Biological Data

Effect of Exposure on Mortality and Developmental Stage a

2-EHHB

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Mortality (Study Day 7) | | Mortality (Study Day 21) | | NF Stage (Study Day 7) | | | NF Stage (Study Day 21) | | | Jonckheere-Terpstra Test on Day 21 NF Stage  (p-value) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Dead | N | Dead | N | Median | IQR b | N | Median | IQR |
| 0.0 [<MQL] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-58 |  |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 58 | 58-59 |
| 3.6 [4.58] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 | NP c,d |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 57-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 58 | 58-59 |
| 10.9 [10.3] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 57-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 57-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 58 | 58-59 |
| 33 [25.0] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 58-59 |
| 100 [62.0] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 | 0.1962 |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 58 | 58-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 58-59 |

4-NP

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0  [<MQL] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-60 |  |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-60 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-60 |
| 1.8  [1.82] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-59 |
| 5.5  [5.17] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-59 |
| 16.5  [12.5] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-59 |
| 50  [48.2] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-60 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 58-59 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-59 |

Effect of Exposure on Mortality and Developmental Stage-continued

4-OP

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Mortality (Study Day 7) | | Mortality (Study Day 21) | | NF Stage (Study Day 7) | | | NF Stage (Study Day 21) | | | Jonckheere-Terpstra Test on Day 21 NF Stage  (p-value) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Dead | N | Dead | N | Median | IQR | N | Median | IQR |
| 0.0  [<MQL] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-59 |  |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-61 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-60 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-60 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-60 |
| 3.60  [5.43] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-61 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-64 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-61 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-62 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 59 | 59-62 |
| 10.9  [13.5] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-64 | 0.1000 |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-63 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-64 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-63 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 60 | 59-63 |
| 33.0  [39.8] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-64 | 0.0036 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-64 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-63 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-64 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 61 | 59-63 |
| 100  [103] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-65 | 0.0009 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-63 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-65 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-65 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 61.5 | 59-64 |

BBP

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0 [<MQL] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |  |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 60 | 59-61 |
| 3.60 [3.50] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 | 0.0114 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-65 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 63 | 59-65 |
| 10.9 [11.5] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 | 0.0011 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 64 | 59-65 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 64 | 59-65 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 63 | 59-65 |
| 33 [34.1] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 | 0.0029 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 64 | 62-65 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 64 | 59-65 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-65 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 63 | 59-65 |
| 100 [105] | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-64 | 0.0289 e |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 63 | 59-65 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-64 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 63 | 59-64 |

Effect of Exposure on Mortality and Developmental Stage-continued

DBP

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Mortality (Study Day 7) | | Mortality (Study Day 21) | | NF Stage (Study Day 7) | | | NF Stage (Study Day 21) | | | Jonckheere-Terpstra Test on Day 21 NF Stage  (p-value) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Dead | N | Dead | N | Median | IQR | N | Median | IQR |
| **0.0 [<MQL]** | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-61 |  |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-61 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 60 | 59-61 |
| **3.6 [4.78]** | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-61 | NP c |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 59 | 59-64 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-62 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 60-63 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 60 | 59-61 |
| **10.9 [13.4]** | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-62 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-64 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-64 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-63 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 61 | 59-62 |
| **33 [46.0]** | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-63 | NP |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-62 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-64 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-63 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 60 | 59-62 |
| **100 [143]** | A | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-64 | NS f |
| B | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 60 | 59-64 |
| C | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 61 | 59-64 |
| D | 20 | 0 | 15 | 0 | 5 | 54 | 54-54 | 15 | 62 | 59-64 |
| Overall | 80 | 0 | 60 | 0 | 20 | 54 | 54-54 | 60 | 61 | 59-63 |

a Jonckheere-Terpstra tests were conducted on NF stage Day 21 replicate median values in a stepdown fashion at the 0.05 level (2-sided). The test was not conducted for SD 7 since all tadpoles were recorded as NF stage 54 on Day 7.

b Interquartile range, 10th to 90th percentiles.

c Jonckheere-Terpstra step-down test was not performed since the highest treatment group was not statistically significant at p≤0.05.

d NP=not performed.

e Significantly greater than control (Jonckheere-Terpstra step-down test, p≤0.05).

f Not significantly different than control (Jonckheere-Terpstra step-down test, p>0.05).

Effect of Exposure on Hind Limb Length (mm)

2-EHHB

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Hind Limb Length (mm) Study Day 7 | | | | | Hind Limb Length (mm) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM a | CV (%) b | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 1.80 | 1.66 | 0.06 | 7.16 | 15 | 6.18 | 6.83 | 0.23 | 6.60 |
| B | 5 | 1.62 | 15 | 6.87 |
| C | 5 | 1.52 | 15 | 7.06 |
| D | 5 | 1.70 | 15 | 7.19 |
| 3.6 [4.58] | A | 5 | 1.70 | 1.86 | 0.12 | 12.81 | 15 | 10.87 | 10.39 | 1.41 | 27.13 |
| B | 5 | 1.94 | 15 | 11.92 |
| C | 5 | 1.64 | 15 | 6.29 |
| D | 5 | 2.16 | 15 | 12.50 |
| 10.9 [10.3] | A | 5 | 1.82 | 1.73 | 0.12 | 13.57 | 15 | 9.23 | 8.83 | 0.59 | 13.43 |
| B | 5 | 1.90 | 15 | 9.67 |
| C | 5 | 1.80 | 15 | 9.35 |
| D | 5 | 1.38 | 15 | 7.07 |
| 33 [25.0] | A | 5 | 1.82 | 1.81 | 0.05 | 5.52 | 15 | 11.97 | 10.51 | 0.88 | 16.80 |
| B | 5 | 1.94 | 15 | 9.69 |
| C | 5 | 1.78 | 15 | 11.96 |
| D | 5 | 1.70 | 15 | 8.41 |
| 100 [61.9] | A | 5 | 1.88 | 2.02 | 0.08 | 8.24 | 15 | 10.47 | 9.72 | 0.36 | 7.48 |
| B | 5 | 2.04 | 15 | 10.10 |
| C | 5 | 1.90 | 15 | 9.50 |
| D | 5 | 2.24 | 15 | 8.81 |

