ABSTRACT

ANALYSIS OF EFFECTIVENESS OF WASTEWATER TREATMENT PLANT (WWTP) ON COD PARAMETERS AT PT.XYZ SUGAR INDUSTRY WITH A PRODUCTION CAPACITY OF 16,000 TCD

By

DESY NUR MAYA

This study aimed to determine the effect of total sugarcane processed on the COD levels of wastewater from the industrial wastewater treatment plant (WWTP) and to analyze the effectiveness of the WWTP at a sugar industry with a capacity of 16,000 TCD (tons of sugarcane per day) on the COD parameter during the period of April to October 2024. The data on the effect of total sugarcane processed on the COD levels of the WWTP wastewater were analyzed for homogeneity of variance using the Kolmogorov-Smirnov test. Subsequently, the data were analyzed using the Pearson Product Moment Correlation method and further tested at a 5% significance level. Then, simple linear regression analysis was performed. The test results showed that the correlation between total sugarcane processed and COD levels in the WWTP wastewater was -0.192, indicating a negative, very weak, and statistically insignificant relationship. The total sugarcane processed contributed 3.69% to the variation in COD levels of the WWTP wastewater. The effectiveness of COD reduction in the WWTP was calculated using the general formula from Metcalf and Eddy (2003). The weekly effectiveness values of the WWTP in reducing COD levels from April to October 2024 were consecutively 94.19%, 98.05%, 97.98%, 98.24%, 95.18%, 96.69%, 95.51%, 97.42%, 96.69%, 93.43%, 95.86%, 95.48%, 96.83%, 96.80%, 95.52%, 98.96%, 98.47%, 99.26%, 99.09%, 98.54%, 97.5%, 98.92%, and 98.1%. The average effectiveness value of the WWTP from April to October 2024 was 97.16%, indicating that the reduction of COD levels in the WWTP wastewater had been carried out effectively and efficiently.

Keywords: Effectiveness, WWTP, Sugar Industry, COD, Total Milled Sugarcane

ABSTRAK

ANALISIS EFEKTIVITAS INSTALASI PENGOLAHAN AIR LIMBAH (IPAL) PADA PARAMETER COD DI INDUSTRI GULA PT.XYZ DENGAN KAPASITAS PRODUKSI 16.000 TCD

Oleh

DESY NUR MAYA

Penelitian ini bertujuan untuk mengetahui pengaruh total tebu giling terhadap kadar COD air limbah IPAL yang dihasilkan dan menganalisis efektivitas instalasi pengolahan air limbah di industri gula dengan kapasitas 16.000 TCD (ton tebu per hari) pada parameter COD dalam kurun waktu April-Oktober 2024. Data pengujian pengaruh total tebu giling terhadap kadar COD air limbah IPAL dianalisis kesamaan ragamnya dengan uji Kolmogorov-Smirnov. Selanjutnya data dianalisis korelasi dengan metode Korelasi Pearson dan diuji lanjut pada taraf signifikansi 5%. Selanjutnya data dianalisis regresi linier sederhana. Hasil pengujian menunjukan bahwa korelasi total tebu giling terhadap kadar COD air limbah IPAL adalah -0.192 dengan hubungan negatif, kekuatan sangat lemah dan tidak signifikan secara statistik. Total tebu giling berpengaruh sebesar 3,69% terhadap variasi kadar COD air limbah IPAL. Efektivitas penurunan kadar COD air limbah IPAL dihitung dengan rumus umum dari Metcalf dan Eddy, 2003. Hasil pengujian nilai efektivitas IPAL dalam menurunkan kadar COD pada kurun waktu April - Oktober 2024 yang dihitung efektivitasnya per minggu secara berturut-turut adalah 94,19%, 98,05%,97,98%, 98,24%, 95,18%, 96,69%, 95,51%, 97,42%, 96,69%, 93,43%, 95,86%, 95,48%, 96,83% 96,80%, 95,52%, 98,96%, 98,47%, 99,26%, 99,09%,98,54%, 97, 5%, 98,92% dan 98,1%. Nilai rata rata efektivitas IPAL dari April-Oktober 2024 adalah 97,16% yang menunjukan bahwa penurunan kadar COD air limbah IPAL sudah berjalan efektif dan efisien.

Kata kunci: Efektivitas, IPAL, Industri Gula, COD, Total tebu giling