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Hippuric Acid, o-,m-,p-Methylhippuric Acid, Mandelic Acid and Phenylglyoxylic Acid in Urine HPLC Analysis Kit

Exposure limits of volatile, organic/petroleum-based solvents, widely used in the industrial field, have been determined to control their use due to their toxic and deformation-causing effects. The excretion of solvents from the body after exposure is mostly through the urine by undergoing biotransformation. The metabolites formed as a product of biotransformation is used as biomarkers to determine the exposure levels of solvents.

Because of their toxicity, the exposure of toluene, xylene, and styrene found in petroleum derivatives, cigarette smoke and insulting materials is delimitated by Occupational Safety and Health Administration (OSHA). The acute toxicologic effects of toluene, xylene, and styrene mostly affect the central nervous system and cause symptoms like weakness, dizziness, memory loss and nausea. However, their chronic toxicological effects can cause permanent brain damage, organ failure, paralysis, coma and even death. Also, styrene is classified as group II which is a potential carcinogen type, by International Agency Research on Cancer (IARC). Hippuric acid is identified as the biomarker of toluene, methyl hippuric acid is identified as the biomarker of xylene, mandelic acid and phenylglioxylic acid are identified as the biomarkers of styrene.

Highlights of the Analysis Kit

- Total run time is 20.0 min.
- Simple sample preparation without SPE or evaporation.
- Isocratic HPLC system with UV detector

Parameters

Hippuric Acid, o-,m-,p- Methylhippuric Acid, Mandelic Acid, Phenylglyoxylic Acid

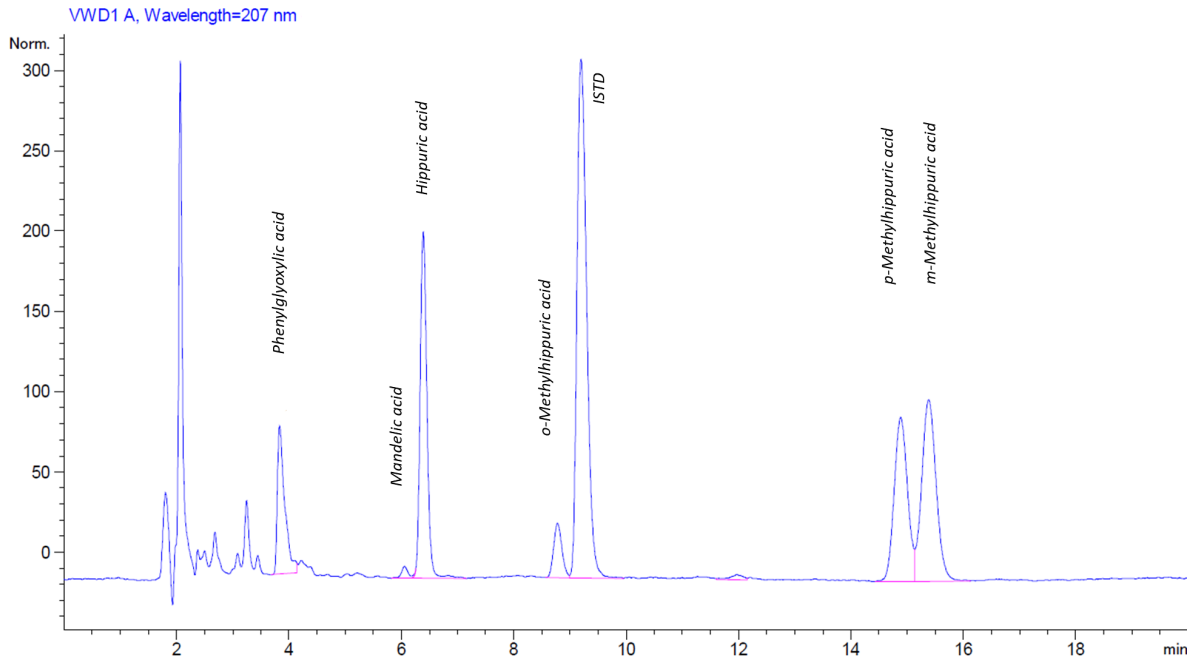
Sample Type

Urine

Sample Preparation

1	Pipet 50 µL of urine sample/calibrator/control into a HPLC vial
2	Add 400 µl of Reagent-1 and vortex 5 sec.
3	30 µl inject to HPLC system

Example Chromatogram



Example chromatogram of hippuric acid, o-,m-,p-methylhippuric acid, mandelic acid and phenylglyoxylic acid in urine.

Method Performance

All results were obtained using Agilent DAD detector and 1200 series HPLC system

Analytes	LOQ (mg/L)	Linearity (mg/L)	Recovery		Repeatability			
					intra-day		inter-day	
			LLQC* (%)	HLQC** (%)	LLQC (%CV)	HLQC (%CV)	LLQC (%CV)	HLQC (%CV)
Phenylglyoxylic acid	7.56	62.5 – 500.0	98	101	1.51	1.31	2.00	1.24
Mandelic acid	6.40	125.0 – 1000.0	97	102	3.60	2.33	3.23	2.89
Hippuric acid	6.71	375.0 – 3000.0	101	97	1.08	2.17	2.32	2.43
o-Methylhippuric acid	5.37	250.0 – 2000.0	104	94	2.94	2.29	3.00	2.52
p-Methylhippuric acid	5.30	250.0 – 2000.0	98	100	1.95	2.26	2.31	2.11
m-Methylhippuric acid	5.30	250.0 – 2000.0	102	102	1.42	2.33	1.63	1.96

* LLQC: Low-level quality control
**HLQC: High-level quality control

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