

# Aplikasi teknologi ozonasi katalitik menggunakan granular activated carbon (GAC) dalam pengolahan limbah cair rumah sakit = The application of catalytic ozonation technology using granular activated carbon (GAC) for hospital wastewater treatment

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## Abstrak

Penelitian ini bertujuan untuk mengetahui efisiensi aplikasi teknologi ozonasi katalitik menggunakan Granular Activated Carbon (GAC) pada penyisihan COD, NH<sub>3</sub>, Coliform dan senyawa antibiotik (turunan fenol) dalam limbah cair rumah sakit. Limbah cair yang digunakan berasal dari limbah cair Rumah Sakit Bumi Waras yang belum memasuki instalasi pengolahan air limbah (IPAL).

Variabel kondisi operasi yang divariasikan pada proses penyisihan senyawa antibiotik (turunan fenol), COD, NH<sub>3</sub>, dan Coliform dalam limbah cair menggunakan teknologi ozonasi katalitik adalah konfigurasi sistem pengolahan limbah (Ozon, Ozon/UV, Ozon/GAC, Ozon/UV/GAC) dan waktu penyisihan (0, 15, 30, 45, 60, 120 menit). Analisis yang digunakan meliputi metode 4-Aminoantipirin untuk senyawa antibiotik (turunan fenol), metode Refluks tertutup untuk COD, metode Nessler untuk NH<sub>3</sub>, dan metode Total plate count untuk Coliform.

Setelah dilakukan penelitian, diketahui bahwa konfigurasi Ozon/UV merupakan konfigurasi yang paling tepat digunakan untuk Instalasi Pengolahan Air Limbah (IPAL) di Rumah Sakit Bumi Waras, Bandar Lampung. Konfigurasi Ozon/UV secara signifikan mampu menyisihkan kandungan antibiotik (turunan fenol) 64%, COD 60%, NH<sub>3</sub> 10,71%, Coliform total 98,89%, dan E.Coli 100%.

The present study was aimed at determining the efficiency of catalytic ozone technology applications using Granular Activated Carbon (GAC) on the removal of COD, NH<sub>3</sub>, Coliform and antibiotic compounds (phenol derivatives) in the treated wastewater. The liquid waste was derived from wastewater of Bumi Waras Hospital that had not entered yet to wastewater treatment plant (WWTP).

Operating conditions variable that varied in Coliform the process of removal antibiotic compounds (phenol derivatives), COD, NH<sub>3</sub>, and in wastewater using catalytic ozone technology is the configuration of wastewater treatment system (Ozone, Ozone/UV, Ozone/GAC, Ozone/UV/GAC) and time of removal process (0, 15.30, 45, 60, 120 minutes).

The results were analyzed with comprising of antibiotic compounds (phenol derivatives) by 4-Aminoantipyrine method, COD by Closed reflux method, NH<sub>3</sub>-N by Nessler method, and Coliform by Total plate count. The result of study shown that the configuration of Ozone/ UV was the most appropriate configuration for Waste Water Treatment Plant (WWTP) at Bumi Waras Hospital, Bandar Lampung. Configuration Ozone/ UV was significantly capable of removing antibiotic content (phenol derivatives), COD, NH<sub>3</sub>, Coliform total, and E.coli by 64%, 60%, 10.71%, 98.89%, and 100%, respectively.