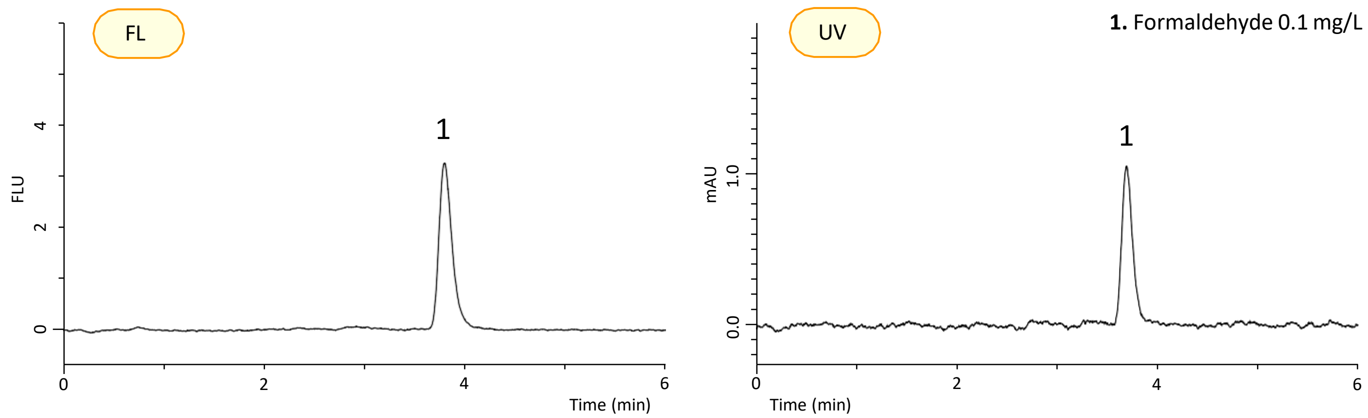
Analysis of Formaldehyde in Drinking Water by HPLC and Post-column Derivatization

Formaldehyde is widely known as a toxic chemical, and the guideline value of 0.9 mg/L for its content in drinking water has been established by WHO. This note describes a determination method for formaldehyde in beer using HPLC equipped with a post-column derivatization system.

Formaldehyde in injected solution is separated from other compounds in the ODS column, reacted with acetylacetone solution, and converted to fluorescent 3,5-diacetyl-1,4-dihydrolutidine.

Concentration of one-tenth of the guideline value of formaldehyde was determined with a UV/VIS detector in the HPLC system. Furthermore, florescence (FL) detector provided even higher sensitivity.

Chromatograms obtained from standard solution



Conditions

Column : Inertsil ODS-3
(5 µm, 250 x 4.6 mm I.D.)
Cat.No. 5020-01732

Eluent : 6 mM Na_2HPO_4 (pH 2.1, H_3PO_4)

Flow rate : 1.0 mL/min

Col. Temp. : 20 ℃

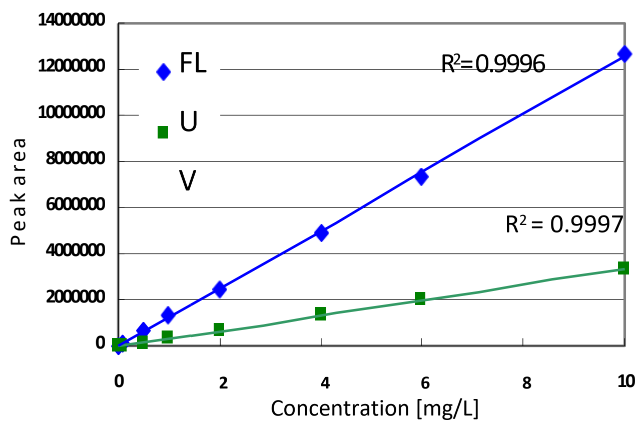
Reaction reaget : Acetylacetone solution*

