

In vitro screening for endocrine disruptive activity in selected South African harbours and river mouths

JC Truter^{1*}, JH van Wyk¹ and BK Newman²

¹ *Department of Botany and Zoology, Stellenbosch University, Stellenbosch, South Africa*

² *Coastal Systems Research Group, Natural Resources and the Environment, CSIR, Durban, South Africa*

** Corresponding author, e-mail: truter.christoff@gmail.com*

Abstract

Various waterborne anthropogenic contaminants disrupt the endocrine systems of wildlife and humans, targeting reproductive pathways, among others. Very little is known, however, regarding the occurrence of endocrine disruptive activity in South African freshwater ecosystems, and coastal ecosystems have not been studied in this regard. In a first attempt to investigate endocrine disruptive activity in South African coastal waters, surface water samples collected from harbours, river mouths and estuaries in three metropolitan municipalities, eThekweni (which includes Durban), Nelson Mandela (specifically Port Elizabeth Harbour) and City of Cape Town, were screened for (anti) oestrogenicity and (anti)androgenicity using recombinant yeast bioassays. Moreover, levels of the female hormone 17 β -(o)estradiol (E2) were determined in all samples, as well as a selection of hydrocarbons in the eThekweni samples. A high proportion of samples collected from eThekweni were oestrogenic, whereas none from Port Elizabeth Harbour and only a single river mouth sampled in the City of Cape Town were oestrogenic. E2 was detected in all the samples tested, but at higher concentrations at the eThekweni and City of Cape Town localities than Port Elizabeth Harbour. In addition, the recombinant yeast assays revealed that anti-androgenicity was widespread, being detected in the majority of samples screened apart from those representing Port Elizabeth Harbour. Conversely, no anti-oestrogenic or androgenic activity was detected. Anti-androgenicity did not associate with hydrocarbon loads, providing evidence that other anti-androgens were responsible for the observed activity. The present data suggest potential reproductive disruption in marine and estuarine fauna inhabiting the eThekweni and City of Cape Town regions.