4-NP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0  [<MQL] | A | 5 | 1.68 | 1.86 | 0.09 | 9.50 | 15 | 14.39 | 13.86 | 1.01 | 14.55 |
| B | 5 | 1.86 | 15 | 16.21 |
| C | 5 | 2.10 | 15 | 11.37 |
| D | 5 | 1.80 | 15 | 13.45 |
| 1.8  [1.82] | A | 5 | 2.00 | 1.85 | 0.09 | 9.40 | 15 | 12.74 | 12.85 | 0.13 | 2.02 |
| B | 5 | 2.00 | 15 | 13.10 |
| C | 5 | 1.72 | 15 | 13.03 |
| D | 5 | 1.68 | 15 | 12.54 |
| 5.5  [5.17] | A | 5 | 1.78 | 2.05 | 0.14 | 13.58 | 15 | 14.13 | 14.22 | 1.26 | 17.79 |
| B | 5 | 1.88 | 15 | 10.75 |
| C | 5 | 2.40 | 15 | 15.32 |
| D | 5 | 2.14 | 15 | 16.66 |
| 16.5  [12.5] | A | 5 | 2.10 | 1.95 | 0.12 | 12.21 | 15 | 12.53 | 15.02 | 1.14 | 15.21 |
| B | 5 | 2.00 | 15 | 13.70 |
| C | 5 | 1.60 | 15 | 16.40 |
| D | 5 | 2.10 | 15 | 17.43 |
| 50  [48.2] | A | 5 | 2.12 | 2.12 | 0.08 | 7.42 | 15 | 17.18 | 15.37 | 1.46 | 18.96 |
| B | 5 | 2.32 | 15 | 17.73 |
| C | 5 | 2.08 | 15 | 15.26 |
| D | 5 | 1.94 | 15 | 11.29 |

Effect of Exposure on Hind Limb Length (mm)- continued

4-OP

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Hind Limb Length (mm) Study Day 7 | | | | | Hind Limb Length (mm) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM | N | Replicate Mean | Replicate Mean | Mean | N | Replicate Mean |
| 0.0  [<MQL] | A | 5 | 2.82 | 2.44 | 0.18 | 14.86 | 15 | 14.63 | 13.60 | 0.85 | 12.56 |
| B | 5 | 2.68 | 15 | 15.45 |
| C | 5 | 2.14 | 15 | 12.39 |
| D | 5 | 2.12 | 15 | 11.92 |
| 3.60  [5.43] | A | 5 | 2.68 | 2.52 | 0.13 | 10.45 | 15 | 20.64 | 17.54 c | 1.46 | 16.71 |
| B | 5 | 2.80 | 15 | 18.36 |
| C | 5 | 2.24 | 15 | 13.61 |
| D | 5 | 2.36 | 15 | 17.53 |
| 10.9  [13.5] | A | 5 | 2.84 | 2.72 | 0.05 | 4.03 | 15 | 17.21 | 18.21 c | 0.70 | 7.68 |
| B | 5 | 2.76 | 15 | 20.28 |
| C | 5 | 2.70 | 15 | 17.70 |
| D | 5 | 2.58 | 15 | 17.64 |
| 33.0  [39.8] | A | 5 | 2.56 | 2.44 | 0.06 | 4.83 | 15 | 18.87 | 17.70 c | 0.73 | 8.22 |
| B | 5 | 2.44 | 15 | 16.44 |
| C | 5 | 2.28 | 15 | 19.03 |
| D | 5 | 2.48 | 15 | 16.43 |
| 100  [103] | A | 5 | 2.52 | 2.51 | 0.04 | 3.29 | 15 | 16.26 | 16.97 c | 0.38 | 4.51 |
| B | 5 | 2.52 | 15 | 16.55 |
| C | 5 | 2.40 | 15 | 18.00 |
| D | 5 | 2.60 | 15 | 17.09 |

BBP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0 [<MQL] | A | 5 | 2.72 | 2.68 | 0.05 | 3.88 | 15 | 13.51 | 12.50 | 0.44 | 7.04 |
| B | 5 | 2.74 | 15 | 12.13 |
| C | 5 | 2.52 | 15 | 12.87 |
| D | 5 | 2.72 | 15 | 11.48 |
| 3.60 [3.50] | A | 5 | 3.02 | 2.89 | 0.08 | 5.46 | 15 | 20.60 | 20.52 c | 0.72 | 7.06 |
| B | 5 | 3.02 | 15 | 19.71 |
| C | 5 | 2.82 | 15 | 22.51 |
| D | 5 | 2.70 | 15 | 19.23 |
| 10.9 [11.5] | A | 5 | 4.32 | 3.41 | 0.31 | 18.11 | 15 | 19.61 | 20.27 c | 0.57 | 5.66 |
| B | 5 | 3.12 | 15 | 19.05 |
| C | 5 | 3.24 | 15 | 20.85 |
| D | 5 | 2.96 | 15 | 21.57 |
| 33 [34.1] | A | 5 | 2.88 | 2.98 | 0.13 | 8.85 | 15 | 23.63 | 21.58 c | 1.17 | 10.82 |
| B | 5 | 2.68 | 15 | 22.65 |
| C | 5 | 3.06 | 15 | 21.78 |
| D | 5 | 3.30 | 15 | 18.27 |
| 100 [105] | A | 5 | 2.72 | 2.89 | 0.07 | 4.83 | 15 | 22.77 | 21.69 c | 0.92 | 8.45 |
| B | 5 | 3.06 | 15 | 20.33 |
| C | 5 | 2.92 | 15 | 23.70 |
| D | 5 | 2.88 | 15 | 19.95 |

