

RINGKASAN

Keberadaan logam berat didalam air berbahaya terhadap kehidupan makhluk hidup hal ini berkaitan dengan sifat dari logam yaitu sulit terurai namun mudah untuk terakumulasi didalam tubuh makhluk hidup maupun pada lingkungan. Sumur gali yang telah digunakan dalam jangka waktu relatif lama memiliki kemungkinan tercemar lebih besar karena mudahnya sumber pencemar seperti air lindi yang mampu menembus tanah menuju ke aliran air tanah yang memusat kedalam sumur (Handriyani *et al.*, 2020). Air sumur gali milik masyarakat dikawasan TPA Talang Gulo Kota Jambi dianalisis kadar logam berat karena dikawasan tersebut dekat radiusnya dengan lahan *opendumping* milik TPA Talang Gulo. Kawasan TPA Talang Gulo Kota Jambi belum adanya pelayanan air bersih dari PDAM untuk wilayah tersebut sehingga masyarakat menggunakan sumur gali untuk kebutuhan air bersih.

Pendahuluan penelitian yang telah dilakukan hasil uji kadar logam berat tertinggi yaitu kadmium 0,047 mg/L. Penurunan kadar kadmium agar air sumur gali memenuhi baku mutu air tanah menurut N.J.A.C dan baku mutu air minum menurut Permenkes Nomor 2 Tahun 2023 menggunakan teknik fitoremediasi dengan eceng gondok. Metode yang digunakan eksperimental, Analisis dilakukan dengan Spektrofotometri Serapan Atom (SSA) dengan destruksi basah. Tahap penelitian meliputi proses aklimatisasi dan pelaksanaan penelitian dengan variasi waktu 7, 14, 21 dan 28 hari. Pengambilan sampel air sumur diambil pada kedalaman 20 cm di bawah permukaan air atau 20 cm di atas dasar sumur dengan banyak sampel yang diambil 12 liter.

Setelah dilakukan teknik fitoremediasi kadmium didapatkan hasil pengujian dengan kadar awal atau 0 hari yaitu 0,047 mg/L, kemudian setelah dilakukan teknik fitoremediasi didapatkan keberadaan logam berat didalam air sumur yaitu pada variasi 7 yaitu 0,023 mg/L, 14 hari 0,012 mg/L, 21 hari 0,003 mg/L, dan 28 hari 0,012 mg/L. Efektivitas eceng gondok dalam fitoremediasi didapatkan bahwa, berdasarkan rumus efektivitas yaitu pada variasi waktu ke 7 hari 51,06%, 14 hari 74,46%, 21 93,61% dan 28 hari 74,46%. Efektivitas yang paling maksimal dalam menurunkan kadar logam berat hingga 0,003 mg/L yaitu eceng gondok pada variasi ke 21 hari juga didasarkan atas uji efektifitas dengan perhitungan yang didapatkan 93,61% dengan daya serap paling tinggi 0,021 mg/L. Berdasarkan kadar tersebut kadmium didalam air sumur gali memenuhi syarat baku mutu air tanah menurut

N.J.A.C yaitu 0,004 mg/L dan baku mutu air minum menurut Permenkes Nomor 2 Tahun 2023 yaitu 0,004 mg/L. Efektivitas eceng gondok berdasarkan uji t menyatakan bahwa H_0 diterima dan H_1 ditolak dengan $t_{hitung} < t_{tabel}$ yaitu $1.807 < 12.70620$ artinya terdapat perbedaan yang nyata terhadap penurunan kadar logam berat kadmium dengan pengaruh fitoremediasi dengan tanaman eceng gondok dan tanpa fitoremediasi. Berdasarkan uji efektivitas tanaman eceng gondok (*Eichhornia crassipes*) memiliki kemampuan yang nyata dalam teknik fitoremediasi logam berat kadmium pada air sumur.

Kata Kunci: Air Sumur, Kadmium, Fitoremediasi, Eceng Gondok, Efektivitas

SUMMARY

The presence of heavy metals in water is dangerous for living creatures. This is related to the nature of the metal, namely that it is difficult to decompose but easy to accumulate in the bodies of living creatures and in the environment. Dug wells that have been used for a relatively long period of time have a greater possibility of being polluted because of the ease with which pollutant sources such as leachate can penetrate the soil and lead to groundwater flow that concentrates into the well (Handriyani et al., 2020). The water from dug wells belonging to the community in the Talang Gulo TPA area of Jambi City was analyzed for heavy metal levels because the area is close in radius to the old landfill belonging to the Talang Gulo TPA. For the Talang Gulo TPA area, Jambi City, there is no clean water service from PDAM for that area, so people use dug wells for their clean water needs.

Preliminary research that has carried out test results for the highest levels of heavy metals, namely 0.047 mg/L cadmium. Reducing Cadmium levels so that dug well water meets groundwater quality standards according to N.J.A.C and drinking water quality standards according to Minister of Health Regulation No. 2 of 2023 using phytoremediation techniques with water hyacinth. The method used was experimental. Analysis was carried out using Atomic Absorption Spectrophotometry (AAS) with wet etrusion. The research phase includes the acclimatization process and research implementation with time variations of 7, 14, 21 and 28 days. Well water samples were taken at a depth of 20 cm below the water surface or 20 cm above the bottom of the well with 12 liters of samples taken.

After carrying out the cadmium phytoremediation technique, the test results obtained with initial levels or 0 days, namely 0.047 mg/L, then after carrying out the phytoremediation technique, it was found that the presence of heavy metals in well water was in variation 7, namely 0.023 mg/L, 14 days 0.012 mg/L, 21 day 0.003 mg/L, and 28 days 0.012 mg/L. The effectiveness of water hyacinth in phytoremediation was found to be based on the effectiveness formula, namely at 7 days 51.06%, 14 days 74.46%, 21 93.61% and 28 days 74.46%. The maximum effectiveness in reducing heavy metal levels up to 0.003 mg/L, namely water hyacinth at the 21 day variation, was also based on effectiveness tests with calculations obtained at 93.61% with the highest absorption capacity of 0.021 mg/L. Based on these levels, cadmium in dug well water meets the requirements for groundwater quality standards according to N.J.A.C, namely 0.004 mg/L and drinking water quality

*standards according to Minister of Health Regulation No. 2 of 2023, namely 0.004 mg/L. The effectiveness of water hyacinth based on the t test states that H_0 is accepted and H_1 is rejected with $t_{count} < t_{table}$, namely $1.807 < 12.70620$, meaning that there is a significant difference in reducing levels of the heavy metal cadmium with the influence of phytoremediation with water hyacinth plants and without phytoremediation. Based on tests of the effectiveness of the water hyacinth plant (*Eichhornia crassipes*) it has real capabilities in the phytoremediation technique of the heavy metal cadmium in well water.*

Keywords: Well Water, Cadmium, Phytoremediation, Water Hyacinth, Effectiveness