

**BIOREMEDIASI TANAH TERCEMAR MINYAK BUMI DENGAN
MENGUNAKAN BIOCHAR TEMPURUNG KELAPA DAN KOTORAN
SAPI DI TAMBANG MINYAK RAKYAT WONOCOLO**

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INTISARI

Indonesia memiliki cadangan sumber daya alam tidak terbarukan berupa minyak bumi yang dieksploitasi secara modern dan tradisional. Tambang minyak rakyat tradisional yang masih beroperasi hingga saat ini di Teksas Wonocolo, Desa Wonocolo, Kecamatan Kedewan, Kabupaten Bojonegoro. Proses produksi secara tradisional dapat menyebabkan tumpahan minyak sehingga mencemari tanah. Oleh karena itu, penelitian ini dilakukan untuk mengetahui pengaruh porositas tanah dan volume produksi terhadap parameter *Total Petroleum Hydrocarbon* (TPH) serta pengaruh nilai TPH terhadap kedalaman tanah tercemar, menganalisis pengaruh efektivitas biochar tempurung kelapa dan biokomposting dengan menggunakan kotoran sapi dalam penurunan TPH, dan merekomendasikan arahan pengelolaan di lokasi penelitian.

Metode yang digunakan dalam penelitian ini merupakan gabungan antara metode kuantitatif dan kualitatif. Data yang digunakan meliputi data primer dan sekunder. Pengambilan sampel tanah tercemar pada 9 titik menggunakan teknik *purposive sampling* berdasarkan produktivitas sumur minyak bumi. Uji korelasi *Spearman* untuk menjawab tujuan pertama. Regresi linear berganda digunakan untuk mengetahui pengaruh komposisi kotoran sapi dan biochar tempurung kelapa terhadap efektivitas penurunan TPH. Eksperimen bioremediasi dilakukan selama 30 hari menggunakan 7 variasi dosis biochar tempurung kelapa dan kotoran sapi. Kadar TPH diuji dengan metode gravimetri. Hasil dosis optimum dan kondisi rona lingkungan digunakan dalam rekomendasi arahan pengelolaan.

Seluruh sampel tanah diklasifikasikan sebagai tanah tercemar karena kandungan TPH melebihi baku mutu menurut Permen LHK Nomor 6 Tahun 2021, yaitu melebihi 5.000 mg/kg. Tidak ada hubungan antara porositas dan volume produksi terhadap nilai TPH serta nilai TPH tidak berhubungan dengan kedalaman tanah tercemar. Variasi S3 yang menggunakan 30% kotoran sapi dan 7% biochar tempurung kelapa dengan efektivitas 76,84% merupakan variasi dengan efektivitas tertinggi dalam menurunkan kadar TPH pada tanah terkontaminasi minyak bumi sehingga menjadi dosis optimum yang disarankan dalam proses pengolahan tanah pada *Soil Bioremediation Facility* (SBF).

Kata kunci: Bioremediasi, Biochar Tempurung Kelapa, Wonocolo, *Total Petroleum Hydrocarbon* (TPH)

**BIOREMEDIATION OF PETROLEUM-CONTAMINATED SOIL USING
COCONUT SHELL BIOCHAR AND COW MANURE IN WONOCOLO
ARTISANAL OIL FIELD**

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ABSTRACT

Indonesia has reserves of non-renewable natural resources in the form of petroleum, which are exploited both modernly and traditionally. Traditional community oil wells that are still operating today can be found in Teksas Wonocolo, Wonocolo Village, Kedewan District, Bojonegoro Regency. The traditional production process can result in oil spills that contaminate the soil. Therefore, this study was conducted to determine the influence of soil porosity and production volume on Total Petroleum Hydrocarbon (TPH) parameters, the effect of TPH values on the depth of contaminated soil, to analyze the effectiveness of coconut shell biochar and biocomposting using cow manure in reducing TPH levels, and to recommend management directions at the study site.

The method used in this research is a combination of quantitative and qualitative approaches. The data used include both primary and secondary data. Contaminated soil samples were taken from 9 points using purposive sampling based on the productivity of the oil wells. Spearman's correlation test was used to address the first objective. Multiple linear regression was used to determine the influence of the composition of cow manure and coconut shell biochar on the effectiveness of TPH reduction. The bioremediation experiment was conducted for 30 days using 7 different dosage variations of coconut shell biochar and cow manure. TPH levels were tested using the gravimetric method. The optimum dosage results and the environmental baseline conditions were used in the recommended management directions.

All soil samples were classified as contaminated soil because the TPH content exceeded the quality standard according to Regulation of the Minister of Environment and Forestry (Permen LHK) Number 6 of 2021, which is above 5,000 mg/kg. There was no correlation between porosity and production volume on TPH levels, and TPH values were also not correlated with the depth of contaminated soil. The S3 variation, which used 30% cow manure and 7% coconut shell biochar with an effectiveness of 76.84%, was the most effective variation in reducing TPH levels in oil-contaminated soil, making it the recommended optimum dosage for soil treatment at the Soil Bioremediation Facility (SBF).

Keywords: Bioremediation, Coconut Shell Biochar, Wonocolo, Total Petroleum Hydrocarbon (TPH)