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ABSTRAK

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PENGARUH VARIASI DOSIS LARUTAN KOAGULAN POLY ALUMINIUM CHLORIDE (PAC) 30% TERHADAP KADAR CHEMICAL OXYGEN DEMAND (COD) PADA AIR LINDI (Studi di Tempat Pemrosesan Akhir Ciangir Kota Tasikmalaya)

Pengelolaan sampah secara konvensional yang masih mengandalkan Tempat Pemrosesan Akhir (TPA) dengan jumlah sampah yang sangat besar akan menimbulkan berbagai dampak lingkungan, salah satunya terbentuknya air lindi (*leachate*). Penanganan lindi yang belum tepat dapat menyebabkan pencemaran lingkungan dan penyebaran penyakit diantaranya diare dan dermatitis. Tujuan dari penelitian ini untuk meneganalisis pengaruh variasi dosis larutan koagulan *Poly Aluminium Chloride* (PAC) 30% terhadap kadar *Chemical Oxygen Demand* (COD) pada air lindi Tempat Pemrosesan Akhir (TPA) Ciangir. Penelitian ini menggunakan metode penelitian kuasi-eksperimen dengan desain studi *nonequivalent control group*. Sampel penelitian merupakan sebagian air lindi yang ada di kolam monitoring outlet yang diambil menggunakan metode *grab sampling*. Variabel bebas penelitan ini merupakan variasi dosis larutan koagulan PAC 30% 4,55 ml; dosis 4,65 ml; dan dosis 4,75 ml. Variabel terikat penelitian ini merupakan kadar COD pada air lindi. Analisis univariat menggunakan rumus efisiensi yang menunjukkan persentase penurunan kadar COD. Analisis bivariat dilakukan menggunakan uji Kruskal Wallis dan Post Hoc Dunn's Test untuk mengetahui pasangan mana yang berbeda signifikan. Menunjukkan adanya perbedaan kadar COD yang signifikan pada perlakuan berbagai variasi dosis larutan koagulan (*p-value* = 0,001). Variasi dosis larutan koagulan PAC 30% memiliki pengaruh terhadap kadar COD pada air lindi TPA Ciangir dengan persentase rata-rata penurunan terbesar sebanyak 40,9%. Penelitian selanjutnya dapat menggunakan konsentrasi larutan PAC yang berbeda dan rentang variasi dosis koagulan PAC yang lebih luas dengan perkiraan penurunan COD dalam perlakuan 1 ml PAC 30% sebesar 156,39 mg/L serta dikombinasikan dengan variasi kondisi operasional. Proses koagulasi-flokulasi dengan PAC 30% dapat dikombinasikan dengan proses pengolahan lain (fisika, kimia, biologi) dalam suatu rangkaian pengolahan air lindi,

sehingga penurunan kadar pencemar dapat lebih optimal sampai memenuhi baku mutu.
Kata Kunci: Koagulan, PAC, Lindi, TPA, COD

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ABSTRACT

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THE EFFECT OF VARIATION IN POLY ALUMINIUM CHLORIDE (PAC) 30% COAGULANT SOLUTION DOSAGE ON CHEMICAL OXYGEN DEMAND (COD) LEVELS IN LEACHATE (Study at the Ciangir Final Processing Site, Tasikmalaya City)

Conventional waste management, which still relies on Landfills (TPA) with a very large amount of waste, will cause various environmental impacts, one of which is the formation of leachate. Improper leachate handling can lead to environmental pollution and the spread of diseases, including diarrhea and dermatitis. The purpose of this research is to determine the effect of variations in dosage of 30% Poly Aluminium Chloride (PAC) coagulant solution on the Chemical Oxygen Demand (COD) levels in leachate at the Ciangir Landfill. This study used a quasi-experimental research method with a nonequivalent control group study design. The research sample consisted of a portion of leachate from the monitoring pond outlet, collected using the grab sampling method. The independent variable of this study was the variation in dosage of the 30% PAC coagulant solution: 4.55 ml; 4.65 ml; and 4.75 ml. The dependent variable of this study is the COD level in leachate. Univariate analysis was performed using an efficiency formula that indicates the percentage decrease in COD levels. Bivariate analysis was conducted using the Kruskal-Wallis test and Dunn's Post Hoc Test to identify which pairs differed significantly. It was found that there was a significant difference in COD levels with the treatment of various doses of coagulant solution (p-value = 0.001). Variations in the dose of 30% Poly Aluminium Chloride (PAC) solution affected the Chemical Oxygen Demand (COD) levels in leachate at the Ciangir Final Processing Site (TPA), with the highest average reduction being 40.9%. Future studies may use different PAC solution concentrations and a wider range of PAC coagulant doses, with an estimated COD reduction of 156.39 mg/L for the treatment using 1 ml of 30% PAC, and can be combined with variations in operational conditions. The coagulation-flocculation process with 30% PAC can be combined with other treatment processes (physical, chemical, biological) in a leachate treatment sequence, so that pollutant levels can be reduced more optimally to meet quality standards.

Key Word: Coagulant, PAC, Leachate, Landfill, COD