

## 2,2',4,4'-Tetrahydroxybenzophenone (Benzophenone-2) (CAS no. 131-55-5)

### Tier 1 *in vivo* Test

#### (1) Results

Fish were exposed to concentrations of 0.0943, 0.939, 9.53 mg/L (measured). No significant differences were observed in mortality, total length, body weight, total number of eggs, number of fertile eggs, gonadosomatic index, hepatosomatic index, secondary sex characteristics and female hepatic vitellogenin level.

At 9.53 mg/L, a significant increase in male hepatic vitellogenin level and a significant decrease in fertility rate was observed.

#### (2) Summary

Estrogenic activity of 2,2',4,4'-tetrahydroxybenzophenone (benzophenone-2) 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 2,2',4,4'-tetrahydroxybenzophenone (benzophenone-2) is an estrogenic compound.

The adverse exposure level indicating of 9.53mg/L was ca. 733,000 times as high as the highest environmental water concentration of 0.013µg/L that was measured in MOE's Environmental Survey and Monitoring of Chemicals in FY2014.

The no observed adverse effect level of 0.939 mg/L was ca. 72,200 times as high as the detection limit of environmental water concentration of 0.013 µg/L for MOE's Environmental Survey and Monitoring of Chemicals in FY2014.

Table 1-A Results

Measured concentration (mg/L)	Number of survived fish male and female	Mortality (%) male and female	Total length (mm)		Body weight (mg)	
			male	female	male	female
Control (<0.0199)	24	0	30.9±7.0	30.1±1.0	288±38	317±39
0.0943	24	0	30.8±1.2	30.2±0.4	291±27	296±16
0.939	23	4.2	30.6±1.1	30.3±1.0	290±32	304±48
9.53	24	0	31.9±1.1	30.4±0.5	327±34	295±8

Table 1-B Results (continued)

Measured concentration (mg/L)	Number of eggs (eggs/female/day)	Number of fertile eggs (eggs/female/day)	Fertility rate (%)	Gonadosomatic Index (%)	
				male	female
Control (<0.0199)	14.4±1.8	13.6±1.6	94.6±1.4	0.856±0.107	7.50±1.38
0.0943	15.4±2.3	14.6±2.2	94.5±2.3	1.07±0.14	6.93±0.34
0.939	14.5±2.7	13.6±2.3	94.3±2.5	0.692±0.154	7.56±1.20
9.53	13.8±1.7	12.5±1.7	89.7±3.5*	0.790±0.226	8.56±0.41

Table 1-C Results (continued)

Measured concentration (mg/L)	Hepatosomatic Index (%)		Vitellogenin (ng/mg liver)		Secondary sex characteristics	
	male	female	male	female	male	female
Control (<0.0199)	1.93±0.28	3.36±0.42	0.567±0.133	345±152	79.8±4.8	0±0
0.0943	1.79±0.37	2.83±0.87	nd	354±105	72.6±7.0	0±0
0.939	1.89±0.24	3.08±0.68	0.888±0.460	398±230	77.0±19.8	0±0
9.53	1.95±0.55	3.48±0.58	393±306*	449±114	78.8±8.4	0±0

Table 1-D Results (continued)

Measured concentration (mg/L)	Other observations
Control (<0.0199)	Not found
0.0943	Not found
0.939	Not found
9.53	Not found

Note. The test compound was a pale yellow-green to red-yellow crystalline power.

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