Efisiensi penyisihan kadar besi dan mangan dengan menggunakan biosand filter untuk air tanah = The efficiency of iron and manganese removal using biosand filter for groundwater

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Abstrak

Latar belakang: Air tanah merupakan satu-satunya sumber air bersih di Kelurahan Kukusan, Beji, Depok.Sampel air baku diambil dari sumur sebuah rumah kos di daerah Kukusan yang memiliki kadar besi dan mangan yang melewati standar baku air bersih yang ditetapkan Permenkes No.492/Menkes/Per/IV/2010. Penelitian dilakukan dengan biosand filter untuk penyisihan besi dan mangan secara biologis dengan bantuan bakteri pengoksidasi besi dan mangan.
Tujuan: Penelitian bertujuan untuk mengetahui efisiensi penyisihan besi dan mangan serta mengetahui pengaruh waktu tinggal, pH, dan suhu terhadap kinerja biosand filter.
Bahan dan metode: Penelitian dilakukan dengan biosand filter skala pilot plant berbentuk silinder berdiameter 20 cm yang terbuat dari bahan akrilik. Media pasir yang digunakan berdiameter 0,595 - 1,19 mm (d10 = 0,425 mm; UC 1,6) dengan ketebalan 50 cm. Penelitian dilakukan tanpa aerasi dan menggunakan waktu tinggal 24 jam.
Hasil: Dalam 40 hari penelitian, penyisihan besi dan mangan masing-masing mencapai 77,67% dan 25%. Penyisihan mangan belum mencapai steady state sehingga perlu dilakukan penelitian lanjutan terhadap penyisihan mangan.
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Background: Ground water is tlie only water resource for Kelurahan Kukusan, Beji, Depok. Water samples collected from a board house’s well in Kukusan had relatively higher iron (Fe) and manganese (Mn) than the permissible limits specified in Permenkes No.492/Menkes/Per/IV/2010. The study was conducted with biosand filters for biological removal of iron and manganese with the help of iron and manganese oxidizing bacteria.
Objective: The study aims to determine the removal efficiency of iron and manganese as well as determine the effect of residence time, pH, and temperature on the performance of biosand filters.
Materials and methods: The study was conducted at the cylindrical pilot plant scale biosand filter with 20 cm in diameter made of acrylic material. Medium sand used is from 0.595 to 1.19 mm in diameter (d10 = 0.425 mm; UC 1.6) with a thickness of 50 cm. The study was conducted without aeration and the use of 24-hour residence time.
Results: In the 40 days of study, the removal of iron and manganese respectively reached 77.67% and 25%. The removal of manganese has not reached steady state so that further research needs to be done against the removal of manganese.