# 4-*t*-Octylphenol (CAS no. 140-66-9)

**Tier 1 *in vivo* Test**

(1) Results

Fish were exposed to concentrations of 25.3, 82.3 and 250 μg/L (measured). No significant differences were observed in fertility rate, total number of eggs, number of fertile eggs, secondary sex characteristics, gonadosomatic index, hepatosomatic index and female hepatic vitellogenin level.

A significant increase was observed in male hepatic vitellogenin level at 82.3 μg/L and higher, and this increase was dose-dependent.

(2) Summary

In this study, no conclusive adverse effects were identified on Medaka.

Estrogenic activity of 4-*t*-octylphenol has been indicated from literature. In this study, an increase in male hepatic vitellogenin level was observed at sublethal concentrations, indicating its estrogenic effect. It was concluded that 4-*t*-octylphenol is an estrogenic compound.

The highest exposure level of 250 μg/L in this study was ca. 8,060 times as high as the highest environmental water concentration of 0.031 μg/L that was measured in MOE's Environmental Survey and Monitoring of Chemicals in FY2012.

Table 1-A Results

| Measured concentration (μg/L) | Number of fish | | Mortality (%) | | Total length (mm) | | Body weight (mg) | |
|---|---|---|---|---|---|---|---|---|
| | male | female | male | female | male | female | male | female |
| Control | 12 | 12 | 0 | 0 | 38.1±1.2 | 36.5±0.5 | 664±73 | 578±29 |
| 25.3 | 12 | 12 | 0 | 0 | 37.0±0.9 | 37.8±0.5 | 608±31 | 625±55 |
| 82.3 | 12 | 12 | 8.3 | 0 | 37.9±0.6 | 37.0±0.2 | 630±44 | 599±16 |
| 250 | 12 | 12 | 0 | 0 | 37.4±0.4 | 36.7±0.5 | 626±21 | 605±10 |

Table 1-B Results (continued)

| Measured concentration (μg/L) | Total number of eggs (eggs/female/day) | Number of fertile eggs (eggs/female/day) | Fertility rate (%) | Gonadosomatic Index (%) | |
|---|---|---|---|---|---|
| | | | | male | female |
| Control | 24.8±4.8 | 23.3±5.2 | 93.8±3.9 | 0.92±0.33 | 10.3±1.5 |
| 25.3 | 26.3±3.2 | 24.1±3.5 | 91.4±5.1 | 0.83±0.11 | 11.4±1.6 |
| 82.3 | 26.5±1.3 | 24.4±1.5 | 91.9±2.1 | 0.81±0.08 | 10.7±0.39 |
| 250 | 23.3±2.6 | 20.7±2.6 | 88.5±3.3 | 0.81±0.08 | 11.1±2.0 |

Table 1-C Results (continued)

| Measured concentration (μg/L) | Hepatosomatic Index (%) | | Vitellogenin (ng/mg liver) | | Secondary sex characteristics | |
|---|---|---|---|---|---|---|
| | male | female | male | female | male | female |
| Control | 2.6±0.50 | 4.2±0.63 | 1.6±0.8 | 3,740±699 | 104±3.45 | 0±0 |
| 25.3 | 2.1±0.16 | 4.6±0.82 | 3.2±2.2 | 3,710±617 | 99±4.06 | 0±0 |
| 82.3 | 2.6±0.10 | 4.1±0.58 | 5.6±1.9 * | 4,380±1,350 | 105±7.67 | 0±0 |
| 250 | 2.9±0.28 | 4.5±0.29 | 11,400±3,040 * | 5,290±2,030 | 98±8.51 | 0±0 |

Table 1-D Results (continued)

| Measured concentration (μg/L) | Other observations |
|---|---|
| Control | Not found |
| 25.3 | Not found |
| 82.3 | Not found |
| 250 | Not found |

Data show mean ± SD (standard deviation)
Statistically significant differences from control group (**p<0.01, *p<0.05)
nd: not detected (below detection limit of vitellogenin: 1ng/mg liver)
(-): not measured
Secondary sex characteristics: number of joint plates with papillary processes