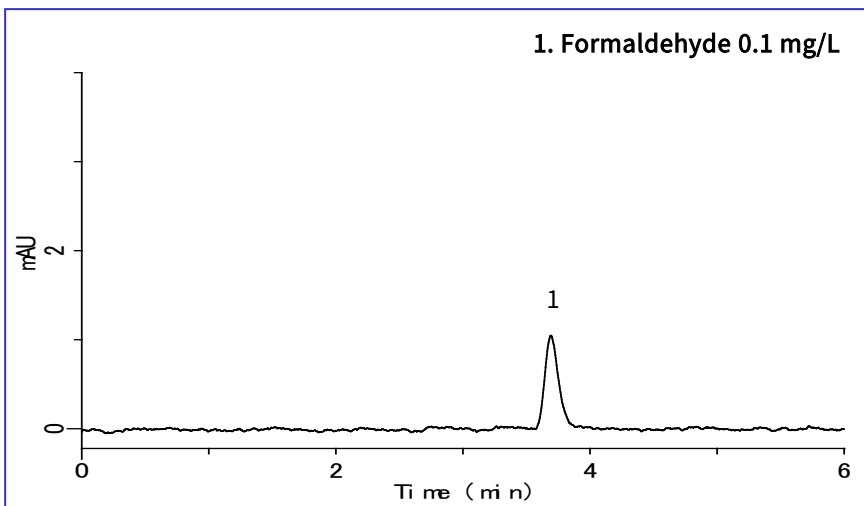


Analysis of Formaldehyde in Cosmetics by Post-column HPLC

Ingredients prohibited for use in cosmetics are listed in the Cosmetics Standards (Ministry of Health and Welfare Notification No. 331, September 2000). Formaldehyde is one ingredient regulated by the standard. Analysis was performed according to the cosmetic test HPLC method. Formaldehyde in a test solution was separated using an ODS-3 column, then derivatized by reaction with acetylacetone solution to yield 3,5-diacetyl-1,4-dihydropyridine, which was then measured using a UV-visible detector.

This post-column method allows selective analysis with little or no influence from contaminants.

Example: Measurement of standard



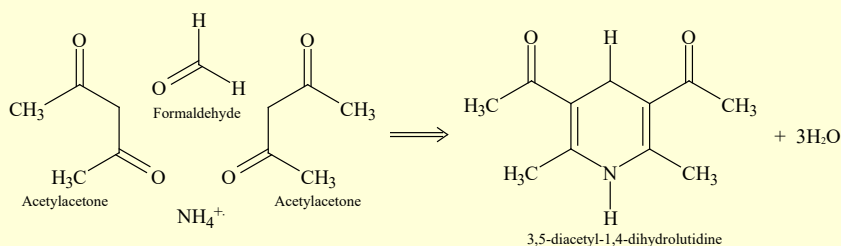
HPLC conditions

Column	: Inertsil ODS-3 (5 μ m, 250 x 4.6 mm I.D.)
Eluent	: 6 mM Na of H_2PO_4 (pH 2.1)
Flow rate	: 1.0 mL/min
Column temperature	: 20 $^{\circ}\text{C}$
Reaction solution	: Acetylacetone solution
Flow rate of the reagent	: 0.5 mL/min
Detected	: VIS 413 nm
Injection volume	: 10 μL

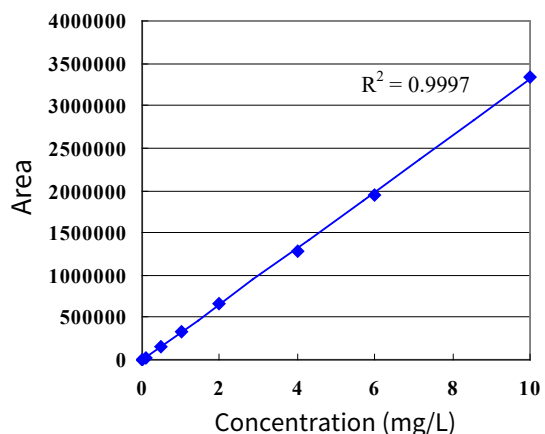
* Acetylacetone solution:
To 150 g of ammonium acetate, 3 mL of acetic acid and 2 mL of acetylacetone, add ultrapure water to make up to 1L

Postcolumn reaction

One molecule of formaldehyde reacts with two molecules of acetylacetone and one molecule of ammonia, resulting in the formation of 3,5-diacetyl-1,4-dihydropyridine.

