrial wastes as determined by the use of Daphnia magna.
Sewage Wks J., 16, 1156

3288 NAQVI S.M. & FERGUSON D.E. 1968
Pesticide tolerances of selected freshwater invertebrates.
J. Miss. Acad. Sci. 14, 121-127.

3294 HENDERSON C. & PICKERING Q.H. 1957
Toxicity of organic phosphorus insecticides to fish.
Trans. Am. Fish. Soc. 87, 39-51.

3312 BRINGMANN G. & KUEHN R. 1978
Testing of substances for their toxicity threshold: model organisms Microcystis aeruginosa and Scenedesmus quadricauda.
Mitt. Int. Ver. Theor. Angew. Limnol. 21, 275-284.

3319 MOORE R.B. 1970
Effects of pesticides on growth and survival of Euglena gracilis.
Bull. Environ. Contam. Toxicol. 5, 226-230.

3320 MATIDA Y. & KAWASAKI N. 1958
Study on the toxicity of agricultural control chemicals in relation to freshwater fisheries management. 2. Toxicity of agricultural insecticides to Daphnia carinata.
Bull. Freshwat. Fish. Res. Lab. Tokyo 8, 1-6.

3323 PICKERING Q.H., HENDERSON, C. & LEMKE A.E. 1962
The toxicity of organic phosphorus insecticides to different species of warmwater fishes.
Trans. Am. Fish. Soc. 91, 175-185.

3346 GEORGHIOU G.P., BREELAND S.G. & ARIARATNAM V. 1973
Seasonal escalation of organophosphorus and carbamate resistance in Anopheles albimatus by agricultural sprays.
Environ. Ent. 2, 369-374.

3350 HALL R.J. & KOLBE E. 1980
Bioconcentration of organophosphorus pesticides to hazardous levels by amphibians.
J. Toxicol. Environ. Hlth. 6, 853-860.

3352 GEORGHIOU G.P., ARIARATNAM V. et al. 1975
Organophosphorus multiresistance in Culex pipiens quinquefasciatus in California.
J. Econ. Ent. 68, 461-467.

3353 LEWALLEN L.L. & WILDER W.H. 1962
Toxicity of certain organophosphorus and carbamate insecticides to rainbow trout.
Mosq. News 22, 369-372.

3355 MULLA M.S. & ISAAK L.W. 1961
Field studies on the toxicity of insecticides to the mosquito fish Gambusia affinis.
J. Econ. Ent. 54, 1237-1242.

3366 SREENIVASAN A. & SWAMINATHAN G.K. 1967
Toxicity of six organophosphorus insecticides to fish.
Curr. Sci. 36, 397-398.

3372 COWART, R.P., BONNER, F.L. & EPPS, E.A. 1971
Rate of hydrolysis of seven organophosphate pesticides.
Bull. Environ. Contam. Toxicol. 6, 231-234.

3383 WEISS C.M. & GAKSTATTER J.H. 1965
The decay of acetylcholinesterase activity of organic phosphorus insecticides on storage in waters of different pH.
Proc. 2nd Int. Wat. Pollut. Res. Conf. Tokyo 1964, 83-99.

3385 SPACIE A. 1976
Acute and chronic parathion toxicity to fish and invertebrates.
US NTIS PB-257 800

3386 CHAMBERS, J.E. & YARBOROUGH J.D. 1974
Parathion and methyl parathion toxicity to insecticide-resistant and susceptible mosquito fish, Gambusia affinis.
Bull. Environ. Contam. Toxicol. 11, 315-320.

3387 ANEES M.A. 1978
Hepatic pathology in a freshwater teleost Channa punctatus exposed to sublethal and chronic levels of three organophosphorus insecticides.
Bull. Environ. Contam. Toxicol. 19, 524-527.

3389 FEDERLE P.F. & COLLINS W.J. 1976
Insecticide toxicity to 3 insects from Ohio Ponds.
Ohio J. Sci. 76, 19-24

3390 DORTLAND R.J. 1978
Aliesterase-(Ali-E) activity in Daphnia magna Straus as a parameter for exposure to parathion.
Hydrobiologia 59, 141-144.

3392 SOLON J.M. & NAIR J.H. 1970
The effect of a sublethal concentration of LAS on the acute toxicity of various phosphate pesticides to the fathead minnow (Pimephales promelas Rafinesque)
Bull. Environ. Contam. Toxicol. 5, 408-413.

3396 MINCHEW C.D. & FERGUSON D.E. 1969(70)
Toxicities of six insecticides to resistant and susceptible green sunfish and golden shiners in static bioassays.
J. Miss. Acad. Sci. 15, 29-32.

