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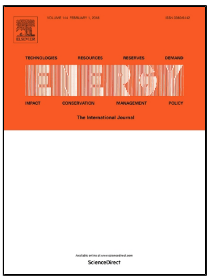

Performance and Emissions of a Diesel Engine Fueled by Biodiesel-Diesel Blends with Recycled Expanded Polystyrene and Fuel Stabilizing Additive

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ABSTRACT

Increasingly strict emission regulations along with man-made global warming has peaked interest in clean burning diesel engines. This study investigates performance and emissions of a diesel engine fueled by biodiesel-diesel blends with recycled expanded polystyrene (EPS) and fuel stabilizing additive acetone. A HATZ 2-cylinder direct injection (DI) diesel engine was used for this investigation and the engine was tested at three different engine speeds: low (1000 rpm), medium (2100 rpm) and high (3000 rpm). Three load conditions: low (≈25%), medium (>50%), and high (full load) are tested. Brake specific fuel consumption (BSFC) and brake thermal efficiency (BTE) are determined as the performance parameters of the engine. Emission analysis was conducted for oxides of nitrogen (NOx), smoke opacity, and carbon monoxide (CO). Performance and emission results of different blends of EPS-dissolved biodiesel with or without stabilizing additive acetone are compared with that of diesel. Investigation results demonstrate that EPS contributed in increasing heating values of EPS-dissolved biodiesel. Acetone as a stabilizing additive lowered the viscosity and cloud point of the blends. In the drawback side, EPS increased viscosity, and acetone reduced the heating value of the blends. In general, EPS-dissolved biodiesel with or without acetone produced lower smoke, CO and NOx.

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