Effect of Exposure on Hind Limb Length (mm)- continued

DBP

| Treatment [Mean Measured Conc.]  (µg/L) | Replicate | Hind Limb Length (mm) Study Day 7 | | | | | Hind Limb Length (mm) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| **0.0 [<MQL]** | A | 5 | 2.10 | 2.07 | 0.04 | 3.74 | 15 | 14.25 | 14.79 | 0.65 | 8.84 |
| B | 5 | 2.04 | 15 | 15.83 |
| C | 5 | 1.98 | 15 | 15.90 |
| D | 5 | 2.16 | 15 | 13.20 |
| **3.6 [4.78]** | A | 5 | 2.06 | 2.38 | 0.12 | 9.78 | 15 | 14.83 | 14.84 | 0.75 | 10.13 |
| B | 5 | 2.36 | 15 | 15.26 |
| C | 5 | 2.52 | 15 | 16.43 |
| D | 5 | 2.58 | 15 | 12.82 |
| **10.9 [13.4]** | A | 5 | 2.46 | 2.38 | 0.12 | 10.25 | 15 | 17.67 | 18.16 c | 0.37 | 4.05 |
| B | 5 | 2.12 | 15 | 17.46 |
| C | 5 | 2.68 | 15 | 18.45 |
| D | 5 | 2.26 | 15 | 19.06 |
| **33 [46.0]** | A | 5 | 2.66 | 2.48 | 0.07 | 5.35 | 15 | 17.07 | 18.26 c | 0.54 | 5.95 |
| B | 5 | 2.34 | 15 | 18.07 |
| C | 5 | 2.46 | 15 | 19.70 |
| D | 5 | 2.46 | 15 | 18.19 |
| **100 [143]** | A | 5 | 2.54 | 2.43 | 0.11 | 9.15 | 15 | 20.75 | 19.95 c | 0.56 | 5.64 |
| B | 5 | 2.50 | 15 | 18.30 |
| C | 5 | 2.10 | 15 | 20.20 |
| D | 5 | 2.58 | 15 | 20.55 |

a Standard error of the mean

b Coefficient of variation = (standard deviation / mean) × 100

c Significantly greater than control (Jonckheere-Terpstra test, p<0.05).

Effect of Exposure on Snout-to-Vent Length (mm)

2-EHHB

| Treatment [Mean Measured Conc.]  (µg/L) | Replicate | Snout-to-Vent Length (mm) Study Day 7 | | | | | Snout-to-Vent Length (mm) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM a | CV b (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 15.44 | 15.48 | 0.28 | 3.62 | 15 | 25.34 | 27.32 | 0.71 | 5.21 |
| B | 5 | 15.70 | 15 | 27.28 |
| C | 5 | 14.72 | 15 | 28.56 |
| D | 5 | 16.04 | 15 | 28.11 |
| 3.6 [4.58] | A | 5 | 13.74 | 14.40 | 0.62 | 8.59 | 15 | 30.53 | 28.36 | 1.09 | 7.66 |
| B | 5 | 14.24 | 15 | 29.57 |
| C | 5 | 13.42 | 15 | 25.61 |
| D | 5 | 16.18 | 15 | 27.71 |
| 10.9 [10.3] | A | 5 | 14.44 | 14.04 | 0.63 | 8.97 | 15 | 27.07 | 25.88 | 0.46 | 3.59 |
| B | 5 | 14.06 | 15 | 25.55 |
| C | 5 | 15.32 | 15 | 26.04 |
| D | 5 | 12.32 | 15 | 24.85 |
| 33 [25.0] | A | 5 | 15.38 | 14.97 | 0.49 | 6.61 | 15 | 26.54 | 27.67 | 0.41 | 2.97 |
| B | 5 | 15.88 | 15 | 28.25 |
| C | 5 | 15.04 | 15 | 28.30 |
| D | 5 | 13.58 | 15 | 27.57 |
| 100 [61.9] | A | 5 | 16.34 | 16.30 | 0.24 | 2.89 | 15 | 27.49 | 27.90 | 0.30 | 2.13 |
| B | 5 | 16.68 | 15 | 27.64 |
| C | 5 | 15.62 | 15 | 27.70 |
| D | 5 | 16.54 | 15 | 28.79 |

4-NP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0  [<MQL] | A | 5 | 11.44 | 11.84 | 0.43 | 7.32 | 15 | 20.55 | 20.83 | 0.33 | 3.18 |
| B | 5 | 12.14 | 15 | 20.35 |
| C | 5 | 12.88 | 15 | 20.61 |
| D | 5 | 10.88 | 15 | 21.81 |
| 1.8  [1.82] | A | 5 | 13.40 | 11.90 | 0.57 | 9.55 | 15 | 23.75 | 23.15 c | 0.53 | 4.61 |
| B | 5 | 12.04 | 15 | 23.34 |
| C | 5 | 10.72 | 15 | 21.59 |
| D | 5 | 11.44 | 15 | 23.91 |
| 5.5  [5.17] | A | 5 | 11.92 | 12.57 | 0.57 | 9.10 | 15 | 26.01 | 25.11 c | 0.51 | 4.05 |
| B | 5 | 11.30 | 15 | 23.73 |
| C | 5 | 13.72 | 15 | 24.97 |
| D | 5 | 13.32 | 15 | 25.72 |
| 16.5  [12.5] | A | 5 | 12.12 | 12.37 | 0.54 | 8.80 | 15 | 25.00 | 25.72 c | 0.55 | 4.24 |
| B | 5 | 12.28 | 15 | 24.67 |
| C | 5 | 11.22 | 15 | 26.19 |
| D | 5 | 13.84 | 15 | 27.03 |
| 50  [48.2] | A | 5 | 14.04 | 13.25 | 0.31 | 4.74 | 15 | 25.29 | 25.29 c | 0.30 | 2.38 |
| B | 5 | 13.32 | 15 | 24.93 |
| C | 5 | 13.10 | 15 | 26.14 |
| D | 5 | 12.52 | 15 | 24.80 |

