

Mesure des aldéhydes tels que le formaldéhyde dans l'air ambiant avec l'analyseur airmoHCHO / Measurement of Formaldehyde and other Aldehydes in ambient air using the airmoHCHO analyzer

Jean-Philippe AMIET^{1*}, Damien Bazin²,

¹ Directeur Commercial – Chromatotec, Saint-Antoine, France

² Recherche et Développement, Chromatotec, Saint-Antoine, France

*Auteur correspondant: 33 (0)5.57.94.95.09, jean-philippe.amiet@chromatotec.com

Key-words

Aldehydes, Formaldehyde, Acetaldehyde, Methanol, Gas Chromatography, Flame Ionization Detection, FID, Volatile Organic Compounds, VOC, Ozone precursor

Objectives

Aldehydes such as formaldehyde (HCHO) and acetaldehyde (CH₃CHO) are VOCs that occur naturally in the environment as part of the metabolic processes of living organisms. They are also present in indoor air due to human activity. Aldehydes can cause adverse human health effects, mainly by inhalation and direct contact with skin. Formaldehyde is also listed as a Directive 2002/3/CE and PAMS (US) VOC ozone precursor substance.

Taking into account the harmful effects of these products, it seems interesting to measure and monitor the aldehydes content observed in ambient air. Chromatotec®'s airmoHCHO analyzer is dedicated to on-line and continuous monitoring of formaldehyde and acetaldehyde at low concentrations (0 to 100 ppb) with excellent linearity and without interferences. Its new configuration also allows methanol analysis.

The airmoHCHO auto-GC-FID uses a sampling trap to pre-concentrate VOCs, which allows it to reach detection limits as low as 3.8 ppb. In the methanizer, protected by a carrier gas back-flush from heavy components in the matrix, formaldehyde, methanol and acetaldehyde react with a catalyst and are transformed into methane for more FID sensitivity.

Innovative and original nature of the proposed topic

The use of an auto-GC-FID is crucial to save time and improve reproducibility for online formaldehyde monitoring. Unlike the HPLC reference method ISO 16000-3: 2011, which requires up to 24h sampling of air for formaldehyde, the airmoHCHO total cycle time is only 30 min. In addition, this automatic solution does not require sample preparation, so there is no risk of losing analysis during cartridge change-out intervals.

While optical methods only detect formaldehyde, auto-GC-FID analyzes two additional compounds (acetaldehyde and methanol) simultaneously and without interference. Moreover, data is represented in a results table or as chromatograms thanks to our integrated software, Vistachrom. This allows for the numerical results to be reviewed.

Last but not least, results are automatically validated by an internal HCHO permeation tube included with the analyzer. The system works with integrated H₂ and Zero Air generators which allows for its use without gas cylinders. The equipment can be deployed on site, as it is a transportable and autonomous unit.