

Toxicity Effects of the Environmental Hormone 4-Tert-Octylphenol in Zebrafish (*Danio Rerio*)

Saputra F^{1,2}, Chia-Hung Yen¹, Chi-Ying Hsieh³, Tsung-Yin Ou⁴, Risjani Y², Wee-Keat Cheah⁵ and Shao-Yang Hu^{1*}

¹Department of Biological Science and Technology, National Pingtung University of Science and Technology, Pingtung, Taiwan

²Department of Aquaculture, Faculty of Fisheries and Marine Science, University of Brawijaya, Indonesia

³Department of Environmental Science and Engineering, National Pingtung University of Science and Technology, Pingtung, Taiwan

⁴Department of Industrial Engineering and Management, National Quemoy University, Kinmen, Taiwan

⁵School of Materials and Mineral Resources Engineering, Universiti Sains Malaysia Engineering Campus, 14300 Nibong Tebal, Penang, Malaysia

Abstract

VWHULOLW\ DQG GH₂FLHQF\ RI JRQDG GHYHORSPHQW RI DTXDWLF DQLPDOV E\ GL
 GHYHORSPHQW LV QHFHVVDU\ ,Q WKH SUHVHQW VWXG\]HEUD₂VK HPEU\RV H[SR
 WR[LFLW\ RI W 23 7KH OHWKDO GRVH /' IRU ZLOG W\SH]HEUD₂VK HPEU\RV
 FDUGLRYDVFXODU GHIHFWV PRUH HI₂FLHQWO\ 7J ₂O (*)3]HEUD₂VK HPEU\RV
)ROORZLQJ H[SRVXUH 7J ₂O (*)3]HEUD₂VK HPEU\RV WR W 23 DW —0 IRU
 EORRG FLUFXODWLRQ 7KH P51\$ H[SUHVVLQR OHYHOV RI WUDQVFULSWLRQ IDFWR
 W 23 VLJQL₂FDQWO\ LQGXFH H[\$]HVVLQR OHYHO RI
 Nkx2.7 Hand2 Tbx2a Tbx2b Tbx5a FGF1a GATA-4 -5 -6 LQ]HEUD₂VK 7KH SUHVHQW VW
 VXJJHVVV WKDW W 23 DIIHFWV WKH FDUGLRYDVFXODU GHYHORSPHQW LQ]HEUD

*Corresponding author:

5RDG 1HLSX 3LQJWXQJ 7DLZDQ 7HO J & 2Q\%4%4% C

Citation: 6DSXWUD) <HQ &+ +VLHK &< 2X 7<7R5LVMWQÇIKHFWW DR WKH (QYLURQPHQWDO +RUPR
Danio Rerio GrpControl

rate variability is a representative index for evaluating the function of cardiovascular function. The development of the cardiac circulation in zebra fish is completed by 48 hpf, so the heart rate was examined at 48, 72 and 96 hpf to evaluate the effects of 4-t-OP on cardiac contraction. Although the heart rate of zebra fish at 48, 72 and 96 hpf were decreased than control group following exposure to 4-t-OP at 0.5 μ M, there was no significant statistical difference between control and 4-t-OP treated group; however zebra fish embryos exposed to 1 μ M of 4-t-OP significantly reduced heart rate at 48, 72 and 96 hpf compared to that

Citation: 6DSXWUD) <HQ &+ +VLHK &< 2X 7<7RSLVMDQÇIKHFWW DR WKH (QYLURQPHQWDO +RUPR
Danio Rerio

References

)U\H *)XOJKHUL

\$*

(
) *HQ ÷VK DTXDWLF

DTXDWLF

**

TXDOLW\
ÀRZLQJ
*RQ]DOH]

**

HIÀXHQWV

*RQ]DOH]

)DJEHPLJXQ
PDMRU

) *
*UHDW

]HEUD ~~danio~~ rerio

Oncorhynchus mykiss

]HEUD ÷VK

9D]TXHÞHLM)EGH