3397 BUTLER G.W., FERGUSON D.E. & REAGAN S.C. 1969(70)
Effect of sublethal parathion exposure on the blood of golden shiners, Notemigonus crysoleucas.
J. Miss. Acad. Sci. 15, 33-36.

3399 BERKE G.M., CHEEVER K.L. et al. 1974
Comparative toxicity, anticholinesterase action and metabolism of methyl parathion and parathion in sunfish and mice.
Toxicol. Appl. Pharmacol. 28, 97-109.

3400 GRUNWALL J.R. & ERIKSON R.H. 1973
Photolysis of parathion (O,O-diethyl-O-(4-nitrophenyl)-thiophosphate). New product.
J. Agric. Food Chem. 21, 929-931.

3403 DAVEY R.B., MEISCH M.V. & CARTER F.L. 1976
Toxicity of five ricefield pesticides to the mosquito fish Gambusia affinis and green sunfish, Lepomis cyanellus under laboratory and field conditions in Arkansas.
Environ. Ent. 5, 1053-1056.

3404 GOLDSMITH L.A. & CARLSON G.P. 1979

Divergent toxicity of parathion in two freshwater invertebrates Orconectes rusticus and Viviparus malleatus.

J. Environ. Sci. Hlth B. 14, 579-588

3405 FAUST S.D. & GOMAA H.M. 1972

Chemical hydrolysis of some organic phosphorus and carbamate pesticides in aquatic environments.

Environ. Lett. 3, 171-201.

3406 CHAMBERS J.E. 1976

The relationship of esterases to organophosphorus insecticide tolerance in mosquitofish.

Pestic. Biochem. Physiol. 6, 517-522

3409 GIBSON W.L. & BROWN L.R. 1975

The metabolism of parathion by Pseudomonas aeruginosa.

Dev. Ind. Microbiol. 16, 77-87

3411 METCALF R.L. & SANDBORN J.R. 1975

Pesticides and environmental quality in Illinois.

Bull. Ill. St. Nat. Hist. Surv. 31, 381-436

3412 BILLARD R., DE KINKELIN P. & ESCAFFRE A.M. 1970

Stérilisation des testicules de guppies par des doses non létales de parathion.

Ann. Hydrobiol. 1, 91-99

3413 GOMAA H.M. & FAUST S.D. 1972

Chemical hydrolysis and oxidation of parathion and paraoxon in aquatic environments.

In: Fate of organic pesticides in the aquatic environment. (Ed. S.D. Faust, 188-209.

3414 GIBSON W.L. 1972

Microbial degradation of parathion.

PhD. Mississippi State University. UM 73-168.

3415 CHEYMOL J., CHABIER P. et al. 1975

New molluscicidal organophorphorus compounds.

C.R. Hebd. Seances Acad. Sci. Ser. D. 281, 1633-1635

3417 KAPLAN H.M. & GLACZENSKI S.S. 1965

Hematological effects of organophosphate insecticides in the frog (Rana pipiens).

Life Sci. 4, 1213-1219

3418 CHAPMAN H.C. & LEWALLEN L.L. 1963

Field tests with insecticides against mountain Aedes larvae in California.

Mosq. News. 23, 41-44

3419 MATSUMURA F. & BROWN A.W.A. 1963

Organophosphorus tolerence in Aedes aegypti.

Mosq. News. 23, 26-31

3422 GIBSON J.R. 1971

Comparative biochemistry of parathion metabolism in three species of fish.

Ph.D. Mississippi State Univ. UM 71-27040, 22 pp.

3423 LELAND II, H.V. 1968

Biochemical factors affecting toxicity of parathion and selected analogs to fishes.

Ph.D. University of Michigan. UM 69-12165, 123 pp.

3424 MULLA M.S., NORLAND R.L. et al. 1971

Control of Chironomid midges in recreational lakes.

J. Econ. Ent. 64, 300-307.

3426 MULLA M.S., ISAAK L.W. & AXELROD H. 1963

Field studies on the effects of insecticides in some aquatic wildlife species.

J. Econ. Ent. 56, 184-188

3429 PODLEJSKI J. & DERVIEUX A.M. 1978

Persistance de quatre produits phytosanitaires dans les eaux de rizieres en Camargue: caracterisation de leurs effects sur l'ecosystems.

Trav. Soc. Pharm. Montpellier. 38, 153-164.

3433 SRIVASTAVA G.N., GUPTA R.A. et al. 1977

Effect of sub-lethal ethyl parathion on the metabolism and activity of Colisa fasciata (Bloch Schneider).

Indian J. Environ. Hlth. 19, 63-66.

3435 SCHMIDT C.H. & WEIDHAAS P.E. 1961

The toxicological action of three organophosphorus insecticides with three species of mosquito larva.

