FITOREMEDIASI LOGAM BESI (Fe) DAN MANGAN (Mn) PADA AIR LIMBAH PENGOLAHAN EMAS PERTAMBANGAN RAKYAT DENGAN GENJER (*Limnocharis flava*) DI DESA PANCURENDANG, KECAMATAN AJIBARANG, KABUPATEN BANYUMAS, JAWA TENGAH

Oleh : Firstananda Yustika
114170057/TL

INTISARI

Pertambangan emas di Desa Pancurendang, Kecamatan Ajibarang, Kabupaten Banyumas, Provinsi Jawa Tengah termasuk ke dalam pertambangan emas rakyat. Pertambangan emas rakyat secara tradisional dapat menyebabkan dampak negatif yaitu terjadinya pencemaran bagi lingkungan hidup di sekitar area pertambangan karena dalam proses pengolahannya masih menghasilkan air limbah. Air Limbah pengolahan emas di Desa Pancurendang mengandung pengotor berupa logam Besi (Fe) dan Mangan (Mn) dengan kandungan melebihi baku mutu yang telah ditetapkan pada Peraturan Daerah Jawa Tengah No. 5 Tahun 2012. Oleh karena itu, penelitian ini bertujuan untuk menganalisis kualitas air limbah kegiatan pengolahan emas pertambangan rakyat, airtanah dan air Sungai Tajur di lokasi penelitian, menganalisis efektivitas fitoremediasi tanaman genjer (*Limnocharis flava*) dalam menurunkan kandungan Besi (Fe) dan Mangan (Mn), dan membuat desain pengolahan air limbah kegiatan pengolahan emas di lokasi penelitian.

Metode yang digunakan dalam penelitian ini menggunakan metode survey dan pemetaan, rancangan percobaan, uji laboratorium, analisis deskriptif dan matematis. Pengambilan sampel air limbah dilakukan di 3 lokasi pengolahan emas, sampel air Sungai Tajur pada titik sebelum pembuangan, titik pembuangan dan setelah titik pembuangan air limbah serta pengambilan sampel airtanah dilakukan di sumur warga. Selanjutnya dilakukan pengolahan menggunakan fitoremediasi sistem *batch*. Percobaan fitoremediasi menggunakan skala laboratorium dengan 3 variasi media yaitu 100% air limbah dengan netralisasi, air limbah dengan netralisasi 5 hari dan 100% air limbah tanpa netralisasi. Netralisasi dilakukan dengan menambahkan batang pisang (*Musa paradisiaca*). Sehingga perlu adanya parameter pendukung pH, DO, BOD, dan COD dalam penelitian ini. Fitoremediasi dilakukan selama 8 hari.

Hasil uji laboratorium air limbah sebelum dilakukan fitoremediasi menunjukkan kandungan Besi (Fe) sebesar 866,7 mg/L dan Mangan (Mn) sebesar 206,83 mg/L. Uji coba fitoremediasi memiliki penyerapan logam Besi (Fe) paling efektif pada sampel tanpa netralisasi dengan nilai efektivitas 99,168%, sedangkan penyerapan logam Mangan (Mn) yang paling efektif pada sampel netralisasi 5 hari dengan nilai efektivitas 68,24%.

Kata Kunci : Air Limbah, Pertambangan Emas, Fitoremediasi, Besi (Fe), Mangan (Mn)

PHYTOREMEDIATION OF IRON (Fe) AND MANGANESE (Mn) METALS IN SMALLHOLDER GOLD MINING WASTEWATER WITH GENJER (LIMNOCHARIS FLAVA) IN PANCURENDANG VILLAGE, AJIBARANG DISTRICT, BANYUMAS REGENCY, CENTRAL JAVA

***By* : Firstananda Yustika**
114170057/TL

ABSTRACT

Gold mining in Pancurendang Village, Ajibarang District, Banyumas Regency, Central Java is an artisanal gold mine. Traditional artisanal gold mining has disadvantages, including the potential for environmental damage because the extraction process still generates wastewater. The wastewater in Pancurendang Village contains impurities in the form of Iron (Fe) and Manganese (Mn) metals which exceed the quality standards stipulated in Central Java Regional Regulation No. 5 of 2012. This endangers the environment as well as the community surrounding the gold processing location. As a result, the objective of this research is to analyze the quality of wastewater from smallholder gold processing activities, groundwater, and Tajur River water at the study site, to evaluate the effectiveness of phytoremediation of the genjer plant (Limnocharis flava) in reducing the impurities of iron (Fe) and manganese (Mn), and to develop a waste water treatment design for gold processing activities at the research site.

The method of this research used survey and mapping methods, as well as experimental designs, laboratory tests, descriptive and mathematical analysis. Purposive sampling was used to collect wastewater, groundwater, and Tajur River water. For smallholder gold processing, wastewater was sampled at three locations: before wastewater disposal, during wastewater disposal, and after wastewater disposal, and groundwater was sampled at residents' wells. Wastewater was treated using a batch system of phytoremediation. The phytoremediation experiment was carried out on a laboratory scale with three different media variations: 100% neutralized wastewater, 5 days neutralized wastewater, and 100% non-neutralized wastewater. Neutralization is done by adding banana stems (Musa paradisiaca). As a result, the supporting parameters pH, DO, BOD, and COD are required in this study. The phytoremediation procedure takes 8 days.

Before phytoremediation, laboratory test results for wastewater revealed an iron (Fe) content of 866.7 mg/L and a manganese (Mn) content of 206.83 mg/L. The phytoremediation trial using a batch system with genjer plants had the most effective absorption of Iron (Fe) metal in samples without neutralization with an effectiveness value of 99.168%. In comparison, Manganese (Mn) metal absorption was most effective in neutralized samples 5 days with an effective value of 68.24%.

Keywords : Wastewater, Gold mining, Phytoremediation, Iron (Fe), Manganese (Mn)