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Analisis efektivitas intermittent slow sand filter dalam penyisihan kekeruhan, TSS, TDS, Besi dan mangan dari air permukaan (studi kasus Danau Mahoni dan Waduk Resapan Universitas Indonesia) = Effectiveness analysis of intermittent slow sand filter in removing turbidity tss tds iron and manganese from surface water (case study mahoni lake and recharge pond Universitas Indonesia)

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Abstrak

Saringan pasir lambat merupakan salah satu metode pengolahan air yang telah digunakan sejak awal abad 19. Walaupun tergolong sederhana, metode ini efektif dalam menghilangkan kontaminan dalam air. Keefektifan tersebut tidak terlepas dari proses kimia, fisika, dan biologis yang terjadi di dalamnya. Tujuan penelitian ini adalah untuk melihat kehandalan saringan pasir lambat dalam mereduksi kontaminan dari air permukaan seperti kekeruhan, besi, mangan, TSS, dan TDS. Sumber air yang digunakan berasal dari waduk resapan dan Danau Mahoni Universitas Indonesia. Penelitian dilakukan selama dua bulan setelah melewati ripening time selama 1 bulan. Adapun desain reaktor yang digunakan adalah reaktor skala rumah tangga menggunakan tanki bervolume 150 liter. Media yang digunakan terdiri dari dua lapisan pasir silika dengan ukuran efektif (ES) masingmasing 0,2 dan 0,45 mm, serta koefisien keseragaman (UC) 3 dan 2,2. Sebagai media pendukung (underdrain) digunakan kerikil berukuran 3/8 inchi. Pengoperasian saringan pasir lambat dilakukan secara intermittent dengan tiga variasi waktu tinggal yaitu 2 jam, 24 jam, dan 48 jam. Berdasarkan hasil pengukuran laboratorium diketahui bahwa efisiensi penyisihan kekeruhan berkisar 64,59 ? 95,41%, penyisihan besi berkisar 70,83 ? 98,44%, penyisihan mangan berkisar 0 ? 100%, dan TSS berkisar 75 ? 100%. Sementara itu, TDS tidak dapat disisihkan.

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Slow sand filter is one method of water treatment that has been used since the early 19th century. Although relatively simple, this method is effective in removing contaminants in the water. Effectiveness of the treatment can not be separated from the chemical, physical, and biological process that occurring in it. The objectives of this research were to see the reliability of slow sand filter to reduce contaminants from surface water such as turbidity, iron, manganese, TSS, and TDS. The source of water used comes from Mahoni Lake and Recharge Pond Universitas Indonesia. The study was conducted over two months after the ripening time for 1 month. The reactor design used is the scale reactor household uses 150 liters of tank volume. The medium used is composed of two layers of silica sand with effective size (ES) of each 0,2 and 0,45 mm, and the uniformity coefficient (UC) of 3 and 2,2. As a supporting medium (underdrain) used gravel with size 3/8 inches. Operation of the slow sand filter intermittently performed with three variations of residence time is 2 hours, 24 hours, and 48 hours. Based on the results of laboratory measurements is known that the turbidity removal efficiency ranged from 64,59 ? 95,41%, iron ranged from 70,83 ? 98,44%, manganese range 0 ? 100 %, and TSS ranges from 75 ? 100 %. Meanwhile, TDS can't removed.