



2nd VegOil

Demonstration of 2nd Generation Vegetable Oil Fuels in Advanced Engines

**Workpackage 5
Engine Demonstration**

**Deliverable N° 5.1:
Four stage 3A compliant demon-
stration vehicles**

Publishable summary

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List of acronyms

DPF	Diesel particle filter
ECU	Engine control unit
EGR	Exhaust gas recirculation
FLRS	Full load rated speed (2100 rpm for all tractors in scope)
JD	John Deere
JDWM	John Deere Werke Mannheim
NO _x	Nitrogen oxides
SN	Serial number of tractor
RO	Rapeseed oil
VWP	Vereinigte Werkstätten für Pflanzenöltechnologie





1 Summary

To demonstrate the vegetable oil capability of stage 3A John Deere tractors, a total of four serial tractors was converted in cooperation with VWP to run on 2nd generation vegetable oil. The conversion was carried out by VWP at the JD workshop in Mannheim. Before the conversion, JD workshop mechanics prepared the tractors.

After the conversions, all tractors were evaluated on JD test benches where performance and system functionality was approved. These measurements will also serve as a reference for later performance measurements.

More detailed information can be found in deliverable 5.8: Fourteen stage 3A compliant demonstration vehicles.

2 Preface

For the 2nd VegOil project a certain range of tractor models was selected for the fleet demonstration. These models are the 6830 Premium, 6930 Premium, 7430 Premium and 7530 Premium tractors of John Deere. Those models are powered by the 6068 PowerTech Plus engine at different power levels. The 6830 Premium and 6930 Premium tractors have got the CD6068HL481 engine and the 7430 Premium and 7530 Premium the CD6068HL482. The different power levels are implemented by different engine control software versions. The 6068 PowerTech Plus engines are four-valve engines with a high pressure common rail system for fuel injection. They are turbocharged and have an external exhaust gas recirculation (EGR) system including cooler to reduce NO_x emissions. The engines comply with the EU stage 3A emission level.

3 Conversion of the tractors

The tractors were converted by VWP at the John Deere Werke Mannheim. Before VWP applied their technology on the tractors, the vehicles were prepared by JD mechanics. The hood had to be dismantled as well as the muffler and the charge air cooler to reach the engine valve cover. Also the fuel filters and fuel supply pump were disassembled. Afterwards VWP modified the fuel system consisting of filters, supply pump and fuel lines for plant oil fuel.





Figure 1 JD 6930 Premium tractor directly off factory

Also the fuel preheating equipment is installed including all required electric circuits. After the hardware configurations the engine control software was adapted to improve the conditions for the combustion of the vegetable oil.

4 Validation and verification

The functionality and performance of the adapted tractors was evaluated and proofed at the JD dynamometer. These basic measurements will serve as a reference for further measurements to