

ABSTRAK

MUHAMMAD RAMADHANI TANJUNG. Unjuk Kerja Reaktor *Continuous Wetland* Menggunakan Tanaman Vetiver (*Vetiveria zizanioides*) dan Bakteri Untuk Mendegradasi Kandungan Besi (Fe), Timbal (Pb), Dan *Total Suspended Solid* (TSS) dari Limbah Minyak Industri X di Yogyakarta. Dibimbing oleh JONI ALDILLA FAJRI dan DEWI WULANDARI.

Kegiatan pencucian dan perawatan di bengkel kereta api hampir selalu menghasilkan air limbah berupa limbah minyak yang mengandung pencemar seperti logam berat dan *Total Suspended Solid* (TSS) sehingga sulit diolah apabila hanya menggunakan pengolahan biasa. Maka dari itu diperlukan pengolahan khusus untuk air limbah yang terkontaminasi oleh logam berat yaitu menggunakan metode *Continuous Wetlands* menggunakan rumput vetiver (*Vetiveria zizanioides*) dan bakteri. Tujuan dari penelitian ini adalah untuk mengetahui kinerja reaktor *Continuous Wetlands* dengan kombinasi *Floating Wetlands* dan *Constructed Wetlands* menggunakan rumput vetiver (*Vetiveria zizanioides*) dan bakteri dalam mengurangi kadar Besi (Fe), Timbal (Pb), dan *Total Suspended Solid* (TSS) pada air limbah industri X di Yogyakarta. Air limbah dimasukkan kedalam reaktor dan ditambahkan bakteri. Selanjutnya *styrofoam* berbentuk pipih dilubangi sebanyak 6 lubang dan setiap lubangnya diisi dengan 2 buah tanaman vetiver yang dimasukkan ke dalam gelas plastik berisikan ijuk, kerikil, pasir, dan tanah yang kemudian diletakkan terapung pada permukaan sampel air limbah dengan posisi akar berada di bawah permukaan air untuk dikontakkan selama 30 hari di tempat yang terkena sinar matahari. Selanjutnya dilakukan pemantauan pada hari ke-0, 6, 11, 16, 21, dan 26 untuk mengetahui konsentrasi logam berat dan kadar *Total Suspended Solid* (TSS) pada air limbah. Hasil menunjukkan penggunaan tanaman vetiver (*Vetiveria zizanioides*) dan bakteri mampu menurunkan kadar Besi (Fe) sebesar 69-93%, Timbal (Pb) sebesar 67-76%, dan konsentrasi *Total Suspended Solid* (TSS) sebesar 93-96%.

Kata Kunci: Air Limbah, *Continuous Wetlands*, *Constructed Wetland*, *Floating Wetlands*, *Vetiveria zizanioides*

ABSTRACT

MUHAMMAD RAMADHANI TANJUNG. *Performance of Continuous Wetland Reactor using Vetiver Plants (Vetiveria zizanioides) and Bacteria to Degrade Iron (Fe), Lead (Pb), and Total Suspended Solid (TSS) from Industrial X Oil Waste in Yogyakarta. Supervised by JONI ALDILLA FAJRI and DEWI WULANDARI.*

Maintenance and another activities in railway workshop frequently produce wastewater that contained pollutants such as heavy metal and Total Suspended Solid (TSS) which complicated to treat if only using ordinary treatment. Therefore, specific treatment is needed to treat wastewater contaminated by heavy metals using Continuous Wetlands method with vetiver grass (Vetiveria zizanioides) and bacteria. The purpose of this research is to find out the performance of Continuous Wetlands reactors with a combination of Floating Wetlands and Constructed Wetlands using vetiver grass (Vetiveria zizanioides) and bacteria to reduce Iron (Fe), Lead (Pb), and Total Suspended Solid (TSS) contents in X industrial wastewater in Yogyakarta. Wastewater is filled into the reactors and bacteria is added to reactors too. Furthermore, flat-shaped styrofoam is perforated with 6 holes and each hole is filled with 2 vetiver grass which planted into plastic cups containing coconut fiber, gravel, sand, and soil then floated on the surface of wastewater sample with root is below the wastewater surface to be contacted for 30 days in a place with well sunlight exposure. After that sampling was carried out on days 0, 6, 11, 16, 21 and 26 to monitor as well as heavy metal concentrations and Total Suspended Solid (TSS) in wastewater. The results showed the using of vetiver grass (Vetiveria zizanioides) and bacteria are able to reduce heavy metals content of Iron (Fe) up to 69-93%, Lead (Pb) 67-76%, and Total Suspended Solid (TSS) 93-96%.

Keywords: *Continuous Wetlands, Constructed Wetland, Floating Wetlands, Vetiveria zizanioides, Wastewater*