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NUTRIENT REMOVAL IN AN AEROBIC GRANULAR SLUDGE SYSTEM FACING EVENTS OF SALTWATER INTRUSION

Environmental and industrial biotechnology (Bioenergy, bioremediation)

PO - (750) - NUTRIENT REMOVAL IN AN AEROBIC GRANULAR SLUDGE SYSTEM FACING EVENTS OF SALTWATER INTRUSION

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Body

The presence of saltwater in wastewater treatment plants (WWTP) can have diverse origins, for instance from the discharge of industrial saline effluents or the saltwater use for toilet flushing. However, in coastal regions, especially during high tide level, saltwater intrusion occurs changing the wastewater composition, posing a challenge for the nearby WWTPs. The impact of the variable salinity levels of the wastewater over a day can affect the biological removal processes, a topic scarcely studied for granular systems.

Aerobic granular sludge (AGS) is one of the most promising biotechnologies for wastewater treatment, mainly due to AGS extraordinary properties, such as the simultaneous nutrient removal capability, good settling properties, and the simplicity of operation.

In this study, the nutrients removal performance of an AGS system treating domestic wastewater with variable saltwater concentrations was evaluated. First, the reactor was operated for 4 months stepwise increasing the saltwater concentration (up to 15 g L^{-1}). Then, the saltwater concentration of the wastewater was variable during each day, fluctuating from basal (7.5 g L^{-1}) to maximum salinity (22.5 g L^{-1}) levels to mimic flood tide events.

During the first stage of operation, the AGS capacity for carbon, ammonium and phosphate removal increased over time, with most of the carbon and nutrients being removed. In the second stage, the saltwater daily intrusion variation due to tidal cycles did not affect neither the granular structure nor the reactor removal performance, as the granulation processes continued to occur and the biomass was able to efficiently treat the wastewater.

The AGS system capacity to deal with saltwater intrusion during high tides showed that this technology is promising to use by utilities situated along the coast with saltwater intrusion events.

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References

Image Legends

Palavras-chave : Tidal cycles, Saltwater intrusion, Granular sludge technology, Wastewater treatment