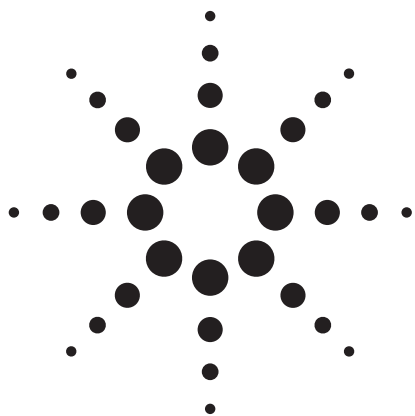




Organic Acids Solution Kit for the Agilent 7100 CE System

Technical Note



Introduction

The Agilent 7100 Capillary Electrophoresis (CE) system is a powerful separation tool for the analysis of anions. This Technical Note demonstrates the typical performance of the Agilent 7100 CE system and the Agilent Organic Acids Analysis kit. This kit was developed to facilitate the analysis of common organic acids and some inorganic anions. Since most of these compounds do not absorb significantly in the UV range, detection is performed indirectly. The organic acid buffer and all other reagents provided in this kit are ready-to-use. A complete organic acid analysis CE method including data on migration time reproducibility is described.



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Experimental

Organic acid analysis was performed using the Agilent 7100 CE system with a 72-cm effective length capillary. An indirect UV detection agent optimized for organic acids was used. The method is based on the Agilent Organic Acids Solution kit (p/n 5063-6510).

- The buffer should be replaced every five runs when using 2 mL glass vials, since the buffer used for indirect UV detection has limited buffering capacity.
- The buffer should be stored at room temperature.
- The Organic Acid Test Mixture stock should be stored at 4 °C. Prior to use, the test mixture should be diluted 1:40 with CE grade water.
- Prior to first use, a new capillary should be conditioned with run buffer for 15 minutes.
- Between analyses, it is recommended that the capillary is flushed with run buffer for 4 minutes.

Organic Acids Solutions kit (Part No.: 5063-6510)

Organic Acid Test Mixture (Includes 1000 ppm each of malate, succinate, and lactate)	20 mL	8500-6900
Organic acid buffer	250 mL	8500-6785
Ultra pure CE water	500 mL	5062-8578
1.0 N sodium hydroxide	250 mL	5062-8576
Bare fused-silica capillary (75 mm id, l _{eff} =72 cm, L=80.5 cm)	2/pk	G1600-62311
Product literature	1	5968-9047E

Parts required (not included in the kit)

CE buffer vials (2 mL, glass)	100/pk	5181-3375
CE Sample vials (100 mL, polypropylene)	1000/pk	9301-0978
CE vials caps (polypropylene)	100/pk	5181-1512
Alignment interface for 75 mm i.d. capillary (color code: blue)	1	G7100-60310

Instrument set-up

Vial contents	Carousel location
Flush vial (organic acid buffer)	1
Waste vial (300 mL CE water)	2
Inlet home vial (organic acid buffer)	3
Outlet home vial (organic acid buffer)	4

Note: The default anion method is available within Agilent CE-ChemStation software method folder as: "organic.m"

Method Summary

Instrument: Agilent 7100 Capillary Electrophoresis System

Mode: Capillary Zone Electrophoresis (CZE)

Organic acid separation with Agilent Organic Acids Solution Kit (p/n 5063-6510)

DAD settings

Signal A	Wavelength 350 [nm]	Bandwidth 20 [nm]	Reference 205 [nm]	Bandwidth 10 [nm]
Peak width	> 0.10 min (2.0 sec response time) (2.5 Hz)			
Stoptime	10:00 min (as CE)			
Posttime	Off			
Spectrum store	None			
Indirect UV	100 mAU (margin for negative absorbance)			
Autobalance				
Prerun	On			
Postrun	Off			

CE settings

Inlet home	Vial 03	<i>Note: Vial locations are exemplary only.</i>			
Outlet home	Vial 04				
Cassette temperature	20 °C				
High voltage	Enabled				
Voltage	-25 KV (ramp: in 0.2 min to -25 KV)				
Current	100 µA (typical current during run: ~10 µA)				
Power	9 W				
Low current alarm	2 µA				
Stoptime	10:00 min				
Posttime	Off				
Replenishment system	Not used				
Preconditioning					
Flush	240 sec	Inlet: 1	Outlet: 2		
	<i>Note: Times mayt be varied as necessary</i>				
Postconditioning	Not used				
Injection				from	to
Apply pressure	50 mbar	5 sec		Inject vial	Outlet vial
Apply pressure	50 mbar	2 sec		Inlet vial	Outlet vial
Time table	Not used				

Organic acid analysis

The Organic Acid Solution kit is ideal for the analysis of short alkyl chain carboxylic acids. The electropherogram in figure 1 shows a typical separation of the Organic Acid Test mixture, included in the kit, demonstrating the performance of the Agilent 7100 CE system. The mixture of three organic acids was well resolved in 7 minutes.