Effect of Exposure on Snout-to-Vent Length (mm)- continued

4-OP

|  | | Snout-to-Vent Length (mm) Day 7 | | | | | Snout-to-Vent Length (mm) Day 21  NF Stage ≤ 60 d | | | | | Snout-to-Vent Length (mm) Day 21  NF Stage > 60 d | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Treatment [Mean Measured Conc.] (µg/L) | Replicate | N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0  [<MQL] | A | 5 | 14.22 | 13.35 | 0.31 | 4.65 | 15 | 22.01 | 20.43 | 0.56 | 5.48 | 0 | . | 18.30 | . | . |
| B | 5 | 13.32 | 14 | 20.41 | 1 | 18.30 |
| C | 5 | 12.78 | 15 | 19.65 | 0 | . |
| D | 5 | 13.08 | 15 | 19.63 | 0 | . |
| 3.60  [5.43] | A | 5 | 13.22 | 13.50 | 0.25 | 3.72 | 11 | 23.58 | 21.44 | 0.76 | 7.11 | 4 | 20.00 | 18.93 | 0.48 | 5.08 |
| B | 5 | 14.24 | 10 | 20.84 | 5 | 19.24 |
| C | 5 | 13.16 | 14 | 20.02 | 1 | 17.70 |
| D | 5 | 13.38 | 11 | 21.32 | 4 | 18.78 |
| 10.9  [13.5] | A | 5 | 13.90 | 13.94 | 0.11 | 1.61 | 12 | 21.90 | 21.33 | 0.43 | 4.07 | 3 | 18.73 | 19.17 | 0.22 | 2.28 |
| B | 5 | 14.26 | 7 | 22.13 | 8 | 19.78 |
| C | 5 | 13.74 | 12 | 20.23 | 3 | 19.10 |
| D | 5 | 13.86 | 8 | 21.05 | 7 | 19.07 |
| 33.0  [39.8] | A | 5 | 13.54 | 13.35 | 0.18 | 2.68 | 7 | 20.39 | 20.34 | 0.72 | 7.09 | 8 | 19.08 | 18.33 | 0.55 | 6.04 |
| B | 5 | 12.88 | 6 | 18.55 | 9 | 17.97 |
| C | 5 | 13.28 | 6 | 22.08 | 9 | 19.34 |
| D | 5 | 13.70 | 8 | 20.35 | 7 | 16.93 |
| 100  [103] | A | 5 | 12.78 | 13.07 | 0.17 | 2.64 | 8 | 19.69 | 19.88 | 0.33 | 3.30 | 7 | 16.93 | 17.49 | 0.31 | 3.51 |
| B | 5 | 12.78 | 8 | 20.55 | 7 | 18.27 |
| C | 5 | 13.46 | 5 | 20.22 | 10 | 17.68 |
| D | 5 | 13.26 | 6 | 19.05 | 9 | 17.08 |

BBP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0 [<MQL] | A | 5 | 14.50 | 14.29 | 0.27 | 3.79 | 14 | 16.74 | 18.26 | 0.52 | 5.74 | 1 | 15.60 | 14.30 | 0.27 | 3.57 |
| B | 5 | 14.96 | 13 | 18.39 | 2 | 14.30 |
| C | 5 | 13.84 | 13 | 18.98 | 2 | 15.00 |
| D | 5 | 13.86 | 14 | 18.92 | 1 | 15.10 |
| 3.60 [3.50] | A | 5 | 15.60 | 14.88 | 0.29 | 3.88 | 4 | 20.35 | 20.40 d | 0.49 | 4.82 | 11 | 17.47 | 18.05 d | 0.58 | 6.45 |
| B | 5 | 14.52 | 3 | 19.13 | 12 | 16.78 |
| C | 5 | 14.32 | 5 | 21.52 | 10 | 19.44 |
| D | 5 | 15.08 | 4 | 20.60 | 11 | 18.49 |
| 10.9 [11.5] | A | 5 | 16.02 | 15.20 | 0.34 | 4.51 | 4 | 22.53 | 22.56 d | 0.64 | 5.71 | 11 | 17.23 | 18.27 d | 0.50 | 5.50 |
| B | 5 | 15.48 | 3 | 20.93 | 12 | 17.64 |
| C | 5 | 14.52 | 1 | 22.70 | 14 | 18.85 |
| D | 5 | 14.76 | 5 | 24.08 | 10 | 19.37 |
| 33 [34.1] | A | 5 | 13.72 | 14.70 | 0.62 | 8.40 | 4 | 22.05 | 22.99 d | 0.82 | 6.19 | 11 | 20.25 | 19.67 d | 0.29 | 2.96 |
| B | 5 | 13.68 | 0 | - | 15 | 19.65 |
| C | 5 | 15.14 | 4 | 24.63 | 11 | 19.90 |
| D | 5 | 16.24 | 7 | 22.29 | 8 | 18.88 |
| 100 [105] | A | 5 | 12.98 | 14.36 | 0.48 | 6.63 | 3 | 23.33 | 23.57 d | 0.11 | 0.92 | 12 | 19.57 | 19.32 d | 0.15 | 1.58 |
| B | 5 | 14.48 | 5 | 23.80 | 10 | 19.13 |
| C | 5 | 15.04 | 6 | 23.70 | 9 | 19.59 |
| D | 5 | 14.94 | 7 | 23.44 | 8 | 18.99 |

Effect of Exposure on Snout-to-Vent Length (mm)- continued

DBP

|  | | Snout-to-Vent Length (mm) Day 7 | | | | Snout-to-Vent Length (mm) Day 21  For NF Stage ≤ 60 | | | | | | Snout-to-Vent Length (mm) Day 21  For NF Stage > 60 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Treatment  [Mean Measured Conc.] (µg/L) | Rep | N | Rep  Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 13.80 | 14.58 | 0.35 | 4.76 | 7 | 18.47 | 18.69 | 0.41 | 4.42 | 8 | 16.84 | 16.28 | 0.33 | 4.09 |
| B | 5 | 14.36 | 9 | 19.73 | 6 | 16.88 |
| C | 5 | 15.46 | 9 | 17.74 | 6 | 15.73 |
| D | 5 | 14.68 | 10 | 18.81 | 5 | 15.68 |
| 3.6 [4.78] | A | 5 | 15.10 | 15.22 | 0.22 | 2.90 | 13 | 20.23 | 19.88 | 0.30 | 3.04 | 2 | 16.75 | 17.51 | 0.31 | 3.59 |
| B | 5 | 15.76 | 10 | 20.55 | 5 | 17.64 |
| C | 5 | 14.70 | 10 | 19.45 | 5 | 17.38 |
| D | 5 | 15.32 | 9 | 19.30 | 6 | 18.27 |
| 10.9 [13.4] | A | 5 | 16.00 | 15.78 c | 0.29 | 3.73 | 5 | 21.70 | 21.77 d | 0.45 | 4.12 | 10 | 18.45 | 18.68 d | 0.11 | 1.14 |
| B | 5 | 14.90 | 10 | 21.54 | 5 | 18.56 |
| C | 5 | 16.10 | 6 | 20.85 | 9 | 18.82 |
| D | 5 | 16.12 | 4 | 23.00 | 11 | 18.90 |
| 33 [46.0] | A | 5 | 16.96 | 16.25 c | 0.51 | 6.30 | 9 | 21.42 | 21.94 d | 0.27 | 2.42 | 6 | 18.63 | 19.23 d | 0.37 | 3.85 |
| B | 5 | 14.86 | 10 | 22.05 | 5 | 19.96 |
| C | 5 | 17.08 | 10 | 22.64 | 5 | 19.78 |
| D | 5 | 16.10 | 8 | 21.66 | 7 | 18.56 |
| 100 [143] | A | 5 | 16.18 | 15.56 c | 0.47 | 6.01 | 5 | 21.48 | 23.05 d | 0.61 | 5.27 | 10 | 19.63 | 19.25 d | 0.17 | 1.76 |
| B | 5 | 15.00 | 8 | 22.81 | 7 | 19.00 |
| C | 5 | 14.54 | 7 | 24.33 | 8 | 18.92 |
| D | 5 | 16.50 | 3 | 23.57 | 12 | 19.43 |