Flow rate of reaction reagent : 0.5 mL/min

Detection : VIS 413nm
FL Ex. 445 nm, Em. 505 nm

Injection vol. : 10 µL

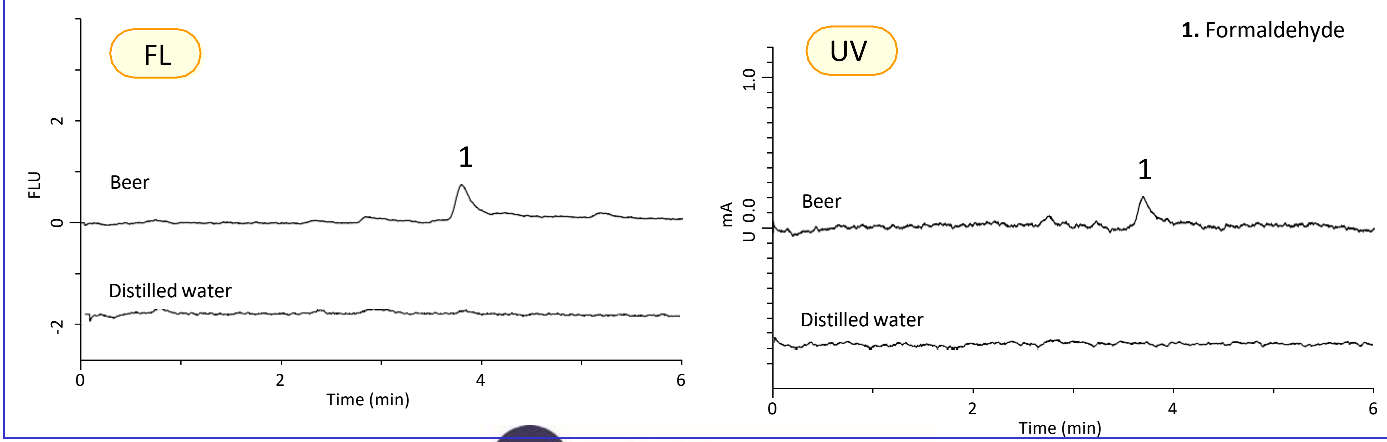
* Acetylacetone solution :
To 150 g of ammonium acetate, 3 mL of acetic acid and 2 mL of acetylacetone was added. The solution was made up to 1 L with water.



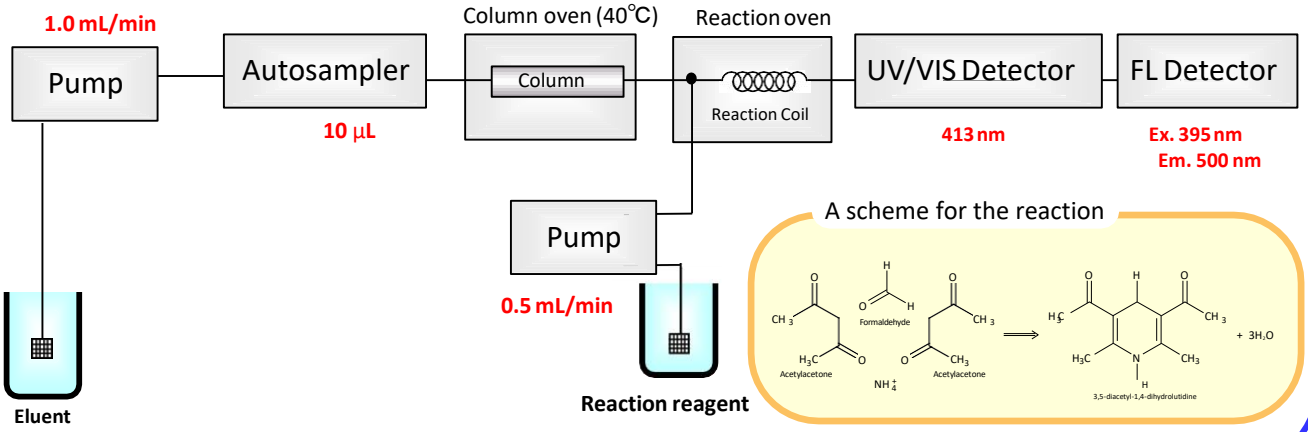
Calibration curves for formaldehyde

An analysis of canned beer

Commercially available canned beer was filtrated with 0.45 µm membrane filter and injected into the HPLC system.



A Diagram for the HPLC System



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