J. Econ. Ent. 54, 583-586

3437 SINGH H. & SINGH T.P. 1981

Effect of parathion and aldrin on survival, ovarian phosphorus -32 uptake and gonodotrophic potency in a freshwater catfish, Heteropneustes fossilis (Bloch).

Endokrinologie. 77, 173-178

3439 RAND G.M. 1977

The effect of subacute parathion exposure on the locomotion behaviour of the bluegill sunfish and largemouth bass.

In: Aquat. Toxicol. Hazard Evaluation ed. Mayer F.L. & Hamelink J.L. , 253-268.

3440 SALTZMAN S., MINGELGRIN U. & YARON B. 1976

Role of water in the hydrolysis of parathion and methyl parathion on kaolinite.

J. Agric. Food Chem. 24, 739-743

3443 WEISS C.M. 1961

Physiological effect of organic phosphorus insecticides on several species of fish.

Trans. Am. Fish Soc. 90, 143-152

3445 MORGAN W.S.G. 1976

Fishing for toxicity: Biological automonitor for continuous water quality control.

Effluent Wat. Treat. J. 16, 471-2; 474-5.

3447 MURPHY S.D., LAUWERYS R.R. & CHEEVER K.L. 1968

Comparative anticholinesterase action of organophosphorus insecticides in vertebrates.

Toxicol. Appl. Pharmacol. 12, 22-35.

3448 MULLA M.S. 1961

Susceptibility of various larval instars of Culex p. quinquefasciatus to insecticides.

Mosq. News. 21, 320-3.

3450 SATIJA R.C., TANEJA S.K. & MITTAL S.K. 1974

Effect of parathion on the acid and alkaline phosphatase in the central nervous system of branchyuran crab Paratelphusa mansonia.

Res. Bull. Panjab. Univ. Sci. 25, 115-116.

3451 BASAK P.K. & KONAR S.K. 1976

Pollution of water by pesticides and protection of fishes: parathion.

Proc. Natn. Acad. Sci. India B. 46, 382-392.

3452 BURKE W.D. & FERGUSON D.E. 1969

Toxicities of four insecticides to resistant and susceptible mosquito fish in static and flowing solutions.

Mosq. News. 29, 96-101.

3453 INOUE T. & KONDO K. 1962

Susceptibility of Branchiura sowerbyi, Limnodrilus socialis and Limnodrilus willeyi to several agricultural chemicals.

Botyu-kagaku. 27, 97-99.

3454 APPERSON C.S. 1975

Biological activity of insecticides against Culicoides variipennis.

Proc. Pap. Annu. Conf. Calif. Mosq. Control. Ass. 43, 118-119.

3457 SCHEIER A. & CAIRNS J. 1968

Apparatus for estimating the effects of toxicants on the critical flicker frequency of the bluegill sunfish.

Eng. Bull. Purdue Univ. Eng. Ext. Ser. 132, 849-855.

3459 WEISS C.M. 1959

Response of fish to sublethal exposures of organic phosphorus insecticides.

Sewage Ind. Wastes. 31, 580-593.

3460 GRAETZ D.A. 1970

I. Parathion degradation in lake sediments.
II. Adsorption of insecticides by organoclay complexes.

Ph.D. Univ. Wisconsin. UM 70 - 20843f.

3461 CHEN P.S., LIN Y-N. & CHUNG C-L. 1971

Laboratory studies on the susceptibility of mosquito-eating fish Lebistes reticulatus and the larvae of Culex pipiens fatigans to insecticides.

J. Formosan Med. Ass. 70, 28-35.

3462 FRANCIS B.M., HANSEN L.G. et al. 1980.

Ecotoxicology of phenylphosphorothioates.

Environ. Health Perspectives. 36, 187-195.

3463 MACKIEWICZ M., DEUBERT K.H. et al. 1969

Study of parathion biodegradation using gnotobiotic techniques.

J. Agri. Food. Chem. 17, 129-130.

3464 GASITH A. & PERRY A.S. 1980.

Fate of parathion via fishpond ecosystem and its impact on food chain organisms. Part of an integrated study of substrate-biological species interaction in an aquatic ecosystem.

In: Agrochemical Residue-Biota Interactions in Soil and Aquatic Ecosystems. 125-151. IAEA, Vienna.

3465 BORIE F., CHANTRIER N., HUVÉ J-L. & THOMSON M.A. 1981

Utilization de l'activite bioelectrique du bulbe olfactif de la Truite Salmo gairdneri dans la detection de pesticides.

