

Brasilia, 22nd of March 2013.

Protocol

Workshop „Use of vegetable oil as fuel in diesel engines“ Inmetro (Xerém, Duque de Caxias), 21/03/2013

The German Embassy in Brasilia together with the National Institute of Metrology, Quality and Technology (Inmetro) organised the a. m. workshop, which was kindly hosted by Inmetro in Xerém, near Rio de Janeiro.

Due to the facts, that Inmetro is actually conducting scientific research about the use of vegetable oils in (small) tractors and that considerable experience about this issue is existing in public institutions and industry in Germany, it was mutually considered useful to have an expert meeting to get an overview about the actual situation in both countries and find out possibilities of cooperation. The workshop was held under the roof of the German Brazilian Agreement of Cooperation in Energy and is meant as a special contribution to the bilateral working group of biofuels.

Participants came from the Brazilian government, Inmetro, German Embassy and private and industrial companies of both countries; the list of participants is part of this protocol.

Dr. Klaus Thuneke from the TFZ (Technologie- und Förderzentrum Straubing), a research institution, which belongs to the Bavarian State Ministry for Food, Agriculture and Forestry, informed about the development of the use of vegetable oil fuel in tractors in Germany.

Research work started in the 1990s. In several field tests such as the „100-tractor-program“ launched in 2002, in which more than 100 tractors were modified for the use of vegetable oil fuel and monitored for three years, a number of technically feasible solutions was found. Now research focusses on low emissions and high efficiency of modern vegetable oil compatible tractors. Today, more than 270 medium and small scale oilmills provide the fuel – mostly rapeseed oil - in a decentralised manner. However, the oil can be produced in an industrial procedure, too. In either way it has to fulfil the relevant industrial standard DIN 51605 for rapeseed oil or the pre-standard DIN SPEC 51623 for other vegetable oils. Due to actual legislation, there is no economic incentive to use vegetable oil as a fuel today, but research is going on, e. g. in Bavaria.

Thomas Kaiser from the IEU (Institut für Energie und Umwelttechnik), Munich, explained that development of pure plant oil technology for direct injection engines started in Europe 30 years ago and specific solutions are now ready for market, mainly because of the common rail engine with its electronic motor management and the application of special fuel sensors.

The EU supported some research projects, i.e. for reaching the European stage 3a emission standard. Cold pressed vegetable oil, after having passed a simple procedure to reduce the minerals (P, Ca and Mg) can now be used as fuel in engines with modern exhaust gas aftertreatment systems. Fuel additives are subject of research to enable operation even under winter condition. He mentioned the large potential of vegetable oils available in Brazil and pointed to Austria, where since short time farmers can use vegetable fuel-oil tax-free instead of highly taxed diesel fuel.

Prof. Peter Pickel from the John Deere European Technology Innovation Center in Kaiserslautern, Germany, presented the newly developed John Deere „Multifuel“ agricultural tractor (prototype or technological concept). These tractors run with diesel (gasoil), biodiesel and plant oil either as pure fuels or in blends of these.

To achieve this, some minor hardware changes are necessary but mainly the control software of the common-rail-engines (6 cyl., 4 valve, 150 to 210 hp) was modified. Based on a fuel detection system, the engines are self-adapting to the different fuel types. Today, a technological challenge still is to optimize plant oil fuel use with regard to EU-emission standards Stage 3B and 4 (TIER 4i and 4) while the technological concept is ready with regard to emission level EU Stage 3A / TIER 3. Although still not developed to the level of a series product and thus not introduced into market, TIER 3 prototype tractors could already be made available for tests, further optimisation and demonstration in Brazil. It would be interesting to observe it working under Brazilian conditions, Mr. Pickel said. Another issue would be leveraging this interesting technology to other engines (e.g. to “uncertified” engines, or to 4 cyl. engines, or backward development to TIER 0 to 2) as well as practical tests with local plant oil fuels, especially soy bean oil.

Each presentation was followed by a detailed discussion about technical issues, concerning e. g. combustion, emissions and oil quality. Some political issues were also mentioned, like possible changes in the fuel policy. Inmetro and its industrial partner will be able to present results within a year. It was unanimously agreed to invite for a second workshop on that occasion.

It was also agreed to report about the workshop and on going action in the area of vegetable oil as fuel for diesel motors to the bilateral working group of biofuels.

After the workshop, Dr. Daroda offered a visit to the test-laboratories, which gave a good insight into the well-equipped test laboratories of Inmetro.