

Abstrak

Meningkatnya jumlah penduduk di dunia, sejalan dengan meningkatnya jumlah limbah yang dihasilkan. Limbah detergen menjadi salah satu limbah yang banyak dihasilkan oleh masyarakat. Limbah detergen mengandung surfaktan dan fosfat yang berpotensi merusak lingkungan jika langsung dibuang tanpa diolah terlebih dahulu. Berdasarkan permasalahan tersebut, diperlukan solusi yakni, "BioCrisio" Pemanfaatan Bioretensi dalam Menanggulangi Krisis Air Berbasis IoT (Internet of Things). Alat ini dirancang menggunakan sensor pH, sensor TDS, sensor kekeruhan air, LCD 16x2, kabel jumper, relay Arduino, ESP32, media bioretensi dan Cyperus Papyrus. Penelitian ini menggunakan metode ADDIE (Analysis, Design, Development, Implementation, dan Evaluation). Bak bioretensi dipasangkan dengan bak yang telah dilengkapi dengan IoT serta keran air kemudian dilubangi diantara keduanya. Internet of Things dalam penelitian ini untuk memudahkan konektivitas antar perangkat. Analisis data yang digunakan adalah analisis deskriptif (kuantitatif). Hasil pengujian menunjukkan bahwa BioCrisio dapat mendeteksi kualitas air setelah difiltrasi bioretensi, menampilkan data hasil pembacaan sensornya, dan hasil pengujian menunjukkan kualitas air yang telah difiltrasi oleh bioretensi dalam konsisi layak. Pengujian kualitas air yang dilakukan adalah pengujian BOD, COD, TDS, pH dan kadar surfaktan menggunakan spektrofometer UV Vis. Hasil pengujian menunjukkan berhasil menurunkan kadar BOD hingga 73,58%, kadar COD hingga 65,3%, kadar TDS hingga 242,1 ppm, pH menjadi 6,8 serta mampu menurunkan kadar sufaktan 10 ppm. Berdasarkan hasil pengujian yang telah dilakukan, menunjukkan bahwa air yang telah diolah menggunakan BioCrisio sudah memenuhi baku mutu lingkungan hidup. Berdasarkan hal tersebut menunjukkan bahwa BioCrisio dapat memfilter limbah detergen, meningkatkan kualitas air, sebagai inovasi teknologi yang memberi solusi dengan memanfaatkan bioretensi untuk meningkatkan kualitas air dan mengurangi krisis air.

Kata Kunci : BioCrisio, detergen, Internet of Things, ESP32 , surfaktan.

Abstract

The increasing number of people in the world, along with the increasing amount of waste generated. Detergent waste is one of the most common wastes generated by the community. Detergent waste contains surfactants and phosphates, which have the potential to damage the environment if disposed of without treatment. which has the potential to damage the environment if directly disposed of without being processed first. Based on these problems, a solution is needed, namely, "BioCrisio". Utilization of Bioretention in Overcoming Water Crisis Based on IoT (Internet of Things). This tool is designed using a pH sensor, TDS sensor, water turbidity sensor, and LCD 16x2, jumper cable, Arduino relay, ESP32, bioretention media, and Cyperus Papyrus. This research uses the ADDIE method (Analysis, Design, Development, Implementation, and Evaluation). Bioretention tub is paired with a tub that has been equipped with IoT and a water faucet then perforated between the two. Internet of Things in this research to facilitate connectivity between devices. The data analysis used is descriptive (quantitative). The test results show that BioCrisio can detect water quality after bioretention filtration, display the sensor readings, and the test results show the water quality. data from the sensor readings, and the test results show the water quality that has been filtered by bioretention in a decent condition. Water quality testing is done by testing BOD, COD, TDS, pH, and surfactant levels using a UV Vis spectrophotometer. The test results showed successfully reduced BOD levels by 73.58%, COD levels by 65.3%, TDS levels by 242.1 ppm, and pH and surfactant levels to 6.8, and was able to reduce surfactant levels by 10 ppm using a UV Vis spectrophotometer. Based on the test results that have been carried out, show that the water that has been treated using BioCrisio that has been treated using BioCrisio has met the quality standards of the environment. Based on this, it shows that BioCrisio can filter detergent waste, and improve water quality, as a technological innovation that provides solutions by utilizing bioretention to improve water quality. technological innovation that provides solutions by utilizing bioretention to improve water quality and reduce the water crisis.

Keywords: BioCrisio, detergent, Internet of Things, ESP32, surfactant.