

PROFICIENCY TESTING IN ANHYDROUS ETHANOL FUEL

1st ROUND

ORGANIZATION



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ABSTRACT

The global demand for renewable fuels has been increasing, and Brazil has the potential to be a major exporter contributing to reducing emissions containing sulfur and other gases responsible for the global warming, since the country has one of the largest industrial parks in the world for ethanol production from sugar cane origins. In order to do so, it is required that the ethanol meet the stringent quality requirements of these markets. Inmetro, which plays a key role in research on biofuels, has made a Proficiency Testing (PT) with the following quality parameters for anhydrous ethanol fuel: water content, electrolytic conductivity, pH, specific gravity and alcohol content. Studies were conducted for characterization, homogeneity and stability of short and long duration of the batch of anhydrous ethanol fuel for this PT according to ISO Guide 35. The following reference values (assigned by Inmetro) were considered in this EP, each one with its expanded uncertainty to $k=2$ for a confidence level of approximately 95%, according to the ISO GUM: water content (0.543 ± 0.039) % m / m at 20 °C, electrolytic conductivity (1.344 ± 0.688) mS cm⁻¹ at 25 °C, pH (6.682 ± 0.19) at 25 °C, density (0.79085 ± 0.00017) g / cm³ to 20 °C and alcohol (99.56 ± 0.08)% m / m at 20 °C. To evaluate the performance of the laboratories, z scores were used as a measure of distance of each laboratory in relation to the reference value from Inmetro. Twenty-three laboratories have participated in the measurement of anhydrous ethanol fuel in the PT scheme. However, not all laboratories have signed up to measure the five parameters proposed in this round. In general, the analysis performed by the laboratories for all parameters are shown in the boxplots. The mean values reported by each laboratory are dispersed in relation to the reference value (Inmetro). In determining the water content parameter, four laboratories showed satisfactory results and two laboratories had questionable results. For the determination of electrolytic conductivity, from the twenty-two participating laboratories, all of them showed satisfactory performance. In determining the parameters pH, among the nineteen participating laboratories, three laboratories had questionable performance, whereas the others showed satisfactory performance. To determine the density, among the sixteen participating laboratories, only one laboratory reported unsatisfactory performance. In determining the alcohol content, among the sixteen participating laboratories, two laboratories had questionable performance and only one laboratory performance was unsatisfactory.