

**ANALISIS RISIKO EKOLOGIS PADA BADAN AIR
PENERIMA AKIBAT PENCEMARAN
LOGAM BERAT LINDI SAMPAH B3 DI
TPA AIR DINGIN KOTA PADANG**

TUGAS AKHIR

Sebagai salah satu syarat untuk menyelesaikan
Program Strata -1 pada
Departemen Teknik Lingkungan
Fakultas Teknik Universitas Andalas



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PADANG**

2026

ABSTRAK

Pencampuran sampah bahan berbahaya dan beracun (B3) dengan sampah kota di TPA Air Dingin Kota Padang berpotensi menghasilkan air lindi yang mengandung logam berat dan memberikan tekanan terhadap badan air penerima. Pengambilan sampel dilakukan dengan metode *grab sampling* pada titik *background*, *inlet*, *outlet*, dan badan air penerima pada kondisi sebelum dan sesudah hujan, sedangkan konsentrasi Pb, Cd, Cr, Zn, Ni, Cu, dan Fe dianalisis menggunakan *Atomic Absorption Spectrophotometry* (AAS). Hasil penelitian menunjukkan konsentrasi logam berat umumnya tertinggi pada *inlet* sesudah hujan, yaitu Fe 5,268 mg/L, Zn 0,650 mg/L, Pb 0,098 mg/L, Ni 0,075 mg/L, Cr 0,061 mg/L, dan Cu 0,018 mg/L, sedangkan Cd berada di bawah LOD ($<0,000006$ mg/L). Pada badan air penerima, Pb, Zn, dan Fe melampaui baku mutu PP Nomor 22 Tahun 2021, sedangkan Ni melampaui baku mutu setelah hujan; Cd pada air lindi masih memenuhi PermenLHK Nomor 59 Tahun 2016. Secara statistik, hanya Cr ($p = 0,044$) dan Cu ($p = 0,035$) yang menunjukkan perbedaan signifikan antara kondisi sebelum dan sesudah hujan. Analisis deskriptif-komparatif menunjukkan kesesuaian keberadaan Pb, Cr, Zn, Ni, Cu, dan Fe pada sampah B3 dan air lindi, yang mengindikasikan bahwa sampah B3 berpotensi menjadi salah satu sumber logam berat pada air lindi dan badan air penerima. Nilai ERI sebelum hujan berkisar 99–146 dan seluruhnya termasuk kategori risiko rendah, sedangkan setelah hujan meningkat menjadi 104–153 dengan *inlet* termasuk kategori risiko sedang. Ni, Cd, dan Pb memberikan kontribusi risiko ekologis terbesar berdasarkan nilai *Ecological Risk Factor* (Er).

Kata kunci: **air lindi, *Ecological Risk Index*, logam berat, sampah B3, TPA Air Dingin.**



ABSTRACT

The mixing of hazardous and toxic waste (B3 waste) with municipal solid waste at the Air Dingin Landfill, Padang City, has the potential to generate leachate containing heavy metals and exert pressure on the receiving water body. Samples were collected using the grab sampling method at the background, inlet, outlet, and receiving water body sampling points under pre-rainfall and post-rainfall conditions. The concentrations of Pb, Cd, Cr, Zn, Ni, Cu, and Fe were analyzed using Atomic Absorption Spectrophotometry (AAS). The results showed that heavy metal concentrations were generally highest at the inlet after rainfall, with Fe at 5.268 mg/L, Zn at 0.650 mg/L, Pb at 0.098 mg/L, Ni at 0.075 mg/L, Cr at 0.061 mg/L, and Cu at 0.018 mg/L, while Cd remained below the limit of detection (LOD) (<0.000006 mg/L). In the receiving water body, Pb, Zn, and Fe exceeded the quality standards stipulated in Government Regulation No. 22 of 2021, while Ni exceeded the standard only after rainfall; Cd in the leachate remained within the standard stipulated in Minister of Environment and Forestry Regulation No. 59 of 2016. Statistically, only Cr ($p = 0.044$) and Cu ($p = 0.035$) showed significant differences between pre-rainfall and post-rainfall conditions. Descriptive-comparative analysis showed a correspondence in the occurrence of Pb, Cr, Zn, Ni, Cu, and Fe in B3 waste and leachate, indicating that B3 waste may be one of the potential sources of heavy metals in leachate and the receiving water body. ERI values before rainfall ranged from 99 to 146, all of which were classified as low ecological risk, whereas after rainfall they increased to 104–153, with the inlet classified as moderate ecological risk. Ni, Cd, and Pb contributed the greatest ecological risk based on their Ecological Risk Factor (Er) values.

Keywords: ecological risk Index, hazardous and toxic waste, heavy metals, leachate, TPA Air Dingin

