KAJIAN SIFAT KIMIA TANAH SAWAH DESA GLONDONG TIRTONIRMOLO YANG TERALIRI AIR IRIGASI TERCEMAR LIMBAH CAIR PABRIK GULA MADUKISMO

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ABSTRAK

Limbah cair industri gula mengandung berbagai senyawa yang berpotensi mengubah sifat kimia tanah, seperti pH, daya hantar listrik (DHL), K-tersedia, Ca-tersedia, Mg-tersedia, P-tersedia, dan SO_4^{2-} tersedia. Data kualitas air irigasi digunakan sebagai data sekunder yang melengkapi analisis. Penelitian ini bertujuan untuk mengkaji air irigasi yang tercemar limbah cair Pabrik Gula Madukismo terhadap sifat kimia tanah sawah di Desa Glondong, Tirtonirmolo, Kecamatan Kasihan, Kabupaten Bantul. Metode penelitian yang digunakan adalah survey lapangan dengan metode pengambilan sampel *purposive sampling*. Pengambilan sampel tanah dari 10 titik yang kemudian dikomposit menjadi lima sampel dengan delapan titik sawah yang terpapar limbah dan dua titik kontrol (tidak tercemar). Pengambilan sampel air diambil 5 sampel dengan 4 sampel air tercemar dan 1 sampel tidak tercemar. Analisis laboratorium dilakukan untuk mengukur parameter kimia tanah. Hasil analisis laboratorium menunjukkan bahwa nilai pH tanah berkisar antara 6,32–6,85; DHL tanah antara 481–2104 µS/cm; dan unsur hara tersedia (P, K, Ca, Mg, SO_4^{2-}) umumnya masih dalam kategori sedang hingga tinggi. Tidak terdapat perbedaan yang signifikan antara tanah yang terpapar dan tanah kontrol. Berdasarkan data tersebut, dapat disimpulkan bahwa air irigasi yang tercemar limbah cair tidak berdampak signifikan terhadap perubahan sifat kimia tanah dan masih layak digunakan sebagai sumber air irigasi sawah di lokasi penelitian.

Kata kunci: Irigasi Tercemar, Limbah Cair, Pabrik Gula, Sifat Kimia Tanah

STUDY OF THE CHEMICAL PROPERTIES OF PADDY SOIL IN GLONDONG VILLAGE, TIRTONIRMOLO, IRRIGATED WITH WASTEWATER-CONTAMINATED WATER FROM THE MADUKISMO SUGAR FACTORY

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ABSTRACT

The wastewater from the sugar industry contains various compounds that have the potential to alter the chemical properties of soil, such as pH, electrical conductivity (EC), available potassium (K), available calcium (Ca), available magnesium (Mg), available phosphorus (P), and available sulfate (SO_4^{2-}). Irrigation water quality data were used as secondary data to complement the analysis. This study aims to assess the impact of irrigation water contaminated by liquid waste from the Madukismo Sugar Factory on the chemical properties of paddy soils in Glondong Village, Tirtonirmolo, Kasihan Subdistrict, Bantul Regency. The research method employed was a field survey using purposive sampling for sample collection. Soil samples were taken from 10 points and composited into five samples—eight from fields exposed to wastewater and two from control points (uncontaminated). Water samples were collected from five locations, consisting of four contaminated samples and one uncontaminated sample. Laboratory analysis was conducted to measure the chemical parameters of the soil. The results showed that the irrigation water contaminated with liquid waste had low pH, very low dissolved oxygen (DO), and elevated concentrations of dissolved ions (K^+, Ca^{2+}, Mg^{2+}, PO_4^{3-}, and SO_4^{2-}). The chemical properties of soils in contaminated locations indicated a decrease in soil pH (down to 6.32), an increase in EC (up to >2000 µS/cm), and spikes in K, P, and SO_4^{2-} levels exceeding the high category based on soil fertility standards for rice. There was also an imbalance in the base cation ratio (K:Ca:Mg), which may functionally reduce soil quality.

Keywords: Contaminated Irrigation, Wastewater, Sugar Factory, Soil Chemical Properties