a Standard error of the mean

b Coefficient of variation = (standard deviation / mean) × 100

c Significantly greater than control (Jonckheere-Terpstra test, p<0.05).

d A two-factor ANOVA with a nested variance structure was used on all test organisms to assess growth effects due to chemical treatments while taking into account the effect of late stage development on growth

Effect of Exposure on Normalized Hind Limb Length (ratio of HLL:SVL)

2-EHHB

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Normalized Hind Limb Length (ratio of HLL:SVL) Study Day 7 | | | | | Normalized Hind Limb Length (ratio of HLL:SVL) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM a | CV (%) b | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 0.10 | 0.10 | 0.00 | 0.00 | 15 | 0.25 | 0.24 | 0.00 | 1.58 |
| B | 5 | 0.10 | 15 | 0.24 |
| C | 5 | 0.10 | 15 | 0.24 |
| D | 5 | 0.10 | 15 | 0.25 |
| 3.6 [4.58] | A | 5 | 0.12 | 0.12 | 0.01 | 8.70 | 15 | 0.35 | 0.36 | 0.04 | 23.67 |
| B | 5 | 0.12 | 15 | 0.40 |
| C | 5 | 0.10 | 15 | 0.25 |
| D | 5 | 0.12 | 15 | 0.45 |
| 10.9 [10.3] | A | 5 | 0.10 | 0.10 | 0.00 | 0.00 | 15 | 0.33 | 0.34 | 0.02 | 12.58 |
| B | 5 | 0.10 | 15 | 0.38 |
| C | 5 | 0.10 | 15 | 0.35 |
| D | 5 | 0.10 | 15 | 0.28 |
| 33 [25.0] | A | 5 | 0.10 | 0.10 | 0.00 | 0.00 | 15 | 0.46 | 0.38 c | 0.04 | 20.10 |
| B | 5 | 0.10 | 15 | 0.33 |
| C | 5 | 0.10 | 15 | 0.42 |
| D | 5 | 0.10 | 15 | 0.30 |
| 100 [61.9 | A | 5 | 0.10 | 0.10 | 0.00 | 0.00 | 15 | 0.38 | 0.35 c | 0.02 | 9.81 |
| B | 5 | 0.10 | 15 | 0.36 |
| C | 5 | 0.10 | 15 | 0.35 |
|  |  |  |  |  |
| D | 5 | 0.10 | 15 | 0.30 |

4-NP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0  [<MQL] | A | 5 | 0.14 | 0.17 | 0.01 | 11.61 | 15 | 0.73 | 0.68 | 0.06 | 17.91 |
| B | 5 | 0.16 | 15 | 0.83 |
| C | 5 | 0.18 | 15 | 0.55 |
| D | 5 | 0.18 | 15 | 0.63 |
| 1.8  [1.82] | A | 5 | 0.16 | 0.17 | 0.01 | 6.79 | 15 | 0.55 | 0.56 | 0.02 | 6.07 |
| B | 5 | 0.18 | 15 | 0.56 |
| C | 5 | 0.18 | 15 | 0.61 |
| D | 5 | 0.16 | 15 | 0.53 |
| 5.5  [5.17] | A | 5 | 0.14 | 0.17 | 0.01 | 15.19 | 15 | 0.55 | 0.56 | 0.04 | 15.66 |
| B | 5 | 0.16 | 15 | 0.45 |
| C | 5 | 0.20 | 15 | 0.61 |
| D | 5 | 0.18 | 15 | 0.65 |
| 16.5  [12.5] | A | 5 | 0.16 | 0.15 | 0.01 | 7.70 | 15 | 0.50 | 0.58 | 0.03 | 11.06 |
| B | 5 | 0.16 | 15 | 0.55 |
| C | 5 | 0.14 | 15 | 0.61 |
| D | 5 | 0.14 | 15 | 0.64 |
| 50  [48.2] | A | 5 | 0.14 | 0.17 | 0.02 | 20.38 | 15 | 0.68 | 0.61 | 0.06 | 18.86 |
| B | 5 | 0.20 | 15 | 0.71 |
| C | 5 | 0.20 | 15 | 0.59 |
| D | 5 | 0.14 | 15 | 0.45 |

Effect of Exposure on Normalized Hind Limb Length (ratio of HLL:SVL)- continued

4-OP

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Normalized Hind Limb Length (ratio of HLL:SVL) Day 7 | | | | | Normalized Hind Limb Length (ratio of HLL:SVL) Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM a | CV (%) b | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0  [<MQL] | A | 5 | 0.20 | 0.19 | 0.01 | 5.41 | 15 | 0.67 | 0.68 | 0.04 | 10.43 |
| B | 5 | 0.18 | 15 | 0.77 |
| C | 5 | 0.18 | 15 | 0.65 |
| D | 5 | 0.18 | 15 | 0.61 |
| 3.60  [5.43] | A | 5 | 0.20 | 0.19 | 0.01 | 10.35 | 15 | 0.91 | 0.85 c | 0.05 | 12.21 |
| B | 5 | 0.20 | 15 | 0.91 |
| C | 5 | 0.16 | 15 | 0.69 |
| D | 5 | 0.18 | 15 | 0.87 |
| 10.9  [13.5] | A | 5 | 0.20 | 0.20 | 0.00 | 0.00 | 15 | 0.83 | 0.90 c | 0.03 | 6.76 |
| B | 5 | 0.20 | 15 | 0.98 |
| C | 5 | 0.20 | 15 | 0.89 |
| D | 5 | 0.20 | 15 | 0.89 |
| 33.0  [39.8] | A | 5 | 0.20 | 0.20 | 0.01 | 5.13 | 15 | 0.95 | 0.93 c | 0.02 | 3.40 |
| B | 5 | 0.20 | 15 | 0.91 |
| C | 5 | 0.18 | 15 | 0.97 |
| D | 5 | 0.20 | 15 | 0.90 |
| 100  [103] | A | 5 | 0.20 | 0.20 | 0.01 | 5.13 | 15 | 0.90 | 0.93 c | 0.03 | 5.79 |
| B | 5 | 0.18 | 15 | 0.87 |
| C | 5 | 0.20 | 15 | 0.97 |
| D | 5 | 0.20 | 15 | 0.97 |

