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## **Experimenteller Vergleich des Strahlausbreitungs- und Verbrennungsverhaltens von Bio- und Mineralöldiesel**

*Experimental comparison of the spray formation and combustion behaviour of biodiesel and mineral diesel*

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### **Abstract**

Bio diesel and its blends seem to be promising completions on a way to a modern energy mix in the traffic sector. So far a lot of work has been done all over the world to evaluate the effects of the use of bio diesel on exhaust gas emissions. This paper presents studies on the in-cylinder behaviour of bio diesel in comparison to mineral diesel.

A first step was the rheological characterization of the used fuels to determine differences in kinematic viscosity and surface tension. The results were, that bio diesel shows a higher kinematic viscosity (factor 2) as well as a higher surface tension as mineral diesel thus leading to the assumption of different spray behaviour.

Experiments on differences in spray characteristics were carried out in a high-temperature high-pressure chamber by use of elastic scattered light (Mie). The experiments showed that due to its higher viscosity and surface tension bio diesel in some cases shows differences in spray break-up mechanism compared to mineral diesel. For example this manifests in lower injection velocities of the bio diesel.

Furthermore the combustion of the chosen fuels was investigated in a rapid compression machine (RCM). A combination of Mie straylight and flame luminescence detection with a high-speed camera system gave the capability to detect the spray and flame progress within one piston stroke. It was observed that bio diesel shows a higher ignition delay and has its problems with evaporation in non-heated engines. Peak pressures and pressure gradients seemed to be similar to mineral diesel.