Desalination and Water Treatment
www.deswater.com
22 (2010) 292–298
October
1944-3994 / 1944-3986 © 2010 Desalination Publications. All rights reserved.
doi: 10/5004/dwt.2010.2150

Importance of EBPR efficiency on energy demand of full-scale wastewater treatment plants

Tolga Tunçal[a]*, Faruk İşgenç[b], Ayşegül Pala[c]

[a]*Namık Kemal University, Çorlu Engineering Faculty, Environmental Engineering Department, 59860, Çorlu, Tekirdağ, Turkey*
Tel. +90 (282) 652 94 75; Fax +90 (282) 652 93 72; email: ttuncal@nku.edu.tr
[b]*Izmir Metropolitan Municipality, İzmir Water & Sewerage Administration, Wastewater Treatment Office, Turkey*
[c]*Environmental Engineering Department, Engineering Faculty, Dokuz Eylül University, 35160, Turkey*

Received 22 December 2009; Accepted 2 June 2010

ABSTRACT

Enhanced biological phosphorus removal processes (EBPR) are one of the most popular methods in nutrient control. Energy demand of wastewater treatment plants (WWTPs) is also very critical actual concern. In this study, relationship between fundamental characteristics of EBPR and energy demand was investigated in a large scale WWTP. Freshly collected wastewater and activated sludge samples were used in all experiments to obtain accurate results. Effect of both temperature and salinity on air demand in biological stages, which has the most significant impact on energy demand, were also considered in modeling efforts to obtain comparable results. Interactions between energy and soluble carbonaceous biochemical oxygen demand ($sBOD_5$) removed by denitrifi es in anaerobic and anoxic zones; acetate uptake rate were evaluated statistically using linear regression model. Effect of salinity on effl uent PO_4-P concentration and energy demand were also investigated by field-based measurements and obtained results evaluated statistically. ANOVA tests were also applied to assess acceptability of models from a statistical perspective. Obtained results indicated that EBPR processes would provide significant amount of energy savings in addition to adequate treatment efficiency.

Keywords: EBPR; Energy recovery; $sBOD_5$; Electron acceptor; Acetate uptake; Salinity

* Corresponding author.