

***Design and Development of a Waste Incinerator Stove Using Wet Scrubber
Filtration System***

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ABSTRACT

Improper waste management can lead to environmental pollution, especially when combustion methods produce harmful emissions. This study aims to design and develop a waste incinerator stove with a wet scrubber filtration system to enhance combustion efficiency while reducing air pollution. The system consists of a burner, combustion chamber, filtration chamber, and a wet scrubber system that filters exhaust gases. The research involved the design, construction, and testing of the system using three different waste loads (10 kg, 20 kg, and 30 kg). The tests were conducted to measure combustion duration, waste oil consumption, and the effectiveness of filtration in reducing gas emissions. The results showed that 10 kg of waste burned in 20 minutes using 500 ml of waste oil, 20 kg burned in 40 minutes using 1000 ml of oil, and 30 kg burned in 60 minutes using 1500 ml of oil. Based on fuel consumption patterns, burning 45 kg of waste is estimated to take 90 minutes with 2.25 liters of waste oil. The three-stage wet scrubber filtration system successfully reduced exhaust emissions significantly. This system has proven to be efficient, consistent, and environmentally friendly, making it suitable for use in Islamic boarding schools that generate 45 kg of waste per day.

Keywords: *Waste Burner Stove, Wet Scrubber Filtration, Used Oil*