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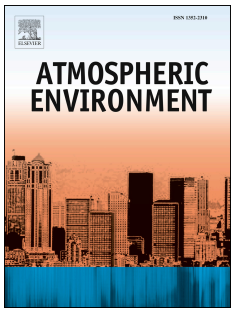

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Real-world exhaust emissions and fuel consumption for diesel vehicles fueled by waste cooking oil biodiesel blends

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Abstract

The real-world exhaust emissions and fuel consumption of on-road diesel vehicles, fueled by waste cooking oil biodiesel blends, were measured using a portable emission measurement system (PEMS). Two light-duty diesel trucks (LDDTs) and two heavy-duty diesel trucks (HDDTs) filled with four mixed fuels with blend ratios of 0% (neat diesel), 5% (B5), 20% (B20), and 100% (B100) (biodiesel in traditional fossil diesel) were tested. The results show that the total fuel consumption (biodiesel + traditional fossil diesel) did not clearly decrease, but blending biodiesel into traditional fossil diesel could clearly decreased the consumption of traditional fossil diesel, reduce the countries' dependence on oil imports. Converting waste cooking oil into biofuel and blending with diesel is a three-win alternative, dealing simultaneously with greenhouse gas (GHG) emission, food security, and energy security. The CO, HC, NO_X and $PM_{2.5}$ emissions for all of the tested vehicles decreased with increasing biodiesel content in the blend, with the exception of $PM_{2.5}$ and NO_X for D3, the NO_X emissions showed a decrease with increasing biodiesel content in the blend for most

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