ABSTRAK

Ayang Andika Yashoda
PERBEDAAN VARIASI WAKTU AERASI DAN ADSORPSI KARBON AKTIF UNTUK MENURUNKAN KADAR AMONIA PADA AIR LIMBAH RSUD DR. SAYIDIMAN KABUPATEN MAGETAN TAHUN 2024
xvi + 62 Halaman + 16 Tabel + 6 Lampiran

Amonia yang terdapat dalam limbah cair yang ada di rumah sakit berasal dari proses dekomposisi asam amino oleh berbagai jenis bakteri, baik aerob maupun anaerob. Sumber utama amonia ini berasal dari area laundry, ruang operasi, kamar mandi, tempat pencucian alat laboratorium, dan dapur. Hasil pemeriksaan kadar amonia pada outlet IPAL RSUD dr. Sayidiman ditemukan kadar sebanyak 0,959 mg/l, yang melebihi ambang batas yang ditetapkan dalam Pergub Jawa Timur No. 72 Tahun 2013, yaitu sebesar 0,1 mg/l. Penelitian ini bertujuan untuk mengetahui perbedaan penurunan amonia dengan variasi waktu aerasi dan adsorpsi karbon aktif.

Penelitian ini merupakan eksperimen semu (quasi experiment) dengan desain pretest-posttest, menggunakan perlakuan 7 jam aerasi dan gabungan antara aerasi 7 jam serta adsorpsi karbon aktif 1 jam. Populasi dalam penelitian ini seluruh air limbah buangan RSUD dr. Sayidiman. Teknik pengambilan sampel air limbah menggunakan *Composite Sampling*. Data yang diperoleh dianalisis menggunakan uji Kruskal Wallis.

Hasil dari penelitian menunjukkan bahwa rata-rata kadar amonia sebelum perlakuan 0,689 mg/l, sesudah aerasi 7 jam 0,496 mg/l dan gabungan aerasi 7 jam serta adsorpsi karbon aktif 1 jam 0,228 mg/l. Hasil uji Kruskal Wallis diperoleh p-value 0,000 lebih kecil dari pada α 0,05 maka terdapat perbedaan variasi waktu aerasi serta aerasi dan adsorpsi karbon aktif dalam menurunkan kadar amonia. Disarankan melakukan pengurasan IPAL dan menambah waktu pengolahan yang lebih lama pada proses aerasi dan adsorpsi karbon aktif.

Kata Kunci : Amonia, Air Limbah, Aerasi, Adsorpsi Karbon Aktif.

ABSTRACT

Ayang Andika Yashoda
THE DIFFERENCE IN AERATION TIME VARIATIONS AND ACTIVATED CARBON ADSORPTION TO REDUCE AMMONIA LEVELS IN WASTEWATER OF RSUD DR. SAYIDIMAN, MAGETAN REGENCY, 2024
xvi + 62 Pages + 16 Tables + 6 Appendices

Ammonia found in hospital wastewater results from the decomposition of amino acids by various types of bacteria, both aerobic and anaerobic. The main sources of ammonia include laundry areas, operating rooms, bathrooms, laboratory equipment washing stations, and kitchens. An examination of ammonia levels at the wastewater treatment plant (WWTP) outlet of RSUD dr. Sayidiman revealed a concentration of 0.959 mg/l, which exceeds the quality standard limit set by East Java Governor Regulation No. 72 of 2013, which is 0.1 mg/l. This study aims to determine the differences in ammonia reduction using variations in aeration time and activated carbon adsorption.

This research is a quasi-experimental study using a pretest-posttest design. The treatments involved 7 hours of aeration and a combination of 7 hours of aeration followed by 1 hour of activated carbon adsorption. The population in this study includes all wastewater discharged from RSUD dr. Sayidiman. Wastewater sampling was conducted using the composite sampling technique. The collected data were analyzed using the Kruskal-Wallis test.

The results showed that the average ammonia concentration before treatment was 0.689 mg/l, after 7 hours of aeration it decreased to 0.496 mg/l, and further reduced to 0.228 mg/l following the combined treatment of aeration and activated carbon adsorption. The Kruskal-Wallis test yielded a p-value of 0.000, which is less than α 0.05, indicating a significant difference in the effectiveness of aeration time variation and the combination of aeration and activated carbon adsorption in reducing ammonia levels. It is recommended to regularly drain the WWTP and extend the treatment duration for both the aeration and activated carbon adsorption processes to improve efficiency.

Keywords: Ammonia, Wastewater, Aeration, Activated Carbon Adsorption