

**ANALISIS KORELASI DAN VARIASI SPASIAL
KONSENTRASI LOGAM TIMBAL (Pb) DAN KROMIUM (Cr)
DALAM AIR DAN SEDIMEN SUNGAI BATANG KURANJI,
PADANG, SUMATRA BARAT**

TUGAS AKHIR

Sebagai salah satu syarat untuk menyelesaikan
Program Strata-1 pada
Departemen Teknik Lingkungan
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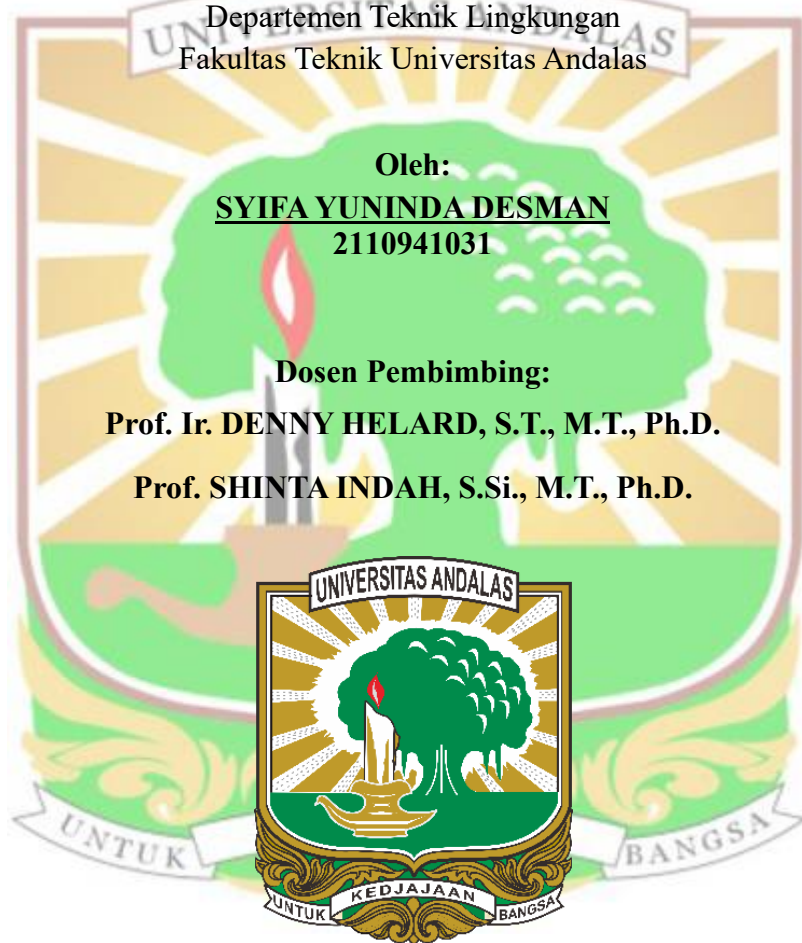
Oleh:

SYIFA YUNINDA DESMAN
2110941031

Dosen Pembimbing:

Prof. Ir. DENNY HELARD, S.T., M.T., Ph.D.

Prof. SHINTA INDAH, S.Si., M.T., Ph.D.



**PROGRAM STUDI SARJANA TEKNIK LINGKUNGAN
DEPARTEMEN TEKNIK LINGKUNGAN
FAKULTAS TEKNIK - UNIVERSITAS ANDALAS
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ABSTRAK

Aktivitas manusia di sepanjang Sungai Batang Kuranji menyebabkan peningkatan konsentrasi logam berat, seperti timbal (Pb) dan kromium (Cr), dalam air dan sedimen. Penelitian ini bertujuan menganalisis korelasi serta variasi spasial konsentrasi Pb dan Cr. Sampling dilakukan tiga kali dengan jeda satu minggu selama enam minggu pada Februari–Maret 2025 di 8 titik aliran utama dan 4 titik sumber pencemar. Hasil menunjukkan konsentrasi rata-rata Pb dalam air 0,009–0,046 mg/L dan Cr 0,014–0,054 mg/L; sementara pada sedimen, Pb 7,022–14,822 mg/kg dan Cr 9,198–15,367 mg/kg. Konsentrasi Pb di hilir (A6–A8) melebihi standar mutu air kelas 1–3, demikian pula Cr di (A8). Pada sumber pencemar, konsentrasi Pb dan Cr masing-masing 0,015–0,336 mg/L dan 0,002–0,066 mg/L. Analisis korelasi rank spearman menunjukkan hubungan positif sangat kuat antara Pb dan Cr dalam air serta sedimen ($r = 0,847-0,926$). Terdapat korelasi negatif signifikan antara Pb dan DO ($r = -0,841$) serta Cr dan DO ($r = -0,831$), serta positif dengan temperatur ($r = 0,490-0,574$) dan debit ($r = 0,532-0,660$). Pada sedimen, Pb dan Cr berkorelasi positif dengan debit ($r = 0,683-0,690$). Tidak ditemukan korelasi signifikan antara konsentrasi logam dengan dengan pH sungai. Analisis spasial menggunakan one-way ANOVA ($\alpha = 0,05$) dengan post-hoc LSD dan Games-Howell, serta Kruskal-Wallis untuk uji nonparametrik, menunjukkan perbedaan signifikan konsentrasi Pb dan Cr di bagian hulu, tengah, dan hilir sungai. Hasil penelitian ini menjadi referensi untuk merancang program pengendalian pencemaran logam berat efisien di Sungai Batang Kuranji.

Kata kunci: korelasi, Kromium (Cr), Sungai Batang Kuranji, Timbal (Pb), variasi spasial.



ABSTRACT

Human activities along the Batang Kuranji River have caused an increase in the concentration of heavy metals, such as lead (Pb) and chromium (Cr), in water and sediments. This study aims to analyze the correlation and spatial variation of Pb and Cr concentrations. Sampling was conducted three times at one-week intervals over six weeks in February–March 2025 at eight main flow points and four pollution source points. The results showed that the average concentration of Pb in water was 0.009–0.046 mg/L and Cr was 0.014–0.054 mg/L; while in sediments, Pb was 7.022–14.822 mg/kg and Cr was 9.198–15.367 mg/kg. The concentration of Pb downstream (A6–A8) exceeded the class 1-3 water quality standard, as did Cr at (A8). At the pollution source, the concentrations of Pb and Cr were 0.015–0.336 mg/L and 0.002–0.066 mg/L, respectively. Spearman's rank correlation analysis showed a powerful positive relationship between Pb and Cr in water and sediment ($r = 0.847$ – 0.926). There was a significant negative correlation between Pb and DO ($r = -0.841$) and Cr and DO ($r = -0.831$), and a positive correlation with temperature ($r = 0.490$ – 0.574) and discharge ($r = 0.532$ – 0.660). In sediments, Pb and Cr were positively correlated with discharge ($r = 0.683$ – 0.690). No significant correlation was found between metal concentrations and river pH. Spatial analysis using one-way ANOVA ($\alpha = 0.05$) with post-hoc LSD and Games-Howell, as well as Kruskal-Wallis for nonparametric tests, showed significant differences in Pb and Cr concentrations in the upper, middle, and lower reaches of the river. The results of this study serve as a reference for designing an efficient heavy metal pollution control program in the Batang Kuranji River.

Keywords: Batang Kuranji River; Chromium (Cr), correlation, , Lead (Pb), spatial variation.

