

計畫名稱：環境荷爾蒙規劃調查

計畫編號：EPA-91-E3S5-02-01

計畫執行單位：大仁技術學院

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成 果 摘 要

經文獻搜尋,將90類121種疑似環境荷爾蒙物質,依其作用列出清單,其中38類種具有雌激素效應,21類具有雄激素效應,38類有甲狀腺效應,22類具生殖影響,以及3種具神經垂體影響,且部分化合物具有多項系統的影響。此90類化合物中僅20種被公告為列管的毒性化學物質。

依今年度計畫工作目標之要求,建立並技術轉移兩種生物效應檢測技術:一為利用人類乳癌細胞株 MVLN 雌激素專一性轉錄分析法,探討雌激素效應物質之篩選,另一為採用 MCF7-AR1 細胞,探討雄激素效應物質之篩選,並於東港溪流域採集21個樣品進行真實環境樣品之檢測,驗證了此兩種生物分析法應用在環境議題上之可行性。21個樣品中 Nonylphenol 的檢出率達72%,其分布範圍介ND-0.5113mg/l;水樣及底泥樣品 Tributyltin 的檢出率皆為0%;豐水期樣品 Nonylphenol 檢測值略低於枯水期樣品,兩次採樣 Nonylphenol 檢測最大值,都出現在港西抽水站。原水樣雌激素效應分析,依 Soto 分類系統顯示枯水期樣品中屬 partial agonist 的佔66.67%,豐水期則僅11.11%;反觀雄激素效應則21個樣品中,只有一樣品呈 partial agonist,但若經濃縮處理後則雄激素效應明顯上升,因此水體品質之安全性仍需進行較長期之監控。

Through a survey of literatures, it is found that 90 groups of 121 compounds were likely environmental hormone. This study was conducted following the endocrine disrupting effect and produced a list of inventory. In the list, 38 groups had estrogen effect, 21 groups had androgen effect, 38 groups had thyroid effect, 22 groups had reproductive effect, and 3 compounds had neuro gland effect. Some compounds had multi-functional effects. In the inventory, only 20 had been publicly announced to be toxic chemical compounds and therefore to be restricted of their usage.

Based on the requirement of the working goal for this year, this study had established and technically transferred two bioassay methods. One was MVLN estrogen specific transcription assay utilizing human breast cancer cell line to screen estrogen effective compounds. The other adopted MCF-AR1 cell line to investigate compounds that may have androgen effect. Twenty-one environmental real samples were collected along Tung-Kong river and analyzed for both estrogen and androgen effects. The results by these two assays showed that these two bioassays had potential to be applied in analyzing environmental samples. The chemical analysis showed that 72% of the 21 samples had nonylphenol and the levels of concentration were between ND – 0.5113 μ g/L. For both water and sediment samples, tributyltin was not detected. During rich water period the concentrations of nonylphenol were less than those of poor water period. The maximum concentrations happened at Kong-She pumping station for both sampling. According to Soto classification system, the estrogen effect of raw water samples adopted during dry period showed that 66.7% of samples belong to partial agonist, however, during rich water period only 11.1% of samples belong to partial agonist. Nevertheless, the androgen effect of the 21 samples showed that only one was classified as partial agonist. When the samples were concentrated, the ratio of androgen effect had significantly increased, which implicated that the safety of water quality still needs long-term monitoring.

關閉視窗