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Assessment of Estrogenic Activity in Tunisian Water and Wastewater by E-Screen Assay

Atef Limam[†], Terence P.N. Talorete[1,†], Mourad Ben Sik Ali, Mitsuko Kawano[1], Amel Ben Rejeb Jenhani[2], Yukuo Abe[1], Ahmed Ghrabi and Hiroko Isoda[1,*]

Centre of Research and Technologies of Water, BP. 273, 8020 Soliman, Tunisia
[1]Graduate School of Life and Environmental Sciences, University of Tsukuba,
1-1-1 Tennodai, Tsukuba City, Ibaraki 305-8572, Japan
[2]Laboratoire Aquaculture et Milieu, Institut National Agronomique de Tunisie,
43, Avenue Charles Nicolle, 1082 Tunis-Mahrajène, Tunisia

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[*]E-mail: isoda@sakura.cc.tsukuba.ac.jp

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Wastewater and surface water samples from three wastewater treatment plants (WWTPs) and three rivers in Tunisia were assayed for estrogenic activity using the E-screen assay and enzyme-linked immunosorbent assay (ELISA). Results showed that all the Tunisian raw wastewater samples as well as the Roriche river water sample induced a strong proliferative response in human MCF-7 breast cancer cells. Tunisian raw wastewater had an average 17β-estradiol content of 2,705.4 pg/ml, whereas that of the Roriche river was 36.7 pg/ml, which is sufficient for inducing endocrine-mediated responses in aquatic organisms. Results further showed that the Mornag WWTP, which uses the activated-sludge treatment system, has a higher estrogen removal efficiency than the stabilization ponds of the Gammart and pilot WWTPs. This study, which is the first of such studies in Tunisia, and probably the first in the North African region, underscores the need to detect and monitor the estrogenic activity of water and wastewater, given the scarcity of water in Tunisia and the detrimental impact of endocrine-disrupting compounds on the physiology of both animals and humans.

[†]Both authors contributed equally to this study.