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Detection of Estrogenic activity of Pyrethroid Insecticides with MCF-7 cells

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Many pesticides have been classified as endocrine disruptors because they possess hormonal like activity. Pyrethroids are extensively used as an insecticide in agriculture and home. Several studies have reported that pyrethroids found to be relatively safe to humans and worldlife. However, epidemiological accounts, clinical reports and other laboratory studies have suggested that pyrethroids exposures are associated with acute or chronic reproductive and developmental impairments. Although the action mechanism of pyrethroids have not been fully established in all cases, the endocrine disrupting effects are associated with estrogen receptor (ER) mediated actions. Thus, the purpose of this study was to investigate the estrogenic activity of pyrethroid compounds using MCF-7 cells (Soto BUS cell) proliferation assay (E-SCREEN). The test compounds included six frequently encountered pyrethroids (cypermethrin, deltamethrin, permethrin, fenvalerate, sumithrin, and tetramethrin). Deltamethrin and tetramethrin did not show any estrogenic effect at all concentrations (from 10^{-11}M to 10^{-5}M). However, fenvalerate and cypermethrin were found to express proliferative activity at relatively lower concentrations. Fenvalerate (10^{-8}M)and cypermethrin (10^{-10}M) have induced 4.2-,and 3.6-fold increases of MCF-7 cell proliferation compared to control, respectively. In addition, permethrin and sumithrin also found to have a weak estrogenic activityat the concentrations of 10^{-6}M and 10^{-10}M, respectively. These results suggest that these pyrethroid compounds also can induce typical estrogenic effects in vivo.

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