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**Study of combustion performance of biodiesel for potential application in motorsport**

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**Abstract**

The variability in viscosity and combustion quality has been identified from the literature as a barrier to the use of biodiesel fuels in motorsport. These parameters can affect performance, emissions and fuel consumption. Diesel engines have had recent success in endurance and touring car racing; biodiesel is an opportunity to increase the sustainability of this emerging area of motorsport.

Methyl esters from rapeseed, soybean and sunflower oils were tested alongside EN 590 diesel fuel. Variations in fuel consumption, output torque and power were observed between the fuels. Further tests were carried out on an automotive diesel engine to evaluate the in-cylinder pressures for soybean B100, beef tallow B50 and EN 590 to gain understanding of the reasons behind the performance differences noted in the initial tests.

Retarding the start of injection for B50 and B100 biodiesel improved the peak torque by up to 5% enabling the production of equal torque at the same engine speed when compared to EN 590 but with lower peak in-cylinder pressure and a shorter ignition delay. The application of this to motorsport is the potential to achieve higher peak power outputs; the shorter ignition delay and more rapid combustion has the potential to be used to raise the maximum engine speed and therefore the peak power output of diesel engines for motorsport.

**Keywords**

Biodiesel, high performance, motorsport

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