C.R. Seances Acad. Sci. Ser. 3. 292, 235-8

3466 DORTLAND R.J., SMISSAERT H.R. et al. 1976

In vitro and in vivo inhibition of ali-esterases and cholinesterases by paraoxon and parathion in Daphnia magna Strauss.

Meded. Fak. Landbouww. Rijksuniv. Gent. 41, 1477-1482

3467 AYAD H. & GEORGHIOU G.P. 1979

Resistance pattern of Anopheles albimanus Wied. following selection by parathion.

Mosq. News. 39, 121-125.

3471 HAZELTINE W.E. 1963

The development of a new concept for control of the Clear Lake gnat.

J. Econ. Ent. 56, 621-626.

3472 HILSENHOFF W.L. 1959

The evaluation of insecticides for the control of Tendipes plumosus L.

J. Econ. Ent. 52, 331-332.

3473 BROWN A.W.A., LEWALLEN L.L. & GILLIES P.A. 1963

Organophosphorus resistance in Aedes nigromaculis in California.

Mosq. News. 23, 341-345.

3475 COLE D.R. & PLAPP F.W. 1974

Inhibition of growth and photosynthesis in Chlorella pyrenoidosa by a polychlorinated biphenyl and several insecticides.

Environ. Ent. 3, 217-220.

3477 YASUNO M., HIRAKOSO S. et al. 1965

Inactivation of some organophosphorus insecticides by bacteria in polluted waters.

Jap. J. Exp. Med. 35, 545-563.

3480 RAND G., KLEEREKOPER H. & MATIS J. 1975

Interaction of odor, and flow perception and the effects of parathion on the locomotor orientation of the goldfish, Carassius auratus.

J. Fish. Biol. 7, 497-504.

3484 GREGORY W.W., REED J.K. & PRIESTER L.E. 1969

Accumulation of parathion and DDT by some alga and protozoa.

J. Protozool. 16, 69-71.

3485 DORTLAND R.J. 1980.

Toxicological evaluation of parathion and azinphosmethyl in a freshwater model ecosystem.

Versl. Landbouwkd. Onderz. 1980, 898, 112 pp.

3488 CARLSON G.P. & FULLER G.C. 1976

Fate of the organophosphate insecticide parathion in the freshwater invertebrates. US NTIS : PB - 266711, 19pp.

3490 KAYSER H., LUEDEMANN D. & NEUMANN H. 1962.

Nerve cell injuries caused by insecticide poisoning in fishes and land crabs.

Z. Angew. Zool. 49, 135-148.

3493 SOLOMON H.M. & WEIS J.M. 1979

Abnormal circulatory development in Medaka caused by the insecticides carbaryl, malathion and parathion.

Teratology. 19, 51-62.

3494 PRIESTER L.E. 1965

The accumulation and metabolism of DDT, parathion and endrin by aquatic food-chain organisms.

Ph.D. Clemson University, 66-10936.

3496 LUDKE J.L. 1970.

Mechanism of resistance to parathion in mosquitofish, Gambusia affinis.

Ph.D. Thesis University of Mississippi. UM 70-16553.

4037 MANSOUR M., THALLER S. & KORTE F. 1983

Action of sunlight on parathion.

Bull. Environ. Contam. Toxicol. 30, 358-364.

4070 PANWAR R.S. & GUPTA R.A. 1982

Toxicity of some chlorinated hydrocarbon and organophosphorus insecticides to gastropod Viviparous bengalensis.

J. Environ. Biol. 3, 31-36.

4096 SUN T.J. & TAYLOR D.H. 1983

The effects of parathion on acquisition and retention of shuttlebox avoidance-conditioning in the goldfish Carassius auratus.

Environ. Pollut. A. 31, 119-131.

4165 HEMINGWAY J. & GEORGHIOU G.P. 1983

Studies on the acetylcholinesterase of Anopheles albimanus resistant and susceptible to organophosphate and carbamate insecticides.

Pestic. Biochem. Physiol. 19, 167-171.

4511 YAWETZ A., SIDIS I. & GASITH A. 1983

Metabolism of parathion and brain cholinesterase inhibition in Araclor 1254 - treated and untreated Caspian terrapin (Mauremys caspica rivulata, Emydidae, Chelonia) in comparison with two species of wild birds.

Comp. Biochem. Physiol. C. 75, 377-382.

4543 PERRY A.S., GASITH A. & MOZEL Y. 1983

Pesticide residues in fish and aquatic invertebrates.

Arch. Toxicol (Suppl.). 6, 199-204.

4671 KANAZAWA J. 1983

In vitro and in vivo effects of organophosphorus and carbamate insecticides on brain acetylcholinesterase activity of a freshwater fish, topmouth gudgeon.

Noyyo Gijutsu Kenkyusho Hokoku C. 37, 19-30.