BBP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0 [<MQL] | A | 5 | 0.22 | 0.21 | 0.00 | 4.88 | 15 | 0.81 | 0.71 | 0.04 | 10.85 |
| B | 5 | 0.20 | 15 | 0.69 |
| C | 5 | 0.20 | 15 | 0.71 |
| D | 5 | 0.20 | 15 | 0.62 |
| 3.60 [3.50] | A | 5 | 0.22 | 0.20 | 0.01 | 8.16 | 15 | 1.15 | 1.11 c | 0.03 | 5.26 |
| B | 5 | 0.20 | 15 | 1.15 |
| C | 5 | 0.20 | 15 | 1.12 |
| D | 5 | 0.18 | 15 | 1.03 |
| 10.9 [11.5] | A | 5 | 0.26 | 0.22 | 0.01 | 12.86 | 15 | 1.09 | 1.07 c | 0.01 | 2.15 |
| B | 5 | 0.20 | 15 | 1.05 |
| C | 5 | 0.22 | 15 | 1.09 |
| D | 5 | 0.20 | 15 | 1.05 |
| 33 [34.1] | A | 5 | 0.20 | 0.20 | 0.00 | 0.00 | 15 | 1.15 | 1.07 c | 0.06 | 10.85 |
| B | 5 | 0.20 | 15 | 1.17 |
| C | 5 | 0.20 | 15 | 1.05 |
| D | 5 | 0.20 | 15 | 0.91 |
| 100 [105] | A | 5 | 0.18 | 0.20 | 0.01 | 5.13 | 15 | 1.13 | 1.06 c | 0.04 | 8.05 |
| B | 5 | 0.20 | 15 | 1.00 |
| C | 5 | 0.20 | 15 | 1.13 |
| D | 5 | 0.20 | 15 | 0.97 |

Effect of Exposure on Normalized Hind Limb Length (ratio of HLL:SVL)- continued

DBP

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Normalized Hind Limb Length (ratio of HLL:SVL) Study Day 7 | | | | | Normalized Hind Limb Length (ratio of HLL:SVL) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 0.14 | 0.13 | 0.01 | 15.38 | 15 | 0.83 | 0.85 | 0.04 | 10.10 |
| B | 5 | 0.14 | 15 | 0.86 |
| C | 5 | 0.10 | 15 | 0.96 |
| D | 5 | 0.14 | 15 | 0.75 |
| 3.6 [4.78] | A | 5 | 0.12 | 0.16 | 0.02 | 22.82 | 15 | 0.77 | 0.78 | 0.04 | 10.88 |
| B | 5 | 0.14 | 15 | 0.79 |
| C | 5 | 0.18 | 15 | 0.88 |
| D | 5 | 0.20 | 15 | 0.67 |
| 10.9 [13.4] | A | 5 | 0.14 | 0.14 | 0.01 | 20.20 | 15 | 0.93 | 0.93 | 0.03 | 5.56 |
| B | 5 | 0.12 | 15 | 0.85 |
| C | 5 | 0.18 | 15 | 0.95 |
| D | 5 | 0.12 | 15 | 0.97 |
| 33 [46.0] | A | 5 | 0.16 | 0.15 | 0.01 | 13.33 | 15 | 0.86 | 0.90 | 0.02 | 4.31 |
| B | 5 | 0.16 | 15 | 0.87 |
| C | 5 | 0.12 | 15 | 0.93 |
| D | 5 | 0.16 | 15 | 0.93 |
| 100 [143] | A | 5 | 0.18 | 0.16 | 0.01 | 16.24 | 15 | 1.03 | 0.99 c | 0.03 | 6.91 |
| B | 5 | 0.16 | 15 | 0.89 |
| C | 5 | 0.12 | 15 | 0.98 |
| D | 5 | 0.16 | 15 | 1.05 |

a Standard error of the mean

b Coefficient of variation = (standard deviation / mean) × 100

c Significantly greater than control (Jonckheere-Terpstra test, p<0.05).

Effect of Exposure on Wet Body Weight (g)

2-EHHB

| Treatment [Mean Measured Conc.] (µg/L) | Replicate | Body Weight (g) Study Day 7 | | | | | Body Weight (g) Study Day 21 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Replicate Mean | Mean | SEM a | CV (%) b | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0 [<MQL] | A | 5 | 0.2070 | 0.2061 | 0.0080 | 7.7446 | 15 | 0.9296 | 1.1260 | 0.0716 | 12.7242 |
| B | 5 | 0.2142 | 15 | 1.1100 |
| C | 5 | 0.1834 | 15 | 1.2427 |
| D | 5 | 0.2196 | 15 | 1.2216 |
| 3.6 [4.58] | A | 5 | 0.2440 | 0.2638 | 0.0303 | 22.9956 | 15 | 1.6203 | 1.4581 | 0.1845 | 25.3048 |
| B | 5 | 0.2398 | 15 | 1.4865 |
| C | 5 | 0.2182 | 15 | 0.9367 |
| D | 5 | 0.3532 | 15 | 1.7889 |
| 10.9 [10.3] | A | 5 | 0.2596 | 0.2531 | 0.0296 | 23.3964 | 15 | 1.4731 | 1.3281 | 0.0643 | 9.6833 |
| B | 5 | 0.2462 | 15 | 1.3003 |
| C | 5 | 0.3254 | 15 | 1.3719 |
| D | 5 | 0.1810 | 15 | 1.1672 |
| 33 [25.0] | A | 5 | 0.3248 | 0.2911 c | 0.0274 | 18.8170 | 15 | 1.4983 | 1.6426 c | 0.0598 | 7.2788 |
| B | 5 | 0.3286 | 15 | 1.6669 |
| C | 5 | 0.2996 | 15 | 1.7871 |
| D | 5 | 0.2112 | 15 | 1.6182 |
| 100 [61.9] | A | 5 | 0.3234 | 0.3131 c | 0.0218 | 13.9443 | 15 | 1.5794 | 1.6284 c | 0.0222 | 2.7267 |
| B | 5 | 0.3544 | 15 | 1.6057 |
| C | 5 | 0.3230 | 15 | 1.6499 |
| D | 5 | 0.2514 | 15 | 1.6787 |

