RINGKASAN

Penelitian ini berfokus pada remediasi tanah yang terkontaminasi logam berat, khususnya timbal (Pb) dan kadmium (Cd), di lokasi Tempat Pemrosesan Akhir (TPA) Lama Talang Gulo, Provinsi Jambi. Proses remediasi dilakukan dengan memanfaatkan tanaman *Sansevieria trifasciata laurentii* sebagai agen fitoremediasi. Latar belakang penelitian ini didasari oleh tingkat pencemaran tanah yang signifikan akibat logam berat Pb dan Cd di area tersebut. Berdasarkan hasil pra-penelitian, diketahui bahwa konsentrasi logam berat timbal sebesar 615 mg/kg dan logam kadmium sebesar 5,145 mg/kg di tanah TPA lama Talang Gulo telah melebihi batas yang ditetapkan oleh Permenkes Nomor 2 Tahun 2023 tentang Peraturan Dalam Pelaksanaan Peraturan Pemerintah Nomor 66 tahun 2014 tentang Kesehatan Lingkungan dan Standar Baku Mutu Tanah yaitu sebesar 300 mg/kg untuk timbal dan 3 mg/kg untuk kadmium. Tujuan penelitian ini yaitu (a) menganalisis berapa konsentrasi logam berat timbal dan kadmium di tanah tercemar air lindi sebelum dan sesudah dilakukan teknik fitoremediasi, (b) menganalisis efektivitas tanaman *Sansevieria trifasciata laurentii* dalam menurunkan kandungan logam berat timbal dan kadmium pada tanah tercemar air lindi di TPA Lama Talang Gulo Jambi.

Penelitian ini menggunakan metode eksperimental dengan teknik fitoremediasi menggunakan tanaman *Sansevieria trifasciata laurentii*. Sampel tanah diambil di sekitar kolam air lindi, dihomogenkan, dan tanaman diaklimatisasi selama 14 hari. Proses fitoremediasi dilakukan dalam empat variasi waktu, yaitu 2, 4, 6, dan 8 minggu. Parameter yang diamati meliputi konsentrasi logam Pb dan Cd sebelum dan sesudah remediasi, akumulasi logam dalam tanaman, serta pertumbuhan tanaman. Kadar logam dianalisis menggunakan Spektrofotometri Serapan Atom (SSA) setelah destruksi sampel, dan data diuji dengan uji T untuk mengetahui perbedaan signifikan.

Hasil penelitian menunjukkan bahwa selama 8 minggu pengamatan tanaman *Sansevieria trifasciata laurentii* mampu secara efektif mengurangi kadar logam berat Pb dan Cd di kawasan TPA Lama Talang Gulo, Jambi. Selama periode pengamatan selama 8 minggu, terjadi penurunan kadar logam yang signifikan. Tanaman *Sansevieria trifasciata laurentii* berhasil menyerap logam Pb sebesar 61% 91% dan Cd sebesar 52 - 83%. Berdasarkan hasil pengujian uji T didapatkan bahwa nilai signifikan yaitu 0,040 yang mana artinya 0,040 < 0,05. Hasil dari nilai t_{hitung} sebesar 7,867 dan untuk nilai t_{tabel} sebesar 63.138. Jadi, dapat disimpulkan bahwa t_{hitung} lebih kecil dari t_{tabel} yaitu dengan nilai 7,867 < 63.138. Berdasarkan nilai tersebut menyatakan bahwa H0 ditolak dan H1 diterima, artinya terdapat perbedaan yang Signifikan terhadap penurunan kadar logam

timbal dan kadmium sesudah dan sebelum dilakukan teknik fitoremediasi dengan menggunakan tanaman *Sansevieria trifasciata laurentii*. Pada penelitian ini menunjukkan bahwa tanaman *Sansevieria trifasciata laurentii* dapat digunakan untuk menurunkan tingkat konsentrasi logam berat Pb dan Cd di kawasan TPA lama Talang Gulo, Provinsi Jambi. Tanaman ini memiliki kemampuan untuk mengakumulasi logam berat, sehingga berkontribusi dalam proses remediasi tanah yang terkontaminasi/tercemar.

SUMMARY

This study focuses on the remediation of soil contaminated with heavy metals such as lead (Pb) and cadmium (Cd) at the former Talang Gulo Final Disposal Site (TPA) in Jambi Province. The remediation process was carried out by utilizing Sansevieria trifasciata laurentii plants as phytoremediation agents. The background of this research is based on the significant level of soil contamination caused by heavy metals Pb and Cd in the area. Based on the results of a preliminary study, it was found that the concentration of lead was 615 mg/kg and cadmium was 5.145 mg/kg in the soil at the former Talang Gulo landfill, exceeding the limits set by the Indonesian Ministry of Health Regulation Number 2 of 2023 concerning the Implementation of Government Regulation Number 66 of 2014 on Environmental Health and Soil Quality Standards, which are 300 mg/kg for lead and 3 mg/kg for cadmium.The objectives of this study are: (a) to analyze the concentrations of lead and cadmium in leachate-contaminated soil before and after the application of phytoremediation techniques, and (b) to analyze the effectiveness of Sansevieria trifasciata laurentii plants in reducing the concentrations of lead and cadmium in leachate-contaminated soil at the former Talang Gulo landfill in Jambi.

This study employed a laboratory experimental method using phytoremediation techniques with Sansevieria trifasciata laurentii plants. Soil samples were collected from around the leachate pond, homogenized, and the plants were acclimatized for 14 days. Phytoremediation was carried out over four different time periods, namely 2, 4, 6, and 8 weeks. The observed parameters included the concentrations of Pb and Cd before and after remediation, the accumulation of metals within the plants, and plant growth. Heavy metal concentrations were analyzed using Atomic Absorption Spectrophotometry (AAS) after sample digestion, and the data were tested using a T-test to determine significant differences.

The results of the study show that over an 8-week observation period, Sansevieria trifasciata laurentii was able to effectively reduce the concentrations of heavy metals Pb and Cd at the former Talang Gulo landfill site in Jambi. During the 8-week observation period, a significant decrease in metal concentrations was observed. Sansevieria trifasciata laurentii successfully absorbed Pb by 61% to 91% and Cd by 52% to 83%. Based on the results of the T-test, the significance value obtained was 0.040, which means 0.040 < 0.05. The calculated t-value (tcount) was 7.867, and the t-table value (ttable) was 63.138. Therefore, it can be concluded that tcount is smaller than ttable (7,867 < 63.138). Based on this value, it indicates that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, meaning there is a significant difference in the reduction of lead and cadmium

concentrations before and after the phytoremediation technique using Sansevieria trifasciata laurentii. This study shows that Sansevieria trifasciata laurentii can be used to reduce the concentration levels of Pb and Cd at the former Talang Gulo landfill area in Jambi Province. This plant has the ability to accumulate heavy metals, thereby contributing to the remediation process of contaminated soil.