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1 Real-world exhaust emissions and fuel consumption for diesel 2 vehicles fueled by waste cooking oil biodiesel blends

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9 **Abstract**

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

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