

1-Naphthol (CAS no. 90-15-3)

Tier 1 *in vivo* Test

(1) Results

Fish were exposed to concentrations of 80.0, 258 and 857 µg/L (measured). No significant differences were observed in number of eggs, number of fertile eggs, male and female mortality, total length, body weight, secondary sex characteristics, gonadosomatic index, hepatosomatic index and male hepatic vitellogenin level.

A significant increase was observed in female hepatic vitellogenin level at 857 µg/L, and this increase was dose-dependent. At this concentration, a significant decrease in fertility rate, abdominal bloating and attachment of unfertilized eggs at the cloaca of female fish were also observed.

(2) Summary

The significant decrease observed in fertility rate at 857 µg/L was considered adverse reproductive effects on Medaka.

While estrogenic activity of 1-naphthol has been indicated from literature, an increase in male hepatic vitellogenin level was not observed at sublethal concentrations to suggest estrogenic effect in this study. It was not concluded that 1-naphthol is an estrogenic compound.

The adverse exposure level of 857 µg/L was ca. 92,000 times as high as the highest environmental water concentration of 0.0093 µg/L that was measured in MOE's Environmental Survey and Monitoring of Chemicals in FY2008.

Table 1-A Results

Concentration ($\mu\text{g/L}$)		Number of fish		Mortality (%)		Total length (mm)		Body weight (mg)	
nominal	measured	male	female	male	female	male	female	male	female
Control		12	12	0	0	39.1 \pm 0.9	38.6 \pm 0.5	669 \pm 52	653 \pm 39
100	80.0	12	12	0	0	39.2 \pm 1.1	39.3 \pm 0.3	645 \pm 53	702 \pm 48
316	258	12	12	0	0	38.2 \pm 1.4	39.0 \pm 0.3	598 \pm 30	697 \pm 43
1,000	857	12	12	0	0	38.9 \pm 1.3	39.2 \pm 1.0	638 \pm 81	807 \pm 126

Table 1-B Results (continued)

Measured concentration ($\mu\text{g/L}$)	Number of eggs (eggs/female/day)	Number of fertile eggs (eggs/female/day)	Fertility rate (%)	Gonadosomatic Index (%)	
				male	female
Control	25.0 \pm 6.3	23.8 \pm 6.4	94.8 \pm 2.6	0.80 \pm 0.05	11.4 \pm 0.67
80.0	26.9 \pm 10	24.1 \pm 10	88.7 \pm 4.0	0.67 \pm 0.15	11.1 \pm 0.37
258	21.3 \pm 7.9	19.4 \pm 8.3	89.6 \pm 5.2	0.81 \pm 0.18	11.0 \pm 1.7
857	17.1 \pm 3.6	11.3 \pm 4.4	64.8 \pm 14*	0.61 \pm 0.03	17.1 \pm 6.1

Table 1-C Results (continued)

Measured concentration ($\mu\text{g/L}$)	Hepatosomatic Index (%)		Vitellogenin (ng/mg liver)		Secondary sex characteristics	
	male	female	male	female	male	female
Control	2.0 \pm 0.21	4.0 \pm 0.14	1.4 \pm 0.9	3,080 \pm 204	126 \pm 7.8	0
80.0	1.9 \pm 0.15	4.2 \pm 0.32	2.2 \pm 1.3	3,220 \pm 623	130 \pm 12	0
258	2.3 \pm 0.48	4.1 \pm 0.48	81.1 \pm 75.2	3,840 \pm 579	121 \pm 16	0
857	2.3 \pm 0.26	4.1 \pm 0.75	1.3 \pm 0.8	5,170 \pm 1,530*	115 \pm 11	0

Table 1-D Results (continued)

Measured concentration ($\mu\text{g/L}$)	Other observations
Control	Not found
80.0	Not found
258	Not found
857	abdominal bloating and attachment of unfertilized eggs at the cloaca of female fish

Data show mean \pm 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 papillary processes