

Dissolved Organic Nitrogen in Antibiotic Production Wastewater Treatment Plant Effluents

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Abstract : Wastewaters from antibiotic production facilities are characterized with high concentrations of dissolved organic substances. Subsequently, it challenges wastewater treatment plant operator to achieve successful biological treatment and to meet regulatory emission levels. Of the dissolved organic substances, this research is investigating the fate of organic nitrogenous compounds (i.e., Chitin) in an antibiotic production wastewater treatment plant located in Irvine, Scotland and its impact on the WWTP removal performance. Dissolved organic nitrogen (DON) in WWTP effluents are of significance because 1) its potential to cause eutrophication in receiving waters, 2) the formation of nitrogenous disinfection by products in drinking waters and 3) limits WWTPs ability to achieve very low total nitrogen (TN) emissions limits (5 - 25 mg/l). The latter point is where the knowledge gap lays between the operator and the regulator in setting viable TN emission levels. The samples collected from Irvine site at the different stages of the treatment were analyzed for TN and DON. Results showed that the average TN in the WWTP influents and effluents are 798 and 261 mg/l respectively, in other words, the plant achieved 67 % removal of TN. DON Represented 51% of the influents TN, while the effluents accounted 26 % of the TN concentrations. Therefore, an ongoing investigation is carried out to identify DON constituents in WWTP effluent and evaluate its impact on the WWTP performance and its potential bioavailability for algae in receiving waters, which is, in this case, Irvine Bay.

Keywords : biological wastewater treatment plant, dissolved organic nitrogen, bio-availability, Irvine Bay

Conference Title : ICWWTP 2017 : International Conference on Water and Wastewater Treatment Plants

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2017