

Pengaruh ZnO sebagai fotokatalisator pada penguraian limbah cair industri farmasi : studi kasus : PT Kimia Farma Pulo Gadung Jakarta Timur = Effect of ZnO as photocatalyst to pharmaceutical industry waste water decomposition : case study PT Kimia Farma Pulo Gadung East Jakarta / Puspa

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Abstrak

[Instalasi Pengolahan Air Limbah (IPAL) di PT. Kimia Farma telah melakukan pengolahan awal untuk air limbah produksi diantaranya adalah pengolahan air limbah ARV, Betalaktam, dan Rifampicin. Penelitian ini bertujuan untuk mengolah air limbah farmasi dengan cara yang mudah dan efisien dengan melakukan percobaan terhadap air limbah produksi ARV. Air limbah produksi ARV ini memiliki debit 11 m³/hari dengan kualitas influen BOD : 87,35 ppm, COD : 231,7 ppm, TSS : 71 ppm, dan pH 6,9. Dengan melakukan penelitian eksperimental untuk skala laboratorium, maka dilakukan percobaan fotolitik sebagai pengolahan yang efektif. Proses ini dilakukan dengan menyinari sampel air limbah produksi ARV yang telah ditambahkan katalis ZnO dengan lampu UV. Dengan dosis penambahan ZnO pada waktu kontak jam ke-5. dosis 0,09 g/l mengalami removal 29,98 %, pada dosis 0,1 g/liter mengalami removal 45%, dan pada dosis 0,11 g/liter mengalami removal 33,48 %. Dari dosis 0,1 g/l didapatkan persamaan terbaik yaitu $y = -0,108 x$, dimana y adalah $\ln C/C_0$ dan x adalah waktu kontak. Pada desain perencanaan, air limbah yang didapat merupakan gabungan limbah ARV, limbah Betalaktam, dan limbah Non-Betalaktam yang memiliki debit 119,4 m³/hari dengan kualitas influen BOD : 454,6 ppm, COD : 708,33 ppm, TSS : 175,06 ppm, dan pH 5,37. Dari perencanaan removal COD harus mencapai 85,88 % agar kualitas efluen sesuai dengan baku mutu lingkungan (Keputusan Menteri Negara Lingkungan Hidup No 51 Tahun 1999). Sehingga diperlukan waktu kontak 24 jam dengan dosis 0,1 g/l dengan proses injeksi katalis. Bak pengolahan yang digunakan memiliki ukuran dengan panjang 10 meter, lebar 5 meter dan kedalaman 3 meter.;

Waste Water Treatment Plant (WWTP) at PT. Kimia Farma has conducted initial treatment for waste water production include waste water treatment of ARV, Betalaktam, and Rifampicin. This research aims to treat pharmaceutical wastewater easily and efficiently with object of experiments is ARV production wastewater. Wastewater discharge production of ARVs has 11 m³/day with the quality of influent BOD: 87,35 ppm, COD: 231,7 ppm, TSS: 71 ppm, and a pH of 6,9. By doing experimental research on a laboratory scale, the photolytic processing performed as an effective treatment. This process is carried out by irradiating the sample (ARV production wastewater) by UV rays which have been previously added ZnO catalyst. With the addition of ZnO dosage, at fifth hour contact time, a dose of 0,09 g/l removed 29,98% of COD, at a dose of 0,1 g/l removed 45% of COD, and at a dose of 0,11 g/l removed 33,48% of COD. At dose of 0,1 g/l, had been gotten best equation $y = -0,108 x$, where y is $\ln C/C_0$ and x is the contact time. In the design planning, waste water obtained is a combination ARV waste, Betalaktam, and Non-Betalaktam discharge that has 119,4 m³/day with the quality of the influent BOD: 454,6 ppm, COD: 708,33 ppm, TSS: 175,06 ppm, and a pH of 5,37. In the planning, COD removal should reach 85,88% for the quality of the effluent in accordance with environmental quality standards (Keputusan Menteri Negara Lingkungan Hidup No 51 Tahun 1999). So, we need 24 hours of contact time with a dose of 0.1 g/l. Treatment batch used has a size with a length of

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