THE EFFECTIVENESS OF VARYING THE NUMBER OF LAYERS IN A GREASE TRAP UNIT FOR REDUCING OIL AND FAT LEVELS AT THE MARGOMULYO SEYEGAN WASTEWATER TREATMENT PLANT

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ABSTRACT

Background : *Large-scale food production at the Nutrition Service Unit (SPPG) generates wastewater with high oil and fat content. The Margomulyo SPPG has implemented filtration using wasp nest media and bioballs, but the wastewater still exhibits an oil film, sediment, and an odor. An oil and fat separation unit is needed, such as a grease trap with varying numbers of layers (partitions).*
Objective : *To determine the effectiveness of varying the number of layers (3, 4, and 5 layers) in grease trap units in reducing the oil and fat content of kitchen wastewater at the SPPG Margomulyo Seyegan facility.*
Methods : *A quasi-experimental study with a pre-test and post-test design without a control group. The grease trap units consisted of acrylic tanks measuring 30 × 25 × 25 cm with removable partitions; each layer variation was replicated 5 times (15 experimental units). Wastewater was collected via grab sampling in October 2026 and analyzed using the gravimetric method (SNI 6989.10:2011). The data were analyzed using a one-sample t-test and one-way ANOVA ($\alpha = 0.05$).*
Results : *Oil and fat levels decreased from 31,532 mg/L to a mean of 3,245.40 mg/L with 3 layers (89.71%), 10,760.20 mg/L with 4 layers (65.87%), and 7,773.00 mg/L with 5 layers (75.35%). The reductions were significant in all variations ($p < 0.001$; $p < 0.001$; $p = 0.002$), but effectiveness did not differ significantly among them (One Way ANOVA, $p = 0.090$).*
Conclusion : *Grease traps with 3, 4, and 5 layers effectively reduce oil and fat levels, but adding more layers does not significantly increase their effectiveness. The 3-layer configuration yields the highest and most consistent average results.*
Keywords : *grease trap, number of layers, oil and fat, kitchen wastewater, SPPG.*

EFEKTIVITAS VARIASI JUMLAH LAYER PADA UNIT *GREASE TRAP* UNTUK MENURUNKAN KADAR MINYAK DAN LEMAK DI SPPG MARGOMULYO SEYEGAN

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ABSTRAK

Latar Belakang : Kegiatan produksi makanan skala besar di Satuan Pelayanan Pemenuhan Gizi (SPPG) menghasilkan air limbah dengan kandungan minyak dan lemak yang tinggi. SPPG Margomulyo telah menerapkan filtrasi dengan media sarang tawon dan biobal, tetapi air limbahnya masih menunjukkan lapisan minyak, endapan, dan bau. Diperlukan unit pemisah minyak dan lemak, salah satunya *grease trap* dengan variasi jumlah layer (sekat).
Tujuan : Mengetahui efektivitas variasi jumlah layer (3, 4, dan 5 layer) pada unit *grease trap* dalam menurunkan kadar minyak dan lemak air limbah dapur SPPG Margomulyo Seyegan.
Metode : Penelitian eksperimen semu dengan rancangan *pre-test and post-test without control group*. Unit *grease trap* berupa bak akrilik 30 × 25 × 25 cm dengan sekat bongkar pasang, masing-masing variasi layer diulang 5 kali (15 unit percobaan). Air limbah diambil secara *grab sampling* pada Oktober 2026 dan diperiksa dengan metode gravimetri (SNI 6989.10:2011). Data dianalisis dengan *a one-sample t-test* dan *One Way ANOVA* ($\alpha = 0,05$).
Hasil : Kadar minyak dan lemak sebelum perlakuan 31.532 mg/L, turun menjadi rata-rata 3.245,40 mg/L pada 3 layer (89,71%), 10.760,20 mg/L pada 4 layer (65,87%), dan 7.773,00 mg/L pada 5 layer (75,35%). Penurunan signifikan pada ketiga variasi ($p < 0,001$; $p < 0,001$; $p = 0,002$), tetapi tidak ada perbedaan efektivitas antar variasi layer (*One Way ANOVA*, $p = 0,090$).
Kesimpulan : Grease trap dengan 3, 4, dan 5 layer efektif menurunkan kadar minyak dan lemak, tetapi penambahan layer tidak meningkatkan efektivitas secara signifikan. Variasi 3 layer memberikan rata-rata tertinggi dan paling konsisten.
Kata Kunci: *grease trap, jumlah layer, minyak dan lemak, air limbah dapur, SPPG*