



First European Meeting on Metrology of Biofuels 6-7 November 2008 in Strasbourg

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Biofuels are considered as a relevant alternative source of energy complementary to the fossil fuels used today. Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 promotes the use of biofuels and other renewable fuels for transport. Within the Directive, the European Union establishes recommendations for partially replacing fossil fuels by biofuels. It is recognized that due to existing technological limits as well as with the view to avoid a significant influence on the feedstock prices, biofuel production will never be capable of replacing fossil fuels completely.

This first workshop “**BioFuels Met 2008 - biofuels and metrology**” was organized in Strasbourg, France, by the Laboratoire National de Métrologie et d'Essais (LNE) and the Physikalisch-Technische Bundesanstalt (PTB) in cooperation with the Collège Français de Métrologie (CFM). It aimed at exchanging ideas and feedback between scientists involved in this area to allow a better understanding of the metrological needs to support production and use of energy from biomaterials, with respect to technical and socio-economic issues, and to take on challenges to be solved in the near future.

The workshop dealt with metrology on all types of biomaterials used for energy production: biogas, liquid biofuel and solid materials. These biofuels should also be considered along with fossil fuels because they are often used in parallel or in combination.

The workshop was organized in different sessions with oral presentations and poster sessions: *Traceability, Environmental Sustainability, Legal Metrology and Standardization, Energy and Thermo-physical Properties, Health and Safety, and Engineering*. The meeting ended with a panel discussion on the definition of the prospective needs of metrology on the issue of biofuels.

70 people from around the world attended the meeting. Many National Metrology Institutes (NMIs) were represented at this workshop.

Following the presentations and the debate during the panel discussion with the invited experts, it is possible to draw some conclusions and to propose recommendations for “Biofuel Metrology”.

The metrological field of biofuels is a wide area that is comprised of both metrology in chemistry for traceably determining the composition of the fuels, and the determination of thermo-physical and transport properties. It furthermore requires the development of new measurement techniques.



The most challenging point is the necessary consideration and measurability of the social sustainability of all the measures taken.

Therefore, it needs an intrinsically interdisciplinary collaboration of all relevant metrology and standardization partners. A good example is the Tripartite Task Force (Brazil, the European Union and the United States of America) and the “White Paper on Internationally Compatible Biofuels Standards” they published on 31 December 2007, aiming at the harmonization of standards, which is obviously essential for international trade.

It has been stated that the NMIs worldwide do not need to mount parallel structures, but rather must activate the existing structures at an international level. The experts are of the opinion that NMIs should take leadership on the issue of biofuels. It is essential to have harmonization across borders and this can be done by bringing together the views:

- of regulatory and standardization organizations
- of metrology organizations at regional and international (CIPM) level
- of stake-holders such as trade organizations and car manufacturers
- of specialized research organizations.

Therefore, the metrology community should take clear actions to support standardization, regulation and accreditation bodies in order to achieve comparable, “standardized” measuring methods.

The issues to be resolved are complex and of different kinds, for instance related to engine parameters, sustainability, or health aspects. Therefore, these groups alone, but also the NMIs, cannot solve all the issues by themselves.

On the specific scientific role of metrology organizations and NMIs

From a general point of view, improving knowledge on biofuels requires competencies in very different fields, in physical and chemical areas, and, therefore, NMIs have to set up transverse activities. The priority for NMIs and related international institutes is to produce reference materials to be used as tools for method validation and instrument calibration. The most difficult task is the dissemination of these reference materials, because all field laboratories use them or should use them. Another important role for NMIs is also related to training, since there is a clear need for field testing laboratories to estimate their measurement uncertainty and to maintain traceability. It has been stated that the priority for the NMIs is to focus on the measurement traceability of important components of biofuels, and to acquire knowledge about the relevance of the so-called “sum-parameters” like pH_e and conductivity and their reliability as “quality indicators” for biofuels. There is a need for practical methods establishing the “trackability of biofuels”, that is to say for tracing the geographical origin of biomaterials, for evident reasons of sustainability.

It is one of the basic tasks of NMIs to establish metrological traceability of energy-content measurements of biofuels. This starts with the development of new physical standards for determining the calorific, thermal and transport properties of the relevant fuels related to their chemical composition and stretches to reliable field measurements and the standardization of



the methods used. The composition of the exhaust gases needs particular attention with respect to the effects on the environment and human health.

The Proficiency Testing (PT) providers should have an important role in supporting testing laboratories to improve their analytical competencies. NMIs can be part of this improvement process and provide necessary metrological assistance to PT providers. This could be done through the “supply” of a traceable reference value by the NMI to the PT scheme.

Regarding the documentary standards, opinions among experts are divided: some believe that the parameters and techniques are already well known, and there is simply a need to harmonize. Some others, on the other hand, consider that NMIs have to work on the relevance of methods and parameters currently used by field laboratories. Clear concepts are to be developed. This might be seen as a coordinating task of international metrological organizations.

The environmental and societal aspects are deemed very important by all experts. In particular, the uncertainty about the outputs of life cycle assessments have to be evaluated. Metrology can build upon these approaches by simplifying the language and highlighting the lack of confidence in this type of analysis. European politics understands these environmental and societal aspects as the most important duty of NMIs and their international organizations.

There should be greater participation of NMIs in societal issues debates to provide appropriate responses to current issues such as “food against biofuels”, and “biofuels and rain forest deforestation”.

It was reported, at the end of the meeting that, among all the meetings held on biofuels in the world, this one had one of the most excellent scientific levels. It was also organized at the right time to bring together all the parties to gain a clear view of the relevant issues and to activate harmonization across borders.

Based on the presentations during the workshop, the organizers have asked the authors to prepare a manuscript that fits the scope and purpose of the journal “ACQUAL”. Selected papers from this workshop will be published in a special issue of this journal.

