

FORMALDEHYDE



Formaldehyde is used for the disinfection of industrially manufactured products. However, it is detrimental to health and its potential carcinogenicity led to the current utilization of formaldehyde donors for microbiological long-term stabilization, which are in hydrolytic equilibrium with formaldehyde. Thereby, the concentration of free formaldehyde is kept as low as possible.

The quantitative determination of free formaldehyde seems quite problematic. Firstly, the detection characteristics of formaldehyde are very unfavorable. Consequently, derivatization is necessary in order to achieve the required sensitivity. Secondly, the hydrolytic equilibrium between donor and free formaldehyde can change quite quickly, which makes the preparation of samples more difficult and/or influences the correctness of analytical results.

An elegant solution for this problem is, therefore, to perform the derivatization step after separation on an HPLC column, because the equilibrium cannot be influenced when donor and free formaldehyde are

chromatographically separated before derivatization. PICKERING offers the complete post-column derivatization system PINNACLE PCX for the detection of traces of formaldehyde. The user, however, has to supply columns, eluents, reagents, etc..

Description of the Method

The derivatization of formaldehyde is performed in a one-step reaction using acetyl acetone (2,4-pentanedione). In the presence of an ammonium salt, it reacts to a yellow, strongly fluorescing 3,5-diacetyl-1,4-dihydropyridine derivative. The detection is performed with either a UV/VIS or fluorescence detector.



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APPLICATION NOTE

HPLC Conditions and Derivatization Parameters

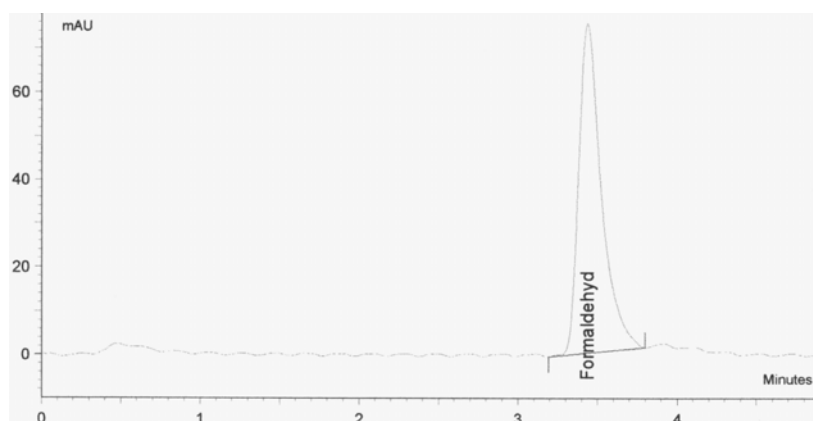
HPLC	
Operating Mode	Isocratic
Eluent	Acetonitril:Water (85:15)
Degassing	Helium- or vacuum degassed
HPLC Column	RP C18
Column Oven	40 °C
Flow Rate	0.5 mL/min
Post-column Derivatization	
Pinnacle PCX	Single-pump
Reactor volume	500 µL
Reactor temperature	100 °C
Reagents	0.81 M Ammonimn acetate / 0.12 M Galicial acetic acid (pH=5)/ 0.05 M 2,4-Pentanedione with water
Reagent Flow	0,4 mL/min
Detection	
Detection Mode	Fluorescence detection
Excitation Wavelength	412 nm
Emission Wavelength	510 nm
Flowcell	Analytic; pressure stable up to 7 bar

APPLICATION NOTE

Chromatogram

Chromatogram of a shampoo sample

Sample spiked with 0,05% formaldehyde. Determination according to K 84.00-7(EG)



Literature

- 1) J. Meister, H. Engelhardt, *LaborPraxis* **1995**, 7, 28 – 31.
- 2) Amtliche Sammlung §64 LFGB, K 84.00-7(EG), September **1991**.

Order Information

Order Number	Description
1153-1022	PINNACLE PCX – single-pump; 500 µL reactor