Migration time and peak area reproducibility is highly dependent on the use of fresh buffer and also capillary conditioning. The Agilent 7100 CE software allows to easily program and reuse conditioning methods to customize and automate any required procedures. Figure 2 provides data on observable differences in CV of migration times for changed run temperatures. Differences in run temperature ($\pm 1^\circ\text{C}$) didn't show a significant effect on migration time reproducibility ($n = 5$). The coefficients of variations of migration time were all less than 0.13 %. The results are comparable to those achieved using the earlier Agilent 1600 CE system.

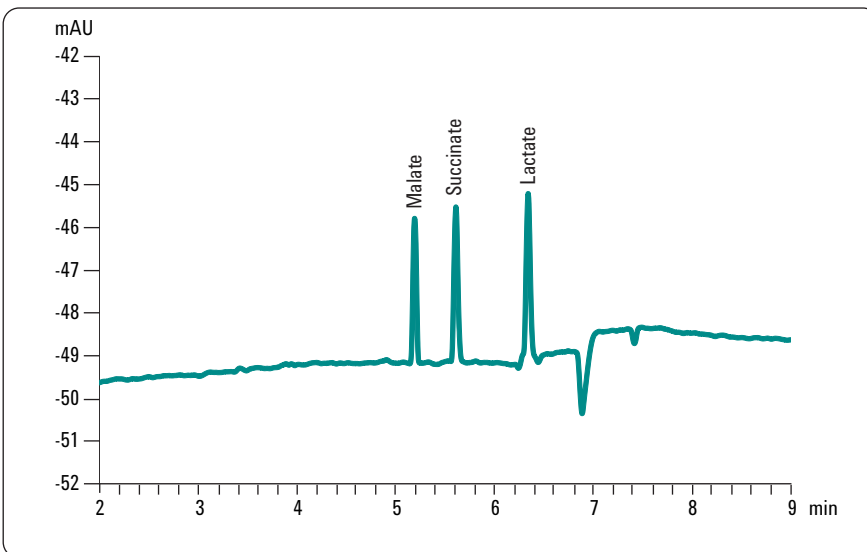


Figure 1
Electropherogram of Organic Acids Test Mixture (1:40 diluted with CE grade water).

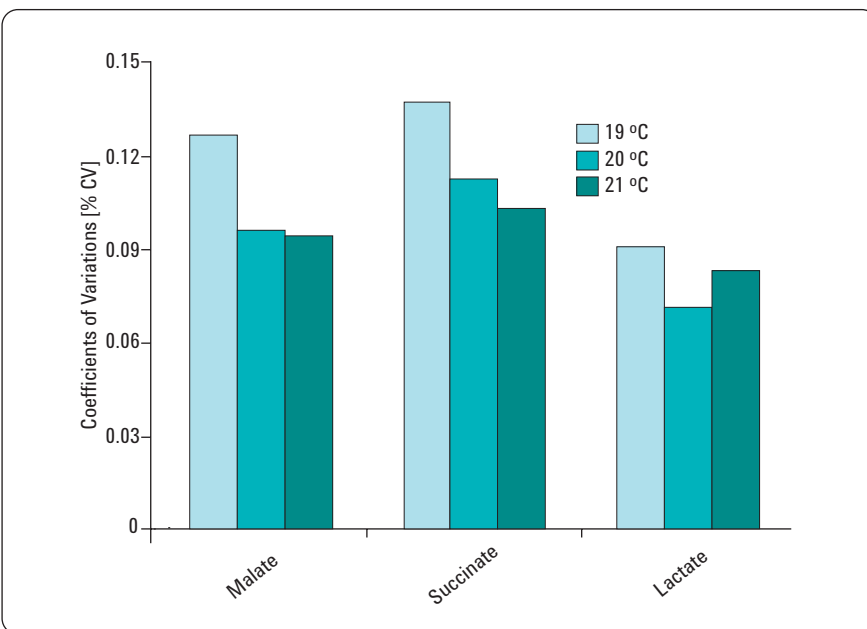


Figure 2
Effect of temperature on migration time reproducibility (n=5).

Raw data are used to plot the data. No internal standard is considered for calculations.

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