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Využití školního chromatografu GC-mini pro stanovení methanolu vedle ethanolu ve školní praxi

Abstrakt - anglický jazyk

The main topic of this work is to investigate the possibilities of using the school gas chromatograph GC-mini in teaching at secondary schools within the topic of chromatographic analysis. Despite the expansion of the method, the teaching of gas chromatography remains rather rare. Specifically, the work focuses on the optimization and determination of methanol alongside ethanol, which is a practically relevant topic for understanding the analysis of alcoholic beverages and methanol-containing samples, and a potentially motivating topic for teaching. The thesis covers the design of experiments, methodologies, and practical aspects of using the GC-mini chromatograph. Additionally, it includes a survey of school educational programs to determine the occurrence of chromatography and gas chromatography in secondary school curricula. As part of this work, laboratory experiments aimed at determining the content of methanol and ethanol in various samples were conducted. The results of these experiments provide information on the efficiency and reliability of the GC-mini school chromatograph for the quantitative and qualitative analysis of these substances. An important component is the creation of teaching materials and procedures for students. In conclusion, the achieved results are summarized, the benefits of using the GC-mini chromatograph in teaching are emphasized, and possibilities for the future development of this method are indicated. The results show that while the qualitative analysis of a mixture of ethanol and methanol vapors can be effectively and reproducibly performed as a school assignment using the GC-mini chromatograph, quantitative analysis cannot be performed reproducibly with this type of chromatograph. Additionally, real alcoholic beverages cannot be used as analyzed samples for the analysis of methanol and ethanol from vapors due to the water content. This work provides a new perspective on the practical teaching of analytical chemistry in secondary schools and offers guidance for incorporating gas chromatography into the teaching process.