4-NP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0  [<MQL] | A | 5 | 0.14 | 0.17 | 0.01 | 11.61 | 15 | 0.73 | 0.68 | 0.06 | 17.91 |
| B | 5 | 0.16 | 15 | 0.83 |
| C | 5 | 0.18 | 15 | 0.55 |
| D | 5 | 0.18 | 15 | 0.63 |
| 1.8  [1.82] | A | 5 | 0.16 | 0.17 | 0.01 | 6.79 | 15 | 0.55 | 0.56 | 0.02 | 6.07 |
| B | 5 | 0.18 | 15 | 0.56 |
| C | 5 | 0.18 | 15 | 0.61 |
| D | 5 | 0.16 | 15 | 0.53 |
| 5.5  [5.17] | A | 5 | 0.14 | 0.17 | 0.01 | 15.19 | 15 | 0.55 | 0.56 | 0.04 | 15.66 |
| B | 5 | 0.16 | 15 | 0.45 |
| C | 5 | 0.20 | 15 | 0.61 |
| D | 5 | 0.18 | 15 | 0.65 |
| 16.5  [12.5] | A | 5 | 0.16 | 0.15 | 0.01 | 7.70 | 15 | 0.50 | 0.58 | 0.03 | 11.06 |
| B | 5 | 0.16 | 15 | 0.55 |
| C | 5 | 0.14 | 15 | 0.61 |
| D | 5 | 0.14 | 15 | 0.64 |
| 50  [48.2] | A | 5 | 0.14 | 0.17 | 0.02 | 20.38 | 15 | 0.68 | 0.61 | 0.06 | 18.86 |
| B | 5 | 0.20 | 15 | 0.71 |
| C | 5 | 0.20 | 15 | 0.59 |
| D | 5 | 0.14 | 15 | 0.45 |

Effect of Exposure on Wet Body Weight (g)-continued

4-OP

|  | | Body Weight (g) Day 7 | | | | | Body Weight (g) Day 21  NF Stage ≤ 60 d | | | | | Body Weight (g) Day 21  NF Stage > 60 d | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Treatment [Mean Measured Conc.] (µg/L) | Replicate | N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) | N | Replicate Mean | Mean | SEM | CV (%) |
| 0.0  [<MQL] | A | 5 | 0.4424 | 0.3559 | 0.0300 | 16.8396 | 15 | 1.5023 | 1.2498 | 0.0887 | 14.1887 | 0 | . | 0.6720 | . | . |
| B | 5 | 0.3422 | 14 | 1.2028 | 1 | 0.6720 |
| C | 5 | 0.3046 | 15 | 1.2071 | 0 | . |
| D | 5 | 0.3342 | 15 | 1.0869 | 0 | . |
| 3.60  [5.43] | A | 5 | 0.3580 | 0.3627 | 0.0234 | 12.8896 | 11 | 1.8873 | 1.5425 | 0.1407 | 18.2425 | 4 | 1.2318 | 1.1321 | 0.0335 | 5.9198 |
| B | 5 | 0.4300 | 10 | 1.5721 | 5 | 1.0890 |
| C | 5 | 0.3266 | 14 | 1.2009 | 1 | 1.1100 |
| D | 5 | 0.3362 | 11 | 1.5097 | 4 | 1.0975 |
| 10.9  [13.5] | A | 5 | 0.3714 | 0.3743 | 0.0153 | 8.1784 | 12 | 1.4918 | 1.4780 | 0.1248 | 16.8871 | 3 | 0.9487 | 0.9941 | 0.0661 | 13.2964 |
| B | 5 | 0.4120 | 7 | 1.8236 | 8 | 1.1820 |
| C | 5 | 0.3372 | 12 | 1.2611 | 3 | 0.8733 |
| D | 5 | 0.3764 | 8 | 1.3358 | 7 | 0.9726 |
| 33.0  [39.8] | A | 5 | 0.3664 | 0.3433 | 0.0204 | 11.8771 | 7 | 1.3004 | 1.2911 | 0.1178 | 18.2487 | 8 | 0.8839 | 0.8771 | 0.0449 | 10.2437 |
| B | 5 | 0.2900 | 6 | 0.9812 | 9 | 0.7726 |
| C | 5 | 0.3342 | 6 | 1.5537 | 9 | 0.8608 |
| D | 5 | 0.3824 | 8 | 1.3293 | 7 | 0.9910 |
| 100  [103] | A | 5 | 0.3330 | 0.3471 | 0.0202 | 11.6218 | 8 | 1.1888 | 1.2484 | 0.0733 | 11.7484 | 7 | 0.6489 | 0.8128 | 0.0957 | 23.5357 |
| B | 5 | 0.3012 | 8 | 1.4604 | 7 | 1.0697 |
| C | 5 | 0.3968 | 5 | 1.2192 | 10 | 0.8458 |
| D | 5 | 0.3574 | 6 | 1.1252 | 9 | 0.6870 |

