Endosulfan-Induced Biomarkers in Japanese Rice Fish (Oryzias latipes) Analyzed by SELDI-TOF-MS

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Abstarc :

The objective of this study was to find and validate estrogen-related biomarkers from plasma proteins in *Oryzias latipes* after exposure to an estrogen disrupting compound, ?-endosulfan. The acute toxicity of ?-endosulfan on *O. latipes* after 96 h of exposure was 13.72, 16.18, and 22.18 ?g L^{-1} for the $LC_{10,}$ LC_{20}, and LC_{50} values, respectively. To confirm estrogenic disturbance by ?-endosulfan, the expression level of vitellogenin in the liver of male fishes was measured at the LC_{10} value, and it was found to be significantly different from the reference group, confirming the estrogenic effect of endosulfan in this concentration range. Proteinchip® array techniques using a weak cation exchange (CM10) and a strong anion exchange proteinchip (Q10) in conjunction with surface-enhanced laser desorption/ionization time of flight mass spectrometry (SELDI-TOF-MS) were used to determine plasma proteins of *O. latipes* differently expressed in response to endosulfan exposure at LC_{10} and LC_{20} concentrations. Analysis of protein profiling of the male fish exposed to ?-endosulfan detected 48 significantly different protein peaks and the proteins at m/z 2819, 8462, 8860, and 9462 were significantly different (p<0.05). The protein peaks at m/z 2819, 8860, and 9462 were up-regulated and the peak at m/z 8462 was down-regulated. Therefore, these four differentially expressed proteins could be used as biomarkers to rapidly determine a possible risk of endosulfan on aquatic ecosystems, although these are not necessarily produced as a result of endocrine disruption.

Key Word :
Oryzias latipes, ?-endosulfan, SELDI-TOF-MS, vitellogenin, biomarkers.