

Improved metrological methodology to address the challenges associated with calorific value analysis of biofuel materials by bomb calorimetry (EMPIR Project BIOFMET)

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Biofuels are considered one of the main promising sources of clean energy. Therefore, the EU aims to increase the share of biofuels into 27% in the energy sector by 2030. To reach this goal, the challenges that are associated with the biofuels would need to be resolved. The EMPIR project BIOFMET focus on the challenges related to the quality management and aims to provide a more reliable, fast, reproducible, traceable and accurate approach for the determination of biofuels/biomass characteristics, i.e., the calorific value, moisture, impurities and ash content. Within the project, (new) metrological methods are explored, and advanced traceable measurement standards are developed which are secured by detailed uncertainty budgets. Moreover, the project focus on the optimization and development of the sampling methods and measurement methods over the production facilities and their metrological traceability. These methodologies will be tested and verified by end-users (industrial partners).

To advance the underpinning metrological framework, the current research phase involves among others an interlaboratory comparison performed by three research partners from different National Metrology Institutes (from Germany, Romania, and Turkey) in the field of bomb calorimetry. It aims on 1) the analysis of the reproducibility of the calorific value measurements of solid biomass and 2) the optimization of existing calorific value measurement strategies as well as data evaluation procedures with regard to biofuels. This practice is considered as a reduced form of a key comparison and allows possible systematic errors to be detected. It minimizes the risks of changing the material parameters by improper handling without detection. Here, we present first results which were obtained from experiments performed with three different kinds of biomasses, i.e., high- and low-quality wood chips as well as wood pellets.