

ABSTRAK

Tifani Eka Anggraini

INOVASI PEMANFAATAN LIMBAH CAIR HCL DARI PABRIK PUPUK ZK
SEBAGAI PRODUK PEMBERSIH LANTAI

(Studi Kasus pada PT Petrokimia Gresik Tahun 2025)

xvi + 78 Halaman + 13 Tabel + 6 Lampiran

Limbah cair hydrochloric acid (HCl) yang berasal dari proses produksi pupuk ZK di PT Petrokimia Gresik mencapai 22 ton grade A dan 18 ton grade B setiap hari. Karakteristik limbah ini tergolong bahan berbahaya dan beracun karena bersifat korosif dan memiliki keasaman tinggi. Potensi pencemaran lingkungan dan risiko kesehatan menjadi tantangan utama jika tidak dikelola secara tepat. Penelitian ini bertujuan menghasilkan formulasi pembersih lantai berbasis limbah cair HCl sebagai solusi inovatif dalam pemanfaatan limbah industri secara aman dan fungsional.

Desain penelitian berupa eksperimen laboratorium dengan rancangan post-test only control group. Sampel limbah diambil langsung dari unit produksi dan diformulasi dalam variasi konsentrasi sebesar 0%, 5%, 9%, dan 17%. Komposisi tambahan berupa surfaktan, pengental, dan pewangi digunakan untuk melengkapi formulasi. Evaluasi dilakukan melalui pengujian pH dan uji organoleptik terhadap lima parameter sensoris yaitu kenampakan, aroma, tekstur, kilap permukaan, dan kesan keseluruhan, dengan acuan SNI 1842:2019.

Hasil menunjukkan bahwa peningkatan konsentrasi HCl berkorelasi dengan peningkatan tingkat keasaman produk, dengan nilai pH terukur berada dalam rentang 2,50 hingga 1,55. Formulasi dengan konsentrasi 9% memperoleh penilaian paling baik dari panelis dalam hal kesan keseluruhan, menunjukkan keseimbangan optimal antara efektivitas pembersih dan kenyamanan sensoris.

Pemanfaatan limbah cair HCl sebagai bahan aktif pembersih lantai terbukti efektif dan aman digunakan. Inovasi ini memberikan alternatif solusi pengelolaan limbah industri yang aplikatif dan bernilai tambah.

Kata kunci: Limbah Cair HCl, Pembersih Lantai, Industri Pupuk

Daftar bacaan: 21 buku (2003–2024), 51 jurnal/artikel/prosiding (2012–2024), 5 situs website (2018–2024), 7 regulasi/peraturan (2001–2023)

ABSTRACT

Tifani Eka Anggraini

INNOVATION IN UTILIZING HCl LIQUID WASTE FROM ZK FERTILIZER FACTORY AS A FLOOR CLEANER PRODUCT

(Case Study at PT Petrokimia Gresik in 2025)

xvi + 78 Pages + 13 Tables + 6 Appendices

Hydrochloric acid (HCl) liquid waste generated during the production of ZK fertilizer at PT Petrokimia Gresik reached 22 tons of grade A and 18 tons of grade B per day. This waste was categorized as hazardous due to its corrosive properties and high acidity. Improper handling posed serious threats to both environmental and human health. This study aimed to formulate a floor cleaning product using industrial-grade HCl liquid waste as a safe and functional reuse solution.

The research applied a post-test-only control group design in a laboratory setting. Waste samples were taken directly from the production unit and formulated into four concentrations: 0%, 5%, 9%, and 17%. Additional components such as surfactants, thickeners, and fragrances were incorporated into the product. Product evaluation involved pH measurements and organoleptic tests covering appearance, aroma, texture, surface shine, and overall impression, based on the criteria outlined in SNI 1842:2019.

Results showed that higher HCl concentrations increased product acidity, with pH values ranging from 2.50 to 1.55. Among the tested formulations, the 9% HCl product received the most favorable panelist responses in terms of overall impression, suggesting an optimal balance between cleaning performance and user comfort.

Industrial-grade HCl liquid waste was successfully utilized as an effective and safe component in floor cleaner formulation. This innovation provided a practical and value-added alternative for industrial waste management.

Keywords: HCl liquid waste, floor cleaner, fertilizer industry

References: 21 books (2003–2024), 51 journals/articles/proceedings (2012–2024), 5 websites (2018–2024), 7 regulations (2001–2023)