

ABSTRAK

Rahadiansyah, Rachmat, 2022, Pengolahan Air Tanah Menggunakan Reverse Osmosis Dengan Pretreatment Berbasis Pasir Silica, Manganese Zeolit dan Karbon Aktif, Tugas Akhir, Teknik Lingkungan, Fakultas Teknik Universitas PGRI Adi Buana Surabaya

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Air kotor dapat menyebabkan berbagai gangguan kesehatan apabila dikonsumsi dan digunakan manusia. Sumur gali atau sumur bor di daerah Sidoarjo masih banyak yang tercemar oleh rembesan *septic tank*, rasanya cenderung asin. Hal telah dibuktikan berdasarkan hasil uji laboratorium air sumur gali milik Bapak Bayu dengan kandungan *Total Dissolved Solid (TDS)* 1.425 mg/L, *Besi (Fe)* 0,0413 mg/L, *Mangan (Mn)* 0,00946 mg/L dan *Fecal Coliform* 580 CFU/100 mL. Air Sumur gali pada penelitian ini akan ditambahkan sampel buatan untuk meningkatkan kadar *Besi (Fe)* dan *Mangan (Mn)* dengan jumlah yang sudah diperhitungkan. Air akan dilakukan treatment *Pasir Silica, Manganese Zeolite, Karbon Aktif*, dan *Reverse Osmosis*. Tujuan dalam penelitian ini untuk mengetahui pengaruh perbedaan tekanan Reverse Osmosis (30, 40, 50 psi) untuk menurunkan Fe, Mn, *Total Dissolved Solid (TDS)* dan *Fecal Coliform (E.Coli)* pada air sumur gali agar memenuhi baku mutu yang dipersyaratkan pada Peraturan Menteri Kesehatan No. 32 Tahun 2017 tentang *Hygiene Sanitasi*. Dari hasil treatment *Pasir Silica, Manganese Zeolite Dan Karbon Aktif* didapat penurunan kadar *Total Dissolved Solid (TDS)* sebesar 43 mg/L (2,57639%), Fe sebesar 0,25 mg/L (17,7305%), Mn sebesar 0,545 (55,6691%) dan *Fecal Coliform (E.Coli)* sebesar 2 MPN/100 mL (7,69231%). Dari hasil Treatment *Reverse Osmosis* didapatkan penurunan kadar kadar *Total Dissolved Solid (TDS)* terbaik pada tekanan 40 psi sebesar 1535,1 mg/L (94,41%). Pada tekanan 40 dan 50 psi didapatkan rata-rata removal terbaik untuk kadar *Mangan (Mn)* yaitu <0,4108 mg/L (>94,65%) dan *Besi (Fe)* sebesar >1,1452 mg/L (>98,72%). dan Pada kadar *Fecal Coliform (E.Coli)* didapatkan rata-rata removal terbaik pada tekanan 50 psi yaitu >22,2 MPN/100 ml (>92,5%). Dari data tersebut air hasil keluaran sudah memenuhi baku mutu yang dipersyaratkan pada Peraturan Menteri Kesehatan No. 32 Tahun 2017 tentang *Hygiene Sanitasi*.

Kata Kunci : *Reverse Osmosis, Air Bersih, Mangan, Besi, Total Dissolved Solid*

ABSTRAC

Rahadiansyah, Rachmat, 2022, Groundwater Treatment Using Reverse Osmosis With Pretreatment Based On Silica Sand, Manganese Zeolite And Activated Carbon, Final Project, Environmental Engineering, Faculty of Engineering, Universitas PGRI Adi Buana Surabaya

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Dirty water can cause various health problems when consumed and used by humans. Many dug wells or drilled wells in the Sidoarjo are still polluted by seepage from the septic tank, the taste to be salty. This has been proven based on the results of laboratory tests of Mr Bayu's dug well water containing Total Dissolved Solid (TDS) 1.425 mg/L, Iron (Fe) 0.0413 mg/L, Manganese (Mn) 0.00946 mg/L and Fecal Coliform 580 CFU/100 mL. In this study, dug well water will be added with artificial samples to increase the levels of Iron (Fe) and Manganese (Mn) with calculated amounts. The water will be treated with Silica Sand, Manganese Zeolite, Activated Carbon, and Reverse Osmosis. The purpose of this study was to determine the effect of pressure differences Reverse Osmosis (30, 40, 50 psi) to reduce Fe, Mn, Total Dissolved Solid (TDS) and Fecal Coliform (E.Coli) in dug well water in order to meet the quality standards required by the Ministerial Regulation. Health No. 32 of 2017 about Sanitary Hygiene. From the results of the treatment of Silica Sand, Manganese Zeolite and Activated Carbon, the total dissolved solid (TDS) levels decreased by 43 mg/L (2.57639%), Fe by 0.25 mg/L (17.7305%), Mn by 0.545 (55.6691%) and Fecal Coliform (E.Coli) of 2 MPN/100 mL (7.69231%). From the results of Reverse Osmosis Treatment, the best reduction in levels of Total Dissolved Solid (TDS) at 40 psi pressure was 1535.1 mg/L (94.41%). At pressures of 40 and 50 psi, the best average removal for Manganese (Mn) was <0.4108 mg/L (>94.65%) and Iron (Fe) was >1.1452 mg/L (>98, 72%). and on Fecal Coliform (E.Coli) levels, the best average removal at 50 psi pressure was >22.2 MPN/100 ml (>92.5%). From these data, the output water has met the quality standards required by the Minister of Health Regulation no. 32 of 2017 abaout Sanitary Hygiene.

Keywords: *Reverse Osmosis, Clean Water, Manganese, Iron, Total Dissolved Solid*