



Effect of Biodiesel on Compression Ignition Engine's Combustion Behavior and Particle Emission

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Abstract. Diesel Engines are widely known for a high compression ratio, which is proportional to the engine's efficiency. The effect from direct injection of a diesel engine generates particulate matter (PM). PMs are mainly composed of Soot and Metallic Ash, which are harmful to human health. This research describes thermal efficiency, engine performance and combustion behavior at various load (20%, 50%, and 80%) and fuel (B7, B20, and B100) by using combustion pressure analyzer. The experimental results demonstrated that B100 has the highest ISFC and lowest ISEC for all test series owing to the highest indicated thermal efficiencies. Operating load and fuel are strongly proportional to heat release rate and ignition delay. The heat release rate of low load condition is retarded compare with medium and high load. Conventional diesel and biodiesel PMs were investigated by using Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM). The average size of ultrafine particles that obtained from the experiment are range of 50-500 nm and primary nanoparticle size of B7 and B100 are in range of 25-50 nm.

Keywords: Biodiesel, Diesel Engine, Combustion Behaviour, Particle Emission