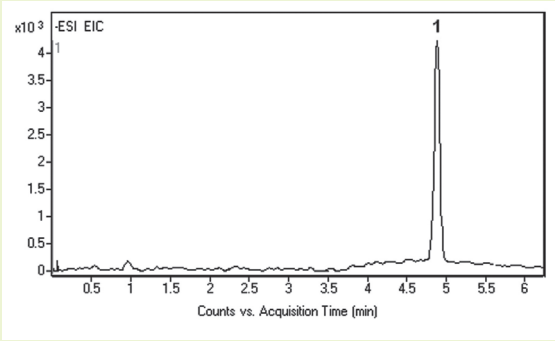
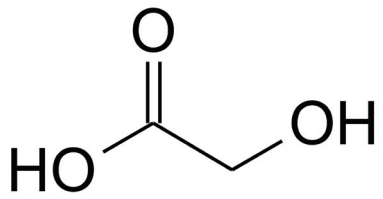
Glycolic Acid (Hydroxyacetic Acid)

Analysis in urine samples





Glycolic acid

Note: Glycolic acid is widely used in adhesives, metal cleaning, dairy cleaning, water-well cleaning, electroplating, dyeing, detergents and cosmetic products. It is also the most commonly used hydrophilic teeth whitening agent.

Method Conditions

Column: **Cogent Diamond Hydride™**, 4µm, 100Å

Catalog No.: 70000-15P-2

Dimensions: 2.1 x 150 mm

Solvents: A: DI H_2O / 10 mM ammonium formate
B: 95% acetonitrile / 5% DI H_2O / 10 mM ammonium formate (v/v)

Gradient:

time (min.)	%B
0	95
1	95
5	30
7	30
8	95

Post Time: 3 min

Flow rate: 0.4 mL/min

Detection: ESI – NEG - Agilent 6210 MSD TOF mass spectrometer

Sample: Urine sample was spiked with stock solution of glycolic acid. The solution was filtered through a disposable 0.45µm filter (MicroSolv Tech Corp.). The sample for injection was diluted 1:100 with 50:50 solvent A:B mixture for a final concentration of 0.1 mg/mL.

Peak: 1. Glycolic acid 75.0088 $[M-H]^-$ m/z in urine sample.

t_0: 0.9 min

Discussion

An enzymatic method is the most widely used for the determinations of glycolic acid in various products, but it suffers from instability and very high cost of the enzyme (glycolate oxidase) which is required.

The LC-MS analysis presented here is rapid, simple, selective, and suitable for routine analyses of urine samples. It offers numerous advantages including ease of sample preparation, low cost, rapidity, and excellent repeatability (precision was better than 1.0% - %RSD below 0.5 for n=3). The calibration curve was linear in the 0.080–0.30 mg/mL (GA). The correlation coefficients of linear regression analysis were with the range 0.9974–0.9997. Recoveries of the GA from urine samples were between 94.9 and 100.5%.

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