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## A Toxicological Assessment of Endocrine Disrupting Chemicals Found in the BMW (Border, Midland and Western) Region of Ireland

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### ABSTRACT

A battery of tests was established to determine the oestrogenic, mutagenic and genotoxic potential of two categories of endocrine disrupting chemicals (EDCs), phthalates and alkylphenols. Diisononylphthalate (DINP), diethylhexylphthalate (DEHP), dibutylphthalate (DBP), diisododecylphthalate (DIDP) and 4-nonylphenol (4-NP) were oestrogenic in the yeast estrogen screen (YES) assay and potently oestrogenic in the MVLN and E-SCREEN assays at environmentally relevant concentrations. DINP and 4-NP were mutagenic in the Ames assay and also induced significant levels of unscheduled DNA synthesis and DNA strand breakage. Significant induction in the percentage of cells containing micronuclei was observed after treatment with DINP, DEHP and 4-NP. In addition, sewage effluents from sewage treatment plants (STPs) in the Border, Midlands and Western (BMW) region of Ireland were significantly oestrogenic in the YES assay. Moreover, analysis of levels of phthalates and alkylphenol identified in Irish rivers receiving treated effluent showed potent oestrogenicity in the YES assay. The proliferative and genotoxic ability of the phthalates and alkylphenol, and the oestrogenicity of the treated effluents reported here, is significant as these EDCs and EDCs within the effluent may play a role in the etiology of human abnormalities.

### KEYWORDS

Endocrine Disrupting Chemicals (EDCs); Proliferation; Transactivation; Mutagenicity; Genotoxicity; Sewage Treatment Plant (STP); Border, Midlands and Western (BMW) Region of Ireland

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