Deliverable report

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Technical coordination	FEV (DE) (www.fev.com)
Project management	Uniresearch (NL) (http://www.uniresearch.com)

Executive Summary

The overall objective of the REDIFUEL project is to develop and validate a novel and cost-competitive process for sustainable production of renewable diesel that is fully compatible with the EN590 fuel standard. The proposed drop-in biofuel is composed of high-cetane number C_{11+} bio-hydrocarbons and C_6-C_{11} bio-alcohols, resulting in improved combustion performance and reduced emissions - owing to the share of alcohols and the paraffinic stucture.

One of the major activities in the REDIFUEL project is to study the new bio-fuel (i.e., REDIFUEL) in terms of combustion and emission behaviour. The aim is to use the new bio-fuel REDIFUEL as a drop-in fuel and the experiments were conducted with the existing engine technology to see the effect of it on the efficiency and reduction in emission. Hence, it is important to investigate spray and evaporation performance of the new bio-fuel in a High Pressure Chamber (HPC). The HPC testing was chosen because the boundary conditions of measurement volume can be maintained as a steady-state. Further, the gas density and temperature can be adjusted similar to as it appears within the engine at the time of injection. The HPC optical access allows Mie scattered light, shadowgraphic, and excited-state OH (OH*) radiation measurements of the injection spray from the horizontal sides. One of the horizontal side access will be used to insert a Heavy-Duty (HD) injector, of same nozzle geometrical features as the one featured by the Single Cylinder Engine (SCE). For these investigations, a special three-hole nozzle is adopted to avoid optical overlap of neighbouring sprays. The know-how gain from this experimental study will be used to calibrate the spray model of the 3D-CFD simulations. This report gives a short overview concerning the spray and combustion behaviour of the new bio-fuel REDIFUEL.

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Project partners:
1 - FEV – FEV EUROPE GMBH - DE
2 - MPI – MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTENEV - DE
3 - CSIC – AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS - ES
4 - VTT – Teknologian tutkimuskeskus VTT Oy - FI
5 - RWTH – RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN - DE
6 - OWI – Science for Fuels gGmbH - DE
7 - VUB – VRIJE UNIVERSITEIT BRUSSEL- BE
8 - NESTE – NESTE OYJ – FI
9 - MOL – MOL HUNGARIAN OIL AND GAS PLC - HU
10 - INER – INERATEC GMBH - DE
11 - T4F – TEC4FUELS - DE
12 - UNR – UNIRESEARCH BV – NL

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