

Abstract

The aim of the presented Diploma Thesis was to develop a new method for the indirect determination of formaldehyde in wood-based products using gas-diffusion microextraction coupled with electrochemical detection on unmodified screen-printed electrodes (MLEM-SPCE). Formaldehyde released from the sample is derivatized using an acetylacetone reagent present in an acceptor solution. The product of derivatization of formaldehyde with acetylacetone is 3,5-diacetyl-1,4-dihydrolutidine (DDL) which forms a selective oxidation voltammetric peak at a potential of 0.4 V. Detection and quantification limits of 0.57 mg kg^{-1} and 1.89 mg kg^{-1} , respectively, were obtained, together with intra- and inter-day precision below 10% (as relative standard deviation, *RSD*). The developed methodology was applied to determine formaldehyde content in seven samples. Similar results were obtained from the European standard method EN 717-3 with a significant reduction of total analysis time.

The developed method MLEM-SPCE, which combines the use of a new sample preparation procedure for volatile compounds with the firstly introduced determination of formaldehyde (as the derivative product DDL) on unmodified SPCEs, proves to be a promising alternative for the determination of formaldehyde in wood-based products and other samples.