

PENURUNAN KADAR SALINITAS LUMPUR KERING MENGGUNAKAN FORMULASI AMELIORAN PADA KOLAM P.35 DI DALAM AREA TERDAMPAK LUMPUR SIDOARJO

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INTISARI

Semburan lumpur Sidoarjo yang terjadi pada 28 Mei 2006 di dekat sumur pengeboran Banjar Panji-1 milik PT Lapindo Brantas telah mengakibatkan kerusakan lingkungan yang luas, termasuk tertutupnya lahan seluas 250 hektar. Salah satu permasalahan utama dalam pengolahan lumpur Sidoarjo adalah tingginya kadar salinitas. Penelitian ini bertujuan untuk menganalisis karakteristik tekstur, daya hantar listrik, pH, dan salinitas pada lumpur kering di Kolam P.35; menganalisis hasil kadar salinitas lumpur kering Sidoarjo setelah diberikan amelioran; menganalisis efektivitas pemberian formulasi amelioran pada lumpur kering setelah perlakuan; menganalisis hubungan antara variasi dosis amelioran dengan efektivitas penurunan kadar salinitas pada lumpur kering; serta merancang arahan pengelolaan lumpur berdasarkan formulasi amelioran terbaik.

Penelitian ini menggunakan metode kuantitatif dan kualitatif. Teknik pengumpulan data dilakukan melalui survei lapangan, pengambilan sampel, dan eksperimen laboratorium. Parameter fisik lumpur kering dianalisis menggunakan metode hidrometer dan ayakan untuk menentukan tekstur, sedangkan parameter kimia berupa salinitas diukur menggunakan metode daya hantar listrik (*Electrical Conductivity*). Data dianalisis dengan pendekatan matematis serta analisis statistik regresi. Untuk menjelaskan hasil secara menyeluruh, digunakan metode analisis deskriptif. Pengujian laboratorium dilakukan untuk menentukan karakteristik tekstur, pH, dan salinitas lumpur. Rancangan percobaan yang dilakukan dalam penurunan kadar salinitas yaitu melalui penambahan tanah pasir dan formulasi amelioran yang terdiri dari tiga variasi dan empat tingkat dosis.

Hasil penelitian menunjukkan bahwa tekstur lumpur di area P.35 didominasi liat dengan tingkat salinitas tinggi, terutama di wilayah utara. Perlakuan 100% biochar tempurung kelapa dosis 80 gram (K1D4) menghasilkan nilai salinitas terendah sebesar 0,687% dan efektivitas penurunan salinitas tertinggi sebesar 20,39%. Berdasarkan analisis hubungan antar variabel, diperoleh nilai R^2 sebesar 0,9225 pada perlakuan K1 yang tergolong kategori kuat, sementara perlakuan K2 dan K3 masing-masing menunjukkan nilai R^2 sebesar 0,6947 dan 0,6023 yang termasuk dalam kategori moderat. Ketiga hasil tersebut menunjukkan bahwa terdapat hubungan yang kuat hingga moderat antara dosis amelioran dan efektivitas penurunan salinitas. Arahan pengelolaan yang diusulkan adalah pembangunan fasilitas remediasi berbasis metode leaching, dengan target pengolahan seluruh lumpur selama $\pm 10,9$ tahun.

Kata Kunci : Lumpur Sidoarjo, Salinitas, Amelioran, Efektivitas

REDUCTION OF DRY MUD SALINITY LEVEL USING AMELIORAN FORMULATION IN POND P.35 IN SIDOARJO MUD IMPACT AREA

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ABSTRACT

The Sidoarjo mudflow that occurred on May 28, 2006 near the Banjar Panji-1 drilling well owned by PT Lapindo Brantas has caused extensive environmental damage, including the covering of 250 hectares of land. One of the main problems in the processing of Sidoarjo mud is the high salinity levels. This study aims to analyze the characteristics of Texture, Electrical Conductivity, pH, and salinity in dry mud in Pond P.35; analyze the results of the salinity levels of Sidoarjo dry mud after being given ameliorants; analyze the effectiveness of providing ameliorant formulations to dry mud after treatment; analyze the relationship between variations in ameliorant doses and the effectiveness of reducing salinity levels in dry mud; and design mud management guidelines based on the best ameliorant formulation.

This study uses quantitative and qualitative methods. Data collection techniques are carried out through field surveys, sampling, and laboratory experiments. The physical parameters of dry mud are analyzed using the hydrometer and sieve methods to determine texture, while chemical parameters in the form of salinity are measured using the electrical conductivity method. The data were analyzed using a mathematical approach and statistical analysis of regression. To explain the results comprehensively, a descriptive analysis method was used. Laboratory tests were conducted to determine the characteristics of the texture, pH, and salinity of the mud. The experimental design carried out in reducing salinity levels was through the addition of sandy soil and ameliorant formulations consisting of three variations and four dosage levels.

The results showed that the mud texture in the P.35 area was dominated by clay with high salinity levels, especially in the northern region. The treatment of 100% coconut shell biochar at a dose of 80 grams (K1D4) produced the lowest salinity value of 0.687% and the highest salinity reduction effectiveness of 20.39%. Based on the analysis of the relationship between variables, an R^2 value of 0.9225 was obtained in the K1 treatment which was classified as a strong category, while the K2 and K3 treatments each showed R^2 values of 0.6947 and 0.6023 which were included in the moderate category. These three results indicate that there is a strong to moderate relationship between the ameliorant dose and the effectiveness of salinity reduction. The proposed management direction is the construction of a remediation facility based on the leaching method, with a target of processing all sludge for ± 10.9 years.

Keywords: Sidoarjo Mud, Salinity, Ameliorant, Effectiveness