DIONEX

Application Brief 105

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Anions and Organic Acids in Wood Extracts

SUMMARY

The aim of this application was to analyze inorganic anions (sulfite, sulfate, and thiosulfate) and anions of organic acids (formate and acetate) in waste liquor from wood extracts. The sample matrix and the contaminant (ligninsulfonates) were removed from the components of interest using an IonPac® NG1 column as an additional guard column. The periodic regeneration of the IonPac NG1 column after each sample was easily integrated into the analytical setup using an additional 10-port valve. With the configuration shown here, it was possible to have an IonPac NG1 column in line with the analytical column, while a second column was rinsed in counterflow direction with acetonitrile/water, followed by a conditioning step using sodium hydroxide (see appendix).

The anions and organic acids were successfully separated using an IonPac AS11-HC column with a hydroxide gradient.

INSTRUMENTATION

ICS-3000 Ion Chromatography System

DP Dual Pump
EG Eluent Generator Module
DC Detector/Chromatography Module
ED Electrochemical Detector
AS Autosampler
Chromeleon® 6.8 Chromatography Data System

ANALYTICAL CONDITIONS

Column:	IonPac NG1 (4 × 35 mm) IonPac AG11-HC (2 × 50 mm) + AS11-HC (2 × 250 mm)
Eluent Source:	EGC II KOH cartridge
Gradient:	Time (min) Concentration KOH (mMol/L) –7.0 1 9.0 1 17 15 25 20 37 70
Flow:	0.38 mL/min
System Pressure:	2576 psi (17.76 MPa)
Detection:	Suppressed Conductivity
Background Signal:	< 0.8 µS/S
Suppressor:	ASRS® 2 mm (Recycle Mode)
Suppressor Current:	66 mA
Sample Preparation:	Dilution in ultrapure water and then centrifugation (10 min at 14,500 rpm).
Sample 1:	Dilution 1 to 1250 for the acetate, sulfate, sulfite, and thiosulfate; dilution 1 to 100 for the formate.
Sample 2:	Dilution 1 to 1000 for the acetate, formate, sulfite, and sulfate; dilution 1 to 100 for the thiosulfate.
Temperature:	30 °C
Injection Volume:	10 µL
Chemicals Used:	Ultrapure Water (18.2 MΩ-cm)

RESULTS

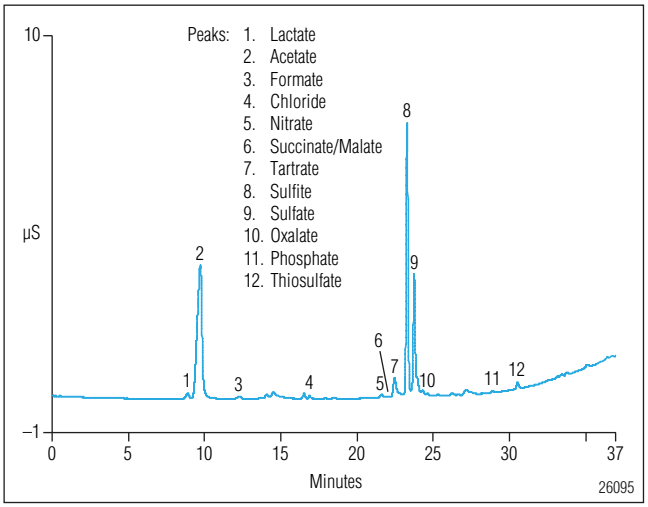

Figure 1. Chromatogram of sample 1 at a dilution of 1 to 1250.

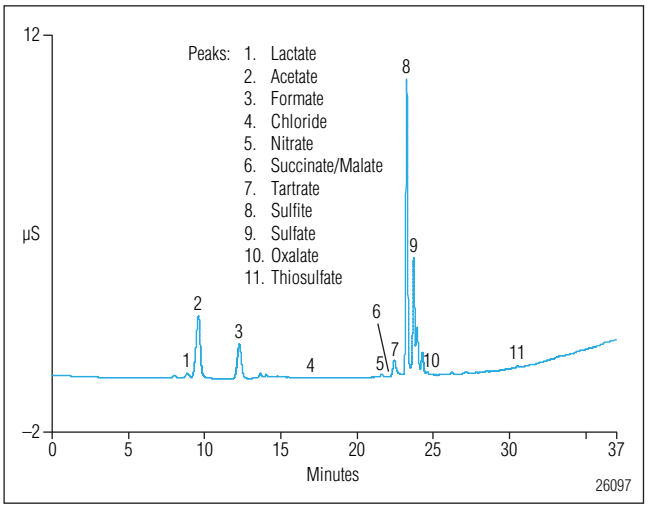

Figure 3. Chromatogram of sample 2 at a dilution of 1 to 1000.

