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Endocrine disrupting chemicals removal in an aerobic granular sludge reactor treating simulated saline wastewater

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Abstract

The occurrence of Endocrine disrupting chemicals (EDCs) in the environment is a topic of concern. It is commonly accepted that the major source of EDCs to the environment is wastewater treatment plants effluents. Salinity is an additional common stress factor in wastewater treatment. Aerobic granular sludge (AGS) has a number of properties that make it more attractive than conventional biological systems for treatment of wastewater containing EDCs. In the present study, an AGS sequencing batch reactor adapted to salinity was operated for 140 days for treating synthetic saline wastewater containing 17 β -estradiol (E2), 17 α -ethinylestradiol (EE2) and bisphenol-A (BPA). E2 was removed by biodegradation. EE2 adsorption/desorption to the aerobic granules was observed. The increasing of BPA removal efficiency after bioaugmentation with a degrading bacterial strain shows that biodegradation was the removal mechanism. COD removal was not significantly affected by EDCs shock loads. Activity of ammonia oxidizing bacteria and nitrite oxidizing bacteria did not seem to be inhibited by the presence of EDCs. The activity of phosphate accumulating organisms was affected.

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Keywords

Aerobic granular sludge; Endocrine disrupting chemicals; saline wastewater; bioaugmentation; bioreactor performance.

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