



HPLC Analysis of Formaldehyde in Indoor Air

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Environmental

Abstract

It was recently discovered that some volatile organic compounds cause the sick building syndrome. Formaldehyde is such a typical compound. It was analyzed by HPLC using 2,4-dinitrophenylhydrazine (DNPH) as the derivatization reagent. The silica gel cartridge, which was impregnated with DNPH (DNPH cartridge) is commonly used for sampling and concentrating aldehydes in air.

In this Application Brief we describe HPLC analysis of formaldehyde in houses using the DNPH cartridge.

Analyzed compounds

Formaldehyde and acetaldehyde of indoor air were analyzed as DNPH derivatives.

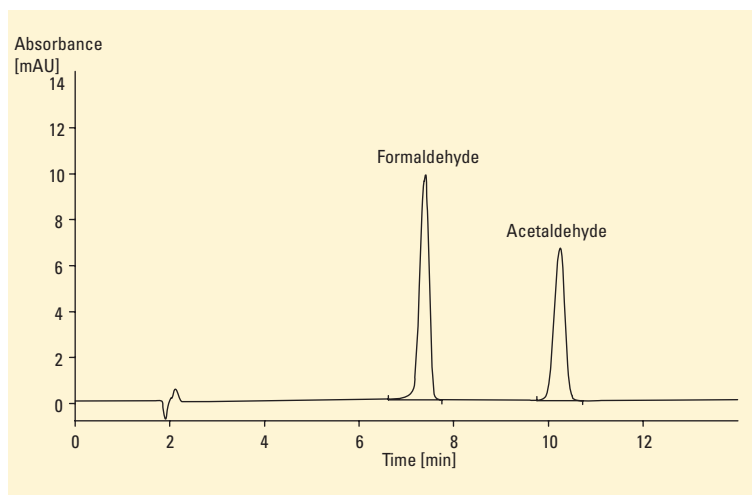


Figure 1
Chromatogram of formaldehyde and acetaldehyde
(standard)

Conditions

Column:

250 x 4.6 mm
ZORBAX Eclipse XDB-C18
(Agilent part number 990967-902)

Mobile phase:

CH₃CN/H₂O = 45/55

Column compartment:

40 °C

Injection vol:

25 µl

Detector:

diode-array detector
wavelength 365/16 nm
reference: off



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Sample preparation

Indoor air of newly built houses was taken as sample. Sampling was performed by sucking air through DNPH cartridges with the pump. An ozone scrubber was inserted before the DNPH cartridge. The actual sampling volume was 5 - 20 l.

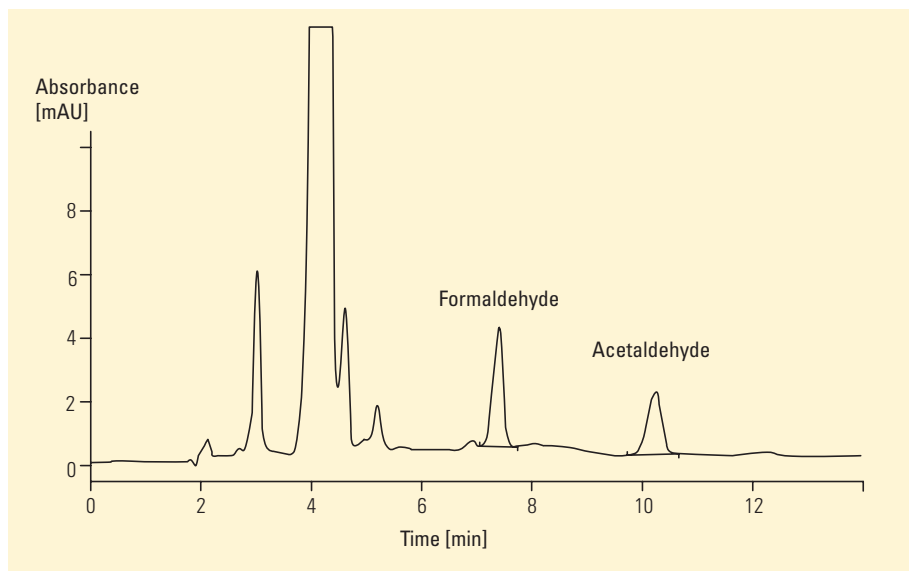


Figure 2
Chromatogram of formaldehyde and acetaldehyde (DNPH derivative) of indoor air of newly-built house A.

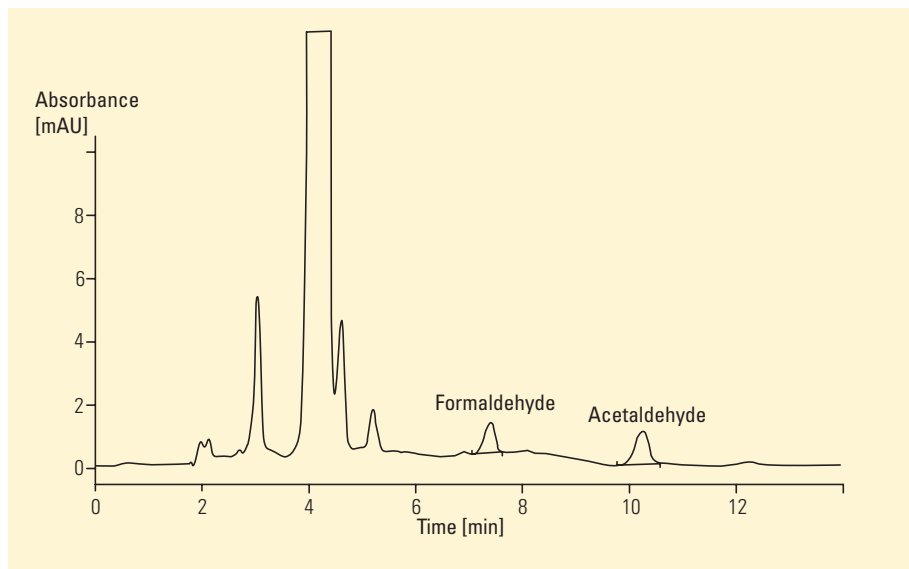


Figure 3
Chromatogram of formaldehyde and acetaldehyde (DNPH derivative) of indoor air of newly-built house B.

Equipment

Agilent 1100 Series

- vacuum degasser
- quaternary pump
- autosampler
- thermostatted column compartment
- diode array detector, Agilent ChemStation + software

HPLC method performance

Limit of detection:
formaldehyde 0.25 $\mu\text{g}/\text{m}^3$,
acetaldehyde 0.35 $\mu\text{g}/\text{m}^3$
(calculated from 3 s of blank values)

Repeatability:
of RT over 6 runs
<0.1 %
of areas over 6 runs
<0.5 %

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