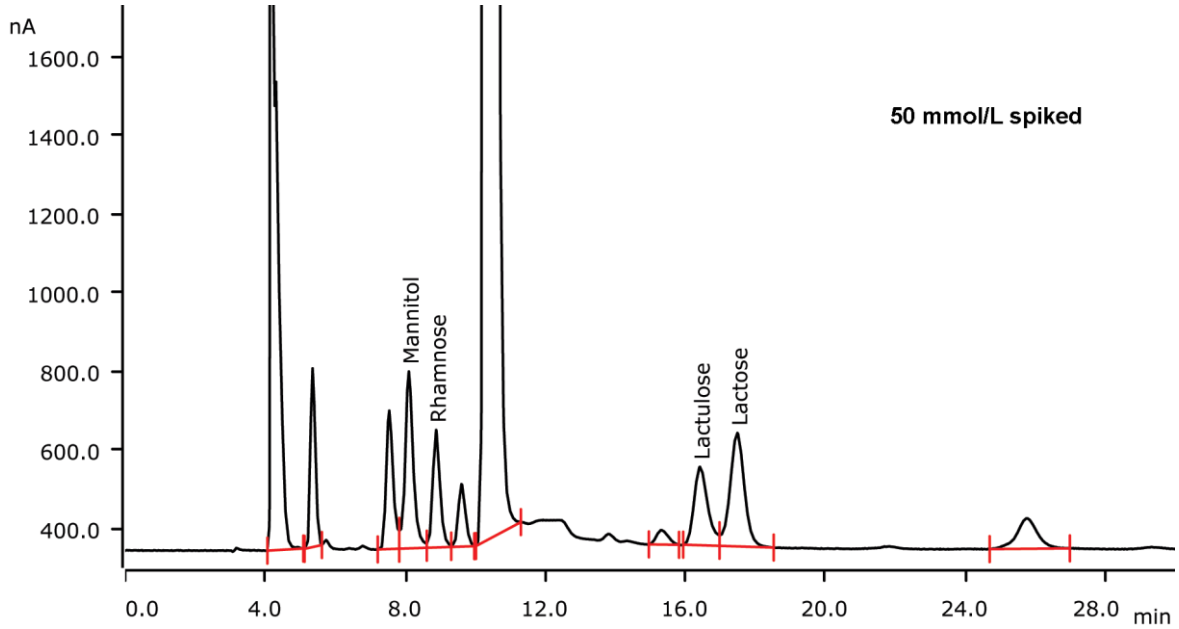
IC Application Note P–63

Mannitol, rhamnose, lactulose, and lactose in blood serum applying pulsed amperometric detection (PAD)



The lactulose/rhamnose (L/R) intestinal permeability test is widely used to determine intestinal permeability dysfunctions. For this test, mannitol, rhamnose, lactose, and lactulose are determined besides the common blood sugars such as glucose, galactose, and sucrose. Results of a spiked blood plasma sample are shown.

Results

Compound	Serum spiked / Recovery					
	[mmol/L]	[%]	[mmol/L]	[%]	[mmol/L]	[%]
Mannitol	10.4	103.6	49.2	98.3	123.4	98.7
Rhamnose	10.5	104.9	48.9	97.7	123.7	99.0
Lactulose	10.1	100.5	48.7	97.3	123.2	98.6
Lactose	9.9	98.6	48.6	97.2	122.9	98.3

Other serum sugar components are not identified

Metrohm

Sample

Purified blood plasma

Sample preparation

Protein precipitation with trichloroacetic acid, ion exchange, and ultrafiltration.

Columns

Metrosep Carb 2 - 250/4.0	6.1090.430
Metrosep Carb 2 Guard/4.0	6.1090.500

Solutions

Eluent	250 mmol/L sodium hydroxide 2.5 mmol/L sodium acetate

Parameters

Flow rate	0.5 mL/min
Injection volume	10 µL
P_{max}	20 MPa
Recording time	30 min
Column temperature	35 °C
Sample temperature	4 °C

PAD Parameters

Cell	Wall-Jet cell
Working electrode	Gold
Reference electrode	Palladium
Spacer	50 µm
Measuring potential	0.05 V
Measuring duration	100 ms
Cycle duration	550 ms
Measuring range	200 µA
Temperature	35 °C
Mode	PAD

Analysis

Pulsed amperometric detection

Instrumentation

930 Compact IC Flex Oven/Deg	2.930.2160
IC Amperometric Detector	2.850.9110
889 IC Sample Center – cool	2.889.0020
IC equipment Wall-Jet cell: Carb (Au, Pd)	6.5337.010