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Experimental investigation of performance, emissions and tribological characteristics of B20 blend from cottonseed and palm oil biodiesels

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Abstract

Reserves of fossil fuel are being depleted, and its use to generate energy also affects the environment. Sustainable and clean energy sources, therefore, need to be produced to meet the demands. In this research, combined blended fuels were produced from cottonseed and palm oil methyl esters with petroleum diesel fuel. To achieve the benefits of palm oil biodiesel (high calorific value) and cottonseed oil biodiesel (low kinematic viscosity and acid value), the combined biodiesel blend (C05P15, C10P10, and C15P05) has been tested to assess their effect on engine performance, emissions, and tribological properties. The physicochemical properties of all fuels were measured following ASTM D6751 standard. A single-cylinder, 4-stroke, and the natural aspiration diesel engine were used for engine testing. The experimental results showed that all combined blended fuels have low brake thermal efficiency and emitted fewer hydrocarbons, carbon monoxide, and smoke opacity apart from nitrogen oxides compared with petroleum diesel fuel. Based on results, the combined blended fuel can be used as a substitute fuel in diesel engines without any engine modifications. © 2021 Elsevier Ltd

Author Keywords

Cottonseed oil biodiesel; Diesel engine; Emissions; Palm oil biodiesel; Performance; Tribology

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