

ABSTRAK

ANALISIS HIDROGEOKIMIA AIRTANAH DI TPA BANYUROTO DAN SEKITARNYA, KECAMATAN NANGGULAN, KABUPATEN KULON PROGO, DAERAH ISTIMEWA YOGYAKARTA

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TPA Banyuroto merupakan sumber pencemar potensial bagi airtanah dangkal karena proses dekomposisi sampah dapat menghasilkan air lindi yang membawa zat terlarut organik maupun anorganik. Airtanah di sekitar TPA masih dimanfaatkan masyarakat melalui sumur gali, sehingga kajian hidrogeokimia diperlukan untuk menilai kondisi airtanah secara lebih menyeluruh dan membedakan pengaruh alami dari kemungkinan masukan antropogenik. Penelitian ini dilakukan di TPA Banyuroto dan sekitarnya, Kecamatan Nanggulan, Kabupaten Kulon Progo, Daerah Istimewa Yogyakarta. Tujuan penelitian ini adalah mengetahui kondisi geologi dan hidrogeologi, menganalisis karakteristik hidrogeokimia airtanah, mengetahui distribusi kualitas airtanah berdasarkan standar parameter Permenkes RI No. 2 Tahun 2023, serta mengkaji hubungan antara aktivitas TPA Banyuroto dan hidrogeokimia airtanah. Metode penelitian meliputi pemetaan geologi, pengukuran muka airtanah pada 41 sumur, pengukuran parameter fisika-kimia secara langsung, dan analisis laboratorium terhadap 6 sampel airtanah. Parameter yang dianalisis meliputi suhu, TDS, kekeruhan, warna, bau, pH, nitrat, nitrit, Fe, Mn, serta ion mayor Na^+ , K^+ , Ca^{2+} , Mg^{2+} , Cl^- , HCO_3^- , dan SO_4^{2-} . Analisis hidrogeokimia dilakukan menggunakan diagram Stiff dan Piper, sedangkan evaluasi kualitas mengacu pada standar yang digunakan dalam penelitian. Hasil penelitian menunjukkan bahwa daerah penelitian tersusun atas Satuan breksi Kaligesing, Satuan batugamping Sentolo, dan endapan aluvial setempat pada tubuh sungai. Satuan batugamping Sentolo berperan sebagai akuifer utama, sedangkan Satuan breksi Kaligesing berperan sebagai akuitard. Airtanah didominasi oleh HCO_3^- , Ca^{2+} , dan Mg^{2+} dengan fasies utama Ca-Mg- HCO_3 menandakan airtanah normal. Beberapa titik tidak memenuhi standar, terutama karena TDS tinggi pada S1, S11, S18, dan S35, nitrat tinggi pada S11, serta Fe, kekeruhan, warna, dan bau pada S28. Potensi pengaruh TPA bersifat lokal dan paling perlu dicermati pada S11, tetapi ciri lindi belum tampak dominan.

Kata kunci: airtanah, hidrogeokimia, kualitas air, TPA Banyuroto.

ABSTRACT

HYDROGEOCHEMICAL ANALYSIS OF GROUNDWATER AT BANYUROTO LANDFILL AND ITS SURROUNDING AREA, NANGGULAN DISTRICT, KULON PROGO REGENCY, SPECIAL REGION OF YOGYAKARTA

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Banyuroto Landfill is a potential source of contamination for shallow groundwater because waste decomposition can generate leachate containing dissolved organic and inorganic substances. Groundwater around the landfill is still used by local communities through dug wells; therefore, a hydrogeochemical study is needed to evaluate groundwater conditions and distinguish natural controls from possible anthropogenic inputs. This study was conducted at Banyuroto Landfill and its surroundings, Nanggulan District, Kulon Progo Regency, Special Region of Yogyakarta. The objectives were to determine the geological and hydrogeological conditions, analyze groundwater hydrogeochemical characteristics, evaluate groundwater quality distribution based on Indonesian Ministry of Health Regulation No. 2 of 2023, and assess the relationship between Banyuroto Landfill activities and groundwater hydrogeochemistry. The methods included geological mapping, groundwater level measurements at 41 wells, in situ physicochemical measurements, and laboratory analysis of 6 selected groundwater samples. The analyzed parameters comprised temperature, TDS, turbidity, color, odor, pH, nitrate, nitrite, Fe, Mn, and major ions consisting of Na^+ , K^+ , Ca^{2+} , Mg^{2+} , Cl^- , HCO_3^- , and SO_4^{2-} . Hydrogeochemical analysis was carried out using Stiff and Piper diagrams, while groundwater quality evaluation followed the standards used in this study. The results show that the study area consists of Kaligesing breccia, Sentolo limestone units, and local alluvial deposits along the river channel. The Sentolo limestone unit acts as the main aquifer, whereas the Kaligesing breccia unit acts as an aquitard. Groundwater is dominated by HCO_3^- , Ca^{2+} , and Mg^{2+} , with Ca-Mg- HCO_3 as the main facies marking normal groundwater. Several points do not meet the standards, mainly due to high TDS at S1, S11, S18, and S35, high nitrate at S11, and Fe, turbidity, color, and odor at S28. The potential landfill impact is local and should mainly be observed at S11, although leachate characteristics are not dominant.

Keywords: *Banyuroto Landfill, groundwater, hydrogeochemistry, water quality.*