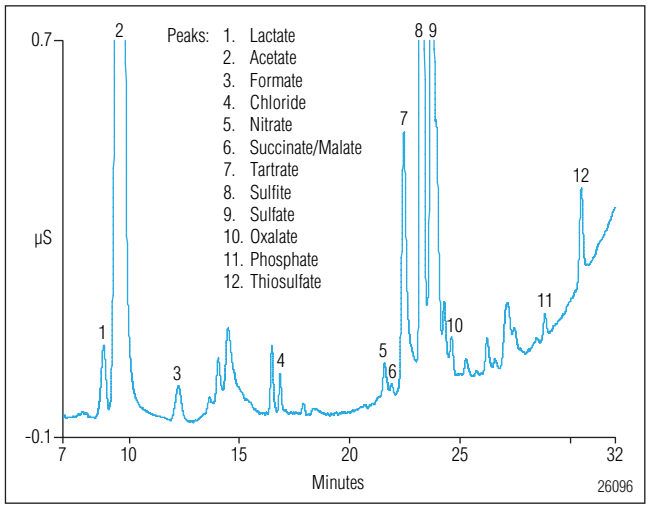

Figure 2. Magnification of the chromatogram of sample 1 at a dilution of 1 to 1250.

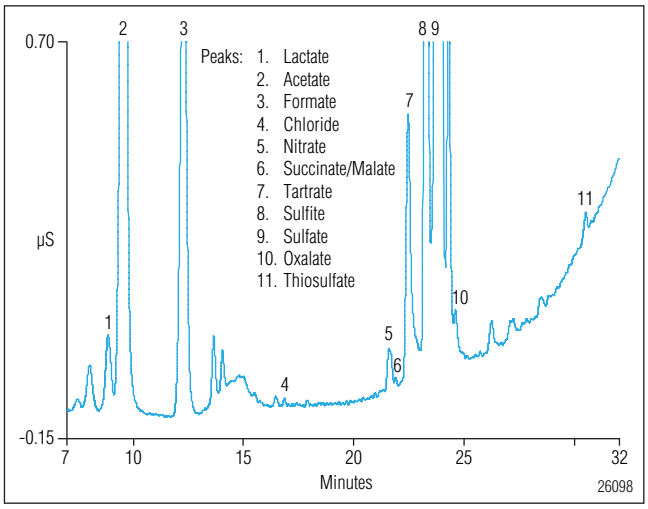

Figure 4. Magnification of the chromatogram of sample 2 at a dilution of 1 to 1250.

APPENDIX

IonPac NG1 Regeneration Conditions

Eluent: (A) 5 mM NaOH
(B) Water/acetonitrile 20/80

Flow: 0.3 mL/min

Chemicals Used: Ultrapure Water (18.2 MΩ-cm), Sodium hydroxide (Fluka 72064, 50-52% solution), Acetonitrile (VWR 100030)

Gradient:

Time (min)	% A	% B
–7.0	100	0
–2.0	0	100
15	0	100
17	100	0
37	100	0

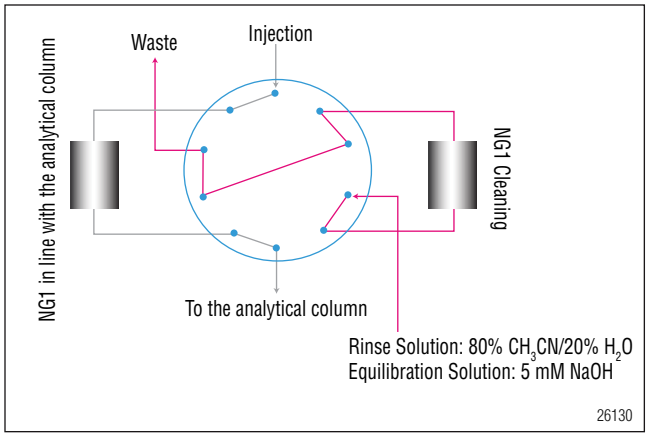

Figure 5. IonPac NG1 regeneration.

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