Validation of Solar-Driven Desalination Prototype for Potable Water Production: Water Quality Analysis = Validasi Prototipe Desalinasi Bertenaga Surya untuk Produksi Air Minum: Analisis Kualitas Air

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Abstrak

The quality of water has progressively worsened in Australia due to increased carbon emissions which strengthened the effect of climate change. With the lack of access to grid electricity in remote communities there is a need for a sustainable solution. This problem was addressed when Oxfam approached Monash University to build an OMP Micro-Desalination System prototype that uses solar energy. The goals of this experiment were to validate the OMP-Micro Desalination System to filter the main impurities of lead, turbidity, trihalomethane, salinity and E. coli, of the Victorian and Australian Drinking Water guidelines. The second goal was to compare the commercial water filters and plastic bottled water to the prototype. Stormwater samples and four community samples were tested on the prototype. Salinity levels were tested with a conductivity meter and the rest of the impurities was tested by a company Water ALS. The common commercial filtration systems were compared with the prototype with a cost analysis. In conclusion, the prototype was able to filter the impurities from the different water feed sources. For the second goal, it showed that the prototype is more affordable than commercial water filters and prototype use will have more savings compared to purchasing bottled water.

.....Kualitas air semakin memburuk di Australia karena meningkatnya emisi karbon yang memperkuat efek perubahan iklim. Dengan kurangnya akses ke jaringan listrik di masyarakat terpencil, ada kebutuhan akan solusi yang berkelanjutan. Masalah ini diatasi ketika Oxfam menghubungi Monash University untuk membangun prototipe OMP-Micro Desalination System yang menggunakan energi surya. Tujuan dari percobaan ini adalah validasi OMP-Micro Desalination System untuk menyaring kotoran utama, yaitu timbal, kekeruhan, trihalometana, salinitas dan E. coli, sesuai pedoman air minum di Victoria dan Australia. Tujuan kedua adalah membandingkan filter air komersial dan air minum kemasan plastik dengan prototipe. Sampel stormwater dan empat sampel komunitas diuji pada prototipe. Tingkat salinitas diuji dengan alat pengukur konduktivitas dan sisa-sisa indikator diuji oleh perusahaan Water ALS. Sistem filtrasi komersial umum dibandingkan dengan prototipe menggunakan analisis biaya. Kesimpulannya, prototipe mampu menyaring kotoran dari sumber air yang berbeda. Untuk tujuan kedua, hasil menunjukkan bahwa prototipe lebih murah daripada filter air komersial dan penggunaan prototipe akan lebih hemat dibandingkan dengan membeli air minum dalam kemasan.