Ministry of Health of the Republic of Indonesia
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"DEVELOPMENT OF AN AIR FILTER DEVICE TO REDUCE DUST LEVELS"
xiv + 68 Pages + 3 Tables + 3 Figures + 3 Appendices

ABSTRACT

Household air pollution poses a risk of respiratory illness. PM10 concentrations in Indonesia frequently exceed the WHO threshold (45 µg/m³), necessitating the use of simple technology to reduce them. The purpose of this research was to develop a prototype air filter and determine the difference in PM10 levels before and after the filtration process.

This research was a development experiment using the ADDIE model. The device, which is based on a cyclone separator, baffle filter, and wet scrubber, was tested in a simulated egg carton combustion scenario within a closed box. PM10 concentrations were measured using an Air Quality Monitor (AQM) under control and treatment conditions for approximately 45 minutes with nine replications. Data were analyzed using ANOVA (α = 0.05).

The results showed an average PM10 level of 900 µg/m³ for the control and 725.4 µg/m³ for the treatment, with a reduction of 174.6 µg/m³. The ANOVA test <001 confirmed a significant difference (p < 0.05).

The conclusion is that the device has been shown to reduce PM10 concentrations significantly; however, it has not yet achieved the WHO standards. Therefore, it is recommended that the design be improved and tested in real-world household conditions.

Keywords: Air purifier, PM 10
References: 26 (1999-2023)

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RIZKY BUNDAN PERMADI

"PENGEMBANGAN ALAT PENYARING UDARA PENURUN KADAR DEBU"

xiv + 68 Halaman + 3 Tabel + 3 Gambar + 3 Lampiran

ABSTRAK

Polusi udara dalam rumah tangga berisiko menimbulkan penyakit pernapasan. Konsentrasi *PM10* di Indonesia sering melebihi ambang batas *WHO* (45 µg/m³), sehingga diperlukan teknologi sederhana untuk menurunkannya. Tujuan penelitian ini adalah mengembangkan prototipe alat penyaring udara dan mengetahui perbedaan kadar *PM10* sebelum dan sesudah proses penyaringan.

Jenis Penelitian ini adalah eksperimen pengembangan dengan model *ADDIE*. Alat berbasis *cyclone separator, baffle filter,* dan *wet scrubber* diuji pada simulasi pembakaran kardus telur dalam *box* tertutup. Konsentrasi PM10 diukur dengan *Air Quality Monitor (AQM)* pada kondisi kontrol dan perlakuan selama ±45 menit dengan 9 ulangan. Data dianalisis menggunakan ANOVA (α = 0,05).

Hasil menunjukkan rata-rata *PM10* kontrol 900 µg/m³, perlakuan 725,4 µg/m³, dengan penurunan 174,6 µg/m³. Uji ANOVA <001 menegaskan perbedaan signifikan (p < 0,05).

Kesimpulan Alat terbukti menurunkan konsentrasi *PM10* secara signifikan, namun belum mencapai standar *WHO.* Oleh karena itu disarankan Perlu perbaikan desain dan uji di kondisi nyata rumah tangga.

Kata Kunci: Penyaring udara, *PM 10.*
Daftar Bacaan: 26 (1999-2023)