

Evaluasi unit dan proses penghilangan amonia secara biologis (moving bed biofilm reactor) skala plant pada instalasi pengolahan air minum: studi kasus: IPA 3 PT. XYZ, Kota Jakarta = Unit and process evaluation of biological ammonia removal (moving bed biofilm reactor) at water treatment plant: case study: IPA 3 PT. XYZ, Kota Jakarta

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Abstrak

Pencemaran air limbah domestik telah menyebabkan kontaminasi terhadap air Sungai Krukut. Tingginya pencemaran air Sungai Krukut berupa Amonia (0.36 – 3.9 mg/L) TSS (123.4 – 172 mg/L), dan COD (20.5 – 27.2 mg/L) telah melampaui syarat mutu Kelas I air baku air minum berdasarkan PP No. 82 Tahun 2001. Oleh karenanya, diterapkan pengolahan biologis *Moving Bed Biofilm Reactor* sebagai *pre-treatment* IPAM karena sifat ramah lingkungan dan kemampuan mereduksi beban pencemar organik dengan baik. Untuk mereduksi beban organik tersebut, dilakukan pendekatan skala plant. Pembubuhan bahan kimia (pH Adjuster) diyakini dapat memberikan pengaruh signifikan terhadap kinerja MBBR lewat nutrient yang dikandungnya. Penelitian ditinjau dengan dua tipe pembubuhan bahan kimia yaitu *Soda Ash* dan *Lime Milk*. Didapatkan bahwa removal tertinggi terjadi dengan pembubuhan *Lime Milk* dengan kemampuan reduksi 41.9±0,14% Amonia; 78.3±0.03% TSS; dan 22.2 ±0,04% COD. Karena terbatasnya HRT, rata-rata konsentrasi efluen Amonia dan COD tidak memenuhi baku mutu sehingga perlu adanya modifikasi proses.

.....The domestic wastewater has caused contamination into Krukut River water. High contamination of Krukut River such as Ammonia (0.36 – 3.9 mg/L) TSS (123.4 – 172 mg/L), and COD (20.5 – 27.2 mg/L) has exceeded the standard of Class I Raw Water for Drinking Water based on Government Regulation Number 82 Year 2001. Therefore, the biological treatment using Moving Bed Biofilm Reactor has applied for Drinking Water Treatment Plant processing due to its environmental friendly property and its ability to reduce the organic pollutant really well. To see the implementation of organic load reduction, a plant-scale approach is carried out. Affixing chemicals (pH Adjuster) is believed to have a significant influence on the performance of MBBR through the nutrients they contain. The research was reviewed with two types specifically Soda Ash and Lime Milk. It was found that the highest removal efficiency occurred at Lime Milk pH Adjuster with the reduction capability of 41.9±0,14% Ammonia; 78.3±0.03% TSS; dan 22.2 ±0,04% COD. Because of the limited HRT, the average concentration of Ammonia effluent and COD does not meet the quality standard so there is a need for process modification.