

GAS QUALITY CONTROL: AN INTERLABORATORY STUDY TO ASSESS THE PERFORMANCE OF FIVE LABORATORIES FOR SAMPLING AND ANALYSIS OF BIOMETHANE SAMPLES

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The development of renewable energy is a major challenge all over the world, in response to various environmental, geopolitical and economic issues. Biomethane (methane produced after treatment of biogas) to be injected into the grid is one answer. The French Energy Agency (ADEME) scenario developed a roadmap for biomethane that suggests the production of 30 TWh by 2030 (about 1400 biomethane injection plants).

By the end of 2015 in France, 14 biomethane plants have GRDF (French Distribution System Operator) authorization to inject into the grid. According to French specifications, 8 parameters need to be controlled before the injection into the gas grid: ammonia (NH₃), total sulfurs and mercaptans, mercury (Hg), chloride (Cl), fluoride (F), carbon monoxide (CO) and hydrogen (H₂).

As there is no international reference method for biomethane, CRIGEN is one of the only French laboratories to have developed specific methods for quantification of biomethane samples. They have been validated in laboratories and on field. For many laboratories (specialized on biogas or air quality monitoring), sampling and analysis of biomethane is a new challenge because of the level of concentrations, difference of matrices with their own developments (biogas or air quality).

In 2015, an interlaboratory study was carried out by CRIGEN for French DSO in order to identify laboratories able to sample and quantify trace compounds in biomethane with reliable results. This study aimed at assessing laboratories and methods to quantify these parameters in biomethane samples. That is why, gas reference sample in cylinders was employed for this proficiency testing. Each laboratory had one gas sample containing the same gas blend but with blinded contents. Then Z-scores were estimated according to ISO 13528 through the maximum permissible error as the standard deviation of the proficiency assessment.

The study shows that the original scope was too ambitious to be performed in one step: on one hand evaluate sampling skills of the laboratories, on the other hand evaluate analysis skills for quantification. Indeed French laboratories do not manage biomethane sampling (materials of the samplers, gas volumes to be sampled, sampling and analysis of gas under pressure, etc.), whereas this step impacts highly the quantification of the target compounds.

As a conclusion, this study allowed to define the current situation of laboratories skills mainly for gas sampling. Different improvements need to be managed by laboratories to master the sampling step. Then a second step should be done to evaluate only the analytical methods for biomethane samples.

These interlaboratory studies are an interesting way to define the best practices, both for biomethane sampling and biomethane analysis. It can be helpful for any standardization process for the quantification of parameters in biomethane.