

Kabupaten Sleman, dengan jumlah penduduk terbanyak di Provinsi Daerah Istimewa Yogyakarta, mengalami peningkatan populasi akibat arus pendatang, terutama wisatawan dan mahasiswa. Pada tahun 2023, jumlah wisatawan mencapai 6,7 juta orang (35,34%) dan mahasiswa sekitar 410 ribu orang (62,37%), keduanya tertinggi di Provinsi DI Yogyakarta. Peningkatan populasi dan mobilitas ini berkontribusi pada lonjakan volume limbah cair domestik. Studi terdahulu menunjukkan limbah cair domestik sebagai salah satu penyebab utama pencemaran air tanah di Kabupaten Sleman, dengan pembuangan langsung ke sumur resapan air hujan sebagai salah satu indikasinya. Penelitian ini bertujuan mendeskripsikan karakteristik dan pola pemanfaatan sumur resapan di Kabupaten Sleman serta mengidentifikasi potensi alih fungsi sumur melalui wawancara dengan pelaku usaha konstruksi. Dalam penelitian dievaluasi efektivitas filter sumur resapan sebagai cara untuk peresapan *greywater*.

Penelitian dilakukan dalam dua tahap. Tahap pertama adalah wawancara dengan pelaku usaha konstruksi terkait rancangan sumur resapan yang akan diaplikasikan di masyarakat dan tahap kedua adalah uji laboratorium terhadap hasil rancangan tersebut apabila digunakan untuk meresapkan limbah *greywater*. Wawancara menggunakan metode *stratified random sampling* di 17 kecamatan di wilayah Kabupaten Sleman sedangkan pengujian sumur resapan sebagai filtrasi *greywater* menggunakan kolom filter dengan konfigurasi ijuk, kerikil dan pasir masing-masing 10 cm. Pengujian filtrasi dilakukan selama 3 minggu dengan pengambilan sampel setiap minggu dan ditinjau efektivitasnya berdasarkan parameter pH, kekeruhan, TSS, minyak & lemak, BOD, COD, amonia, dan *total coliform*.

Hasil penelitian lapangan (observasi dan wawancara) menunjukkan bahwa sumur yang dirancang untuk meresapkan air hujan sebagian besar dialihfungsikan sebagai resapan limbah cair domestik tanpa pengolahan. Pengujian filtrasi terhadap konfigurasi filter yang digunakan menunjukkan penurunan kekeruhan, TSS, dan minyak & lemak pada minggu pertama, meskipun belum memenuhi baku mutu. Efektivitas penyisihan menurun pada minggu berikutnya, mengindikasikan kejenuhan media, termasuk peningkatan keasaman. Efektivitas terhadap BOD, COD, amonia, dan *total coliform* cenderung lebih baik di minggu kedua dibandingkan minggu pertama, meskipun hanya amonia yang memenuhi baku mutu sebelum dan sesudah filtrasi. Kondisi ini menunjukkan sistem filtrasi memerlukan waktu adaptasi untuk stabil, yang dipengaruhi oleh proses biodegradasi dalam filter. Penambahan ketebalan pasir tiga kali lipat meningkatkan efektivitas penyisihan meskipun mayoritas parameter masih belum memenuhi baku mutu.

Kata kunci: Air hujan, Limbah cair domestik, Multimedia filter, Pencemaran air tanah, Infiltrasi

ABSTRACT

Sleman Regency, which has the highest population in the Special Region of Yogyakarta, has experienced population growth due to the influx of migrants, particularly tourists and students. In 2023, the number of tourists reached 6,7 million (35,34%), while the student population was approximately 410 thousand (62,37%), both the highest in the Special Region of Yogyakarta. This increase in population and mobility has contributed to the surge in domestic wastewater volume. This growth has led to a corresponding rise in the volume of domestic wastewater. Previous studies have identified domestic wastewater as a major contributor to groundwater pollution in Sleman, with the direct discharge of wastewater into rainwater infiltration wells serving as one of the key indicators. This study aims to describe the characteristics and usage patterns of infiltration wells in Sleman Regency and to identify the potential for functional conversion through interviews with construction practitioners. Additionally, the study evaluates the effectiveness of infiltration well filters in infiltrating greywater.

The research was conducted in two stages. The first stage involved interviews with construction practitioners regarding infiltration well designs intended for community use, while the second stage consisted of laboratory tests on the performance of these designs when used to infiltrate greywater. Stratified random sampling was employed for interviews across 17 districts within Sleman Regency. The greywater filtration test was conducted using a filter column containing layers of palm fiber, gravel, and sand—each 10 cm thick. Filtration was assessed over a three-week period, with samples collected weekly and analyzed based on pH, turbidity, TSS, oil and grease, BOD, COD, ammonia, and total coliform.

Field observations and interviews revealed that infiltration wells initially designed for rainwater infiltration are often repurposed for unprocessed domestic wastewater disposal. Filtration experiment showed a reduction in turbidity, TSS, and oil and grease during the first week, although none of the parameters met the applicable quality standards. Removal efficiency declined in the following weeks, indicating media saturation and increasing acidity. The removal performance for BOD, COD, ammonia, and total coliform improved in the second week compared to the first, although only ammonia met quality standards both before and after filtration. These findings suggest that the filtration system requires an adaptation period to reach stability, influenced by biodegradation processes within the filter media. Increasing the sand layer thickness threefold enhanced removal efficiency, although most parameters still failed to meet the required standards.

Keywords: Rainwater, Domestic wastewater, Multimedia filter, Groundwater pollution, Infiltration