BBP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.0 [<MQL] | A | 5 | 0.3460 | 0.4224 | 0.0297 | 14.0392 | 14 | 0.8499 | 0.9094 | 0.0523 | 11.4953 | 1 | 0.4980 | 0.5135 | 0.0177 | 7.0208 |
| B | 5 | 0.4416 | 13 | 0.7938 | 2 | 0.5135 |
| C | 5 | 0.4142 | 13 | 0.9811 | 2 | 0.5440 |
| D | 5 | 0.4878 | 14 | 1.0130 | 1 | 0.4590 |
| 3.60 [3.50] | A | 5 | 0.5188 | 0.4104 | 0.0399 | 19.4569 | 4 | 1.3170 | 1.2768 d | 0.1338 | 20.9519 | 11 | 0.7058 | 0.7854 | 0.0740 | 18.8431 |
| B | 5 | 0.4112 | 3 | 1.0300 | 12 | 0.6608 |
| C | 5 | 0.3292 | 5 | 1.6358 | 10 | 0.9947 |
| D | 5 | 0.3824 | 4 | 1.1243 | 11 | 0.7803 |
| 10.9 [11.5] | A | 5 | 0.4478 | 0.3921 | 0.0197 | 10.0414 | 4 | 1.4675 | 1.3795 d | 0.0677 | 9.8189 | 11 | 0.6295 | 0.604 | 0.0215 | 7.0978 |
| B | 5 | 0.3910 | 3 | 1.2207 | 12 | 0.6507 |
| C | 5 | 0.3600 | 1 | 1.3160 | 14 | 0.5575 |
| D | 5 | 0.3694 | 5 | 1.5138 | 10 | 0.5808 |
| 33 [34.1] | A | 5 | 0.2748 | 0.3516 | 0.0509 | 28.9747 | 4 | 1.2120 | 1.2585 d | 0.1352 | 18.6067 | 11 | 0.8083 | 0.729 d | 0.0308 | 8.4270 |
| B | 5 | 0.2748 | 0 | . | 15 | 0.6589 |
| C | 5 | 0.3668 | 4 | 1.5125 | 11 | 0.7341 |
| D | 5 | 0.4898 | 7 | 1.0511 | 8 | 0.7180 |
| 100 [105] | A | 5 | 0.2438 | 0.3215 c | 0.0280 | 17.4034 | 3 | 1.4757 | 1.4888 d | 0.0427 | 5.7330 | 12 | 0.7764 | 0.770 d | 0.0083 | 2.1577 |
| B | 5 | 0.3260 | 5 | 1.5276 | 10 | 0.7502 |
| C | 5 | 0.3400 | 6 | 1.5755 | 9 | 0.7654 |
| D | 5 | 0.3762 | 7 | 1.3763 | 8 | 0.7894 |

Effect of Exposure on Wet Body Weight (g)- continued

DBP

|  | | | Body Weight (g) Day 7 | | | | | | | | | | Body Weight (g) Day 21  For NF Stage ≤ 60 | | | | | | | | | | Body Weight (g) Day 21  For NF Stage > 60 | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Treatment [Mean Measured Conc.] (µg/L) | | Rep | | N | | Replicate Mean | | Mean | | SEM | | CV (%) | | N | | Replicate Mean | | Mean | | SEM | | CV (%) | | N | | Replicate Mean | | Mean | | SEM | | CV (%) | |
| 0.0 [<MQL] | A | | 5 | | 0.3114 | | 0.3744 | | 0.0252 | | 13.4775 | | 7 | | 0.8209 | | 0.9822 | | 0.0749 | | 15.2421 | | 8 | | 0.7750 | | 0.7521 | | 0.0428 | | 11.3926 | |
| B | | 5 | | 0.3590 | | 9 | | 1.1822 | | 6 | | 0.8522 | |
| C | | 5 | | 0.4270 | | 9 | | 0.9776 | | 6 | | 0.6463 | |
| D | | 5 | | 0.4002 | | 10 | | 0.9480 | | 5 | | 0.7348 | |
| 3.6 [4.78] | A | | 5 | | 0.3710 | | 0.3909 | | 0.0146 | | 7.4548 | | 13 | | 1.0884 | | 1.0097 | | 0.0368 | | 7.2836 | | 2 | | 0.6735 | | 0.7111 | | 0.0235 | | 6.5988 | |
| B | | 5 | | 0.4320 | | 10 | | 1.0442 | | 5 | | 0.7296 | |
| C | | 5 | | 0.3912 | | 10 | | 0.9879 | | 5 | | 0.6724 | |
| D | | 5 | | 0.3694 | | 9 | | 0.9182 | | 6 | | 0.7690 | |
| 10.9 [13.4] | A | | 5 | | 0.4880 | | 0.4835 c | | 0.0197 | | 8.1380 | | 5 | | 1.2126 | | 1.2724 d | | 0.0930 | | 14.6156 | | 10 | | 0.8046 | | 0.8427 | | 0.0249 | | 5.9122 | |
| B | | 5 | | 0.4414 | | 10 | | 1.2799 | | 5 | | 0.8248 | |
| C | | 5 | | 0.4694 | | 6 | | 1.0763 | | 9 | | 0.8253 | |
| D | | 5 | | 0.5350 | | 4 | | 1.5208 | | 11 | | 0.9160 | |
| 33 [46.0] | A | | 5 | | 0.5488 | | 0.4815 c | | 0.0449 | | 18.6350 | | 9 | | 1.3026 | | 1.3657 d | | 0.0645 | | 9.4498 | | 6 | | 0.7967 | | 0.9317 d | | 0.0520 | | 11.1631 | |
| B | | 5 | | 0.3534 | | 10 | | 1.2956 | | 5 | | 1.0454 | |
| C | | 5 | | 0.5380 | | 10 | | 1.5592 | | 5 | | 0.9654 | |
| D | | 5 | | 0.4856 | | 8 | | 1.3055 | | 7 | | 0.9193 | |
| 100 [143] | A | | 5 | | 0.5592 | | 0.4599 c | | 0.0421 | | 18.3250 | | 5 | | 1.2518 | | 1.5506 d | | 0.1263 | | 16.2963 | | 10 | | 1.0266 | | 0.9489 d | | 0.0277 | | 5.8341 | |
| B | | 5 | | 0.4028 | | 8 | | 1.4333 | | 7 | | 0.9139 | |
| C | | 5 | | 0.3784 | | 7 | | 1.7894 | | 8 | | 0.9050 | |
| D | | 5 | | 0.4992 | | 3 | | 1.7280 | | 12 | | 0.9501 | |

a Standard error of the mean

b Coefficient of variation = (standard deviation / mean) × 100

c Significantly greater than control (Jonckheere-Terpstra test, p<0.05).

d A two-factor ANOVA with a nested variance structure was used on all test organisms to assess growth effects due to chemical treatments while taking into account the effect of late stage development on growth