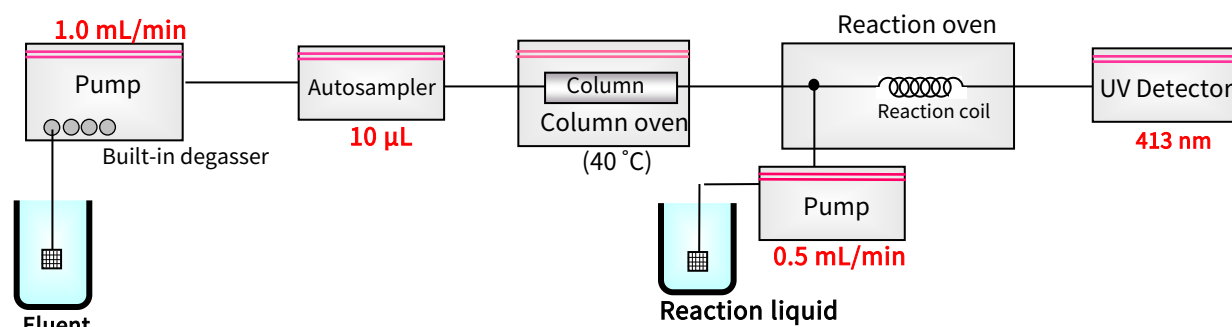


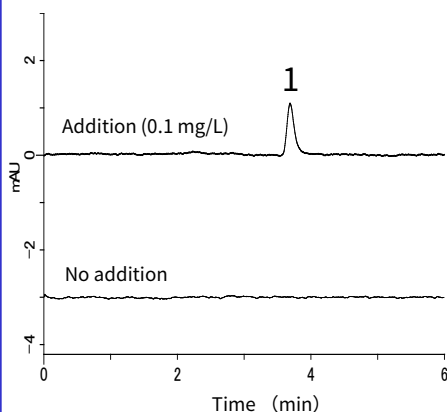
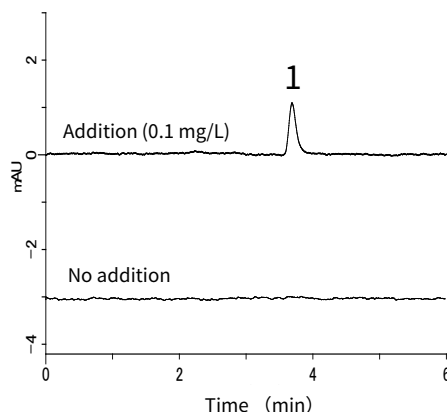
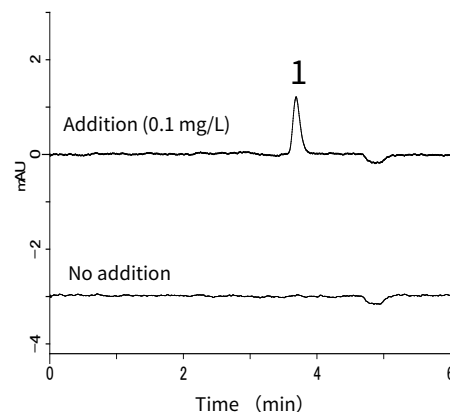
Structures are created using Chemistry 4-D Draw which is provided by ChemInnovation Software, Inc.



Calibration curve for formaldehyde

Flow diagram



Example: Measurement of cosmetics**1. Formaldehyde****Lotion****Moisturizing agent****Shampoo**

* Due to the high viscosity of moisturizers and shampoos, 2 g of sample was diluted with ultrapure water to 100 mL and used for sample measurement.

GL Sciences disclaims any and all responsibility for any injury or damage which may be caused by this data directly or indirectly. We reserve the right to amend this information or data at any time and without any prior announcement.

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