The Study on Screening for Endocrine Disrupting Property of Alkylphenolic Compounds

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Alkylphenols are widely used as plastic additives and surfactants. The estrogenic properties of alkylphenols may lead to spurious results, and may also be potentially harmful to exposed humans and the environment at large. The purposes of our study were to screen and elucidate the endocrine disrupting activity and mechanism of 12-alkylphenols. Among these compounds, p-nitrophenol (Maximal Response, 105.3%) and was the most active in the yeast estrogen transcriptional assay (YES), followed by the 4-tert-octylphenol (MR, 91.3%) and bisphenol A(MR, 88.4%). In yeast progesterone (YPS) and androgen (YAS) transcriptional assay, p-nonylphenol and isocyanic acid- chlorophenol showed a weak response (MR, 4.68% and 3.36%) respectively. In vitro E-screen cell proliferation assay, bisphenol A, 4-tert-octylphenol, and p-nonylphenol showed high estrogenic activity. Their relative proliferation efficiency(RPE) were 110.3, 104.5 and 107.3%, respectively. In vitro estrogen receptor(ER) competitive binding assays, their relative binding affinity is 0.0143, 0.1968, and 0.0739%, respectively. In vivo uterotrophic assay, these three chemicals increase uterus weight in immature rats about 1.4, 2.7 and 1.7-fold compared to control. As a result, 4-tet-octylphenol, p-nonylphenol, and bisphenol A possess strong estrogen activities. And these assessment methods can be useful screening environmental chemicals for endocrine disrupting activity.

[PA4-8] [10/18/2001 (Thr) 14:00 - 17:00 / Hall D]

The estrogenic effects of pyrethroid insecticides using glucose-6-phosphate dehydrogenase in MCF-7 cells and uterine glutathione peroxidase in rats

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The synthetic pyrethroid insecticides are now the most widely used agents for indoor control, providing potential for human exposure. We have shown that the glucose-6-phosphate dehydrogenase (G6PD) in estrogen sensitive human breast cancer cells (MCF-7 cells) and glutathione peroxidase (GPx) in female immature Sprague-Dawley rats could be used as useful screening methods for endocrine disruptors. In this study we have endeavored to screen permethrin, cypermethrin and phthalthrin for estrogenic effects using assays of uterine GPx and G6PD in MCF-7. For GPx assay, 19-day female rats were treated with pyrethroids (permethrin, PM, cypermethrin, CM, phthalthrin, PT, 100, 500 1,000 mg/kg, s.c., 3 days), or 17β-estradiol (0.3 mg/kg, s.c., 3 days) as a positive control. GPx activities in uterine were significantly enhanced at the high doses (1,000 mg/kg) of PM, CM, and PT without increases in uterine weights. Also at dosages of 100 and 500 mg/kg, PM, CM and PT tended to increase GPx activities, while these changes were not statistically significant. These results suggest that permethrin, cypermethrin, and phthalthrin have estrogenic effects and might act as endocrine disruptors. The G6PD assay in MCF-7 is under study.

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Role of a 42 kDa Ca^{2+}-dependent Cytosolic Phospholipase A_2 in RBC Function

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