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"Development on the margin"

# Monitoring of Endocrine Disruptors in Surface Water of Agro-ecosystems in the Mekong Delta, Vietnam

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**Abstract**

Endocrine disruptors (EDs) are pollutant that may be hormonally active at low concentrations and are emerging as a major concern for water quality. Estrogenic EDs (e-EDs) are a subclass of EDs that can negatively affect humans and wildlife. We monitored the e-EDs in a peri-urban and a rural agro-ecosystem in the Mekong-Delta, Vietnam. The activity of e-EDs was analysed by the yeast estrogen screen (YES) assay and reported in terms of estrogenic equivalent activity (EEQ). Except in the canals (range: under the detection limit (ND) to 2.99 ng EEQ/L; median: 0.26 ng EEQ/L), the estrogenic activity in the agricultural fields (range: ND to 3.6 ng EEQ/L; median: 0.3 ng EEQ/L) and the fishponds (range: 0.05 to 2.66 ng EEQ/L; median: 0.69 ng EEQ/L) in Can Tho city (CTC) were significantly higher than those in their respective sampling categories in the more rural Dong Thap province (DTP), an upstream area of CTC. In DTP, the estrogenic activity ranged from ND to 2 ng EEQ/L (median: 0.19 ng EEQ/L) for the canals; 0.02 to 0.58 ng EEQ/L (median: 0.16 ng EEQ/L) for the agricultural fields and ND to 0.75 ng EEQ/L (median: 0.14 ng EEQ/L) for the fishponds. In total, about 14 % (in CTC) and 6 % (in DTP) of the samples exceeded the predicted no effect concentration (PNEC) of 1 ng EEQ/L, indicating a potential estrogenic risk to aquatic fauna in these sampling areas. However, this estrogenic risk is higher (*i.e.* the concentration and the occurrence frequency) at the downstream peri-urban area as compared to that of the upstream and more rural area. The direct discharge of domestic waste including human and animal wastes without properly treatment into surface water could be a major contributor to the observed estrogenic activity in the surface water of the Mekong Delta in Vietnam.

**Keywords:** Agroecosystems, endocrine disruptors, estrogenic